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BUDGET-SENSITIVE

Office of the Minister for Economic Development

Chair, Cabinet Economic Development Committee

UPDATE ON INDUSTRY TRANSFORMATION PLANS

Proposal

1. This paper provides an update on the development of Industry Transformation Plans to deliver the Government's Industry Strategy, with a recommendation that we engage with our social partners to broaden the scope of our ITP framework. It also seeks agreement to release a draft Industry Transformation Plan for the agritech sector for public consultation.

Executive Summary

2. In February 2019, Cabinet agreed to a refreshed approach to industry policy in New Zealand, with Industry Transformation Plans (ITPs) being the key means by which we implement this. The ITPs are a partnership mechanism to transform our economy to be more resilient and future-focused, and to support different groups through this transition. For this reason, ITPs are a key component of our work programme for the Future of Work Tripartite Forum.

3. The purpose of ITPs is to develop a long-term plan for key sectors to drive the transition towards the Government's vision, as laid out in our Economic Plan, of a productive, sustainable and inclusive economy by 2050. ITPs will be an important tool for contributing to the eight shifts identified in the plan, and will be developed in partnership between government, industry, science and academia, iwi, unions and other interested stakeholders. Te Tiriti o Waitangi underpins our engagement and partnership with Māori, and there are significant opportunities for the Māori economy throughout New Zealand that this work could advance.

4. The ITPs are being shaped by guiding principles, which include taking a partnership-led approach with stakeholders, having an evidence base to guide our focus, using specific sector strategies, being consistent with our international obligations and leveraging international connections, and providing clear signals from Government on proposed actions. I propose that we complement our guiding principles with an additional principle of ensuring that our activity on ITPs is supporting better jobs, involving decent and sustainable work, and good wages and conditions.

5. Our work around the Construction Sector Accord is the most advanced ITP. My colleague, the Minister for Building and Construction, is bringing a Construction Sector Transformation Plan for approval to this Committee today. This ITP sets out how government and industry will deliver on the joint commitments in the Accord to transform the construction sector. It moves government and industry into the delivery phase of a comprehensive set of concrete actions over the next three years.

6. We have also now developed a draft agritech ITP, which has been led by Agritech New Zealand in partnership with the Ministry of Business, Innovation and Employment (MBIE). This is attached as annex three and I am seeking agreement to release this for wider consultation. The ITP outlines a long term vision for the agritech sector, describes the state

of New Zealand's agritech sector, challenges and opportunities, and sets out themes for an action plan with three actions detailed for implementation.

7. Work on the Digital Technologies, Forestry and Wood Processing, and Food and Beverage ITPs is progressing in partnership with key industry stakeholders. These draft ITPs will be ready for consultation next year.

8. The Digital Technologies ITP is being led by NZTech in partnership with MBIE. Thus far, we have developed an agreed scope for the ITP, and identified four key themes: people; government; infrastructure; and considering how the sector and government can develop a strategic foresight function. Immediate next steps include the development of an agreed evidence base to inform the ITP, and further engagement with the sector before the end of 2019 to begin developing a long term vision for the sector.

9. The key partners in the Forestry and Wood Processing ITP are the Forestry Ministerial Advisory Group (FMAG), and the Wood Processors and Manufacturers Association, led in partnership with Te Uru Rākau, with support from MBIE. The ITP will focus on giving effect to FMAG's proposals to advance the transition of the sector to a circular bio-economy by 2050, expanding the range of products produced by the sector to include chemicals, biofuels and bio-plastics. The ITP will be informed by research about to be commissioned to identify internationally competitive opportunities for investment in bio-based products in wood fibre production and processing, and facilitate New Zealand transitioning to a bio-economy.

10. The Food and Beverage ITP is being led by the Ministry for Primary Industries and MBIE. The Primary Sector Council will be releasing its sector-wide vision for the Food and Fibre sector by the end of 2019. A range of actions will be necessary to realise this vision, from on-farm practices and systems, to increasing further value-added production in processed and manufactured foods. I anticipate that the ITP framework will be highly relevant for managing the co-design and implantation of these actions over time.

11. Our early work on the ITPs is highlighting some important insights. For example, there is an opportunity for industry policy to include sectors facing significant disruption and we plan to continue engagement with our social partners to develop an 'ITP handbook', that will outline the purpose and objectives of ITPs, and information on how they can be developed by different parties.

12. I seek to confirm governance arrangements for the ITPs to support the collective work across government and maximise the likelihood for the ITPs to reach their full potential. I propose the lead Ministers for the ITPs are myself, the Minister of Finance, the Minister of Research, Science and Innovation and the Minister for Workplace Relations and Safety.

13. I also note an initiative under development to secure funding for ITPs through Budget 2020. The only ITP with current funding is the Construction Sector Accord, and that funding will run out from December 2019. Officials are exploring funding avenues for the construction ITP so government and industry can maintain momentum and deliver on the first set of commitments.

Background

14. On 13 October 2019 the Minister of Finance and I launched the coalition government's Economic Plan to transition the economy to be more productive, sustainable and inclusive and to tackle New Zealand's long term challenges.

15. This vision is underpinned by four priorities: grow and share New Zealand's prosperity; support thriving and sustainable regions; transition to a clean, green and carbon neutral New Zealand; and deliver responsible governance with a broader measure of success.

16. The plan identifies eight economic shifts which represent some of the most important transitions we must make to prepare our economy for the challenges coming our way and address our most pressing economic, social and environmental challenges.

17. Aside from addressing climate change, one of the key economic shifts needed to achieve our vision is moving the New Zealand economy from volume to value with kiwi businesses, including SMEs, becoming more productive. This means:

- building on our existing strengths and international connections to leverage new opportunities in domestic and international markets;
- investing in new technology and being at the forefront of digital innovation including to drive mitigation and adaptation to climate change; and
- thriving and dynamic small, medium and large enterprises.

18. In order to achieve this key economic shift, the government needs to take a more active role and make strategic choices in support of broader economic, social and environmental objectives.

Industry Transformation Plans will support the successful delivery of our Economic Plan

19. In February 2019, Cabinet agreed to a refocused approach towards a more active Industry Policy, based on international experience in countries including Singapore and the United Kingdom [CAB-19-MIN-0033.01]. This recognised that an active industry policy, after decades of being largely out of favour, is increasingly seen internationally as a valued means of obtaining both economic and social goals.

20. We agreed that our refocused Industry Policy would be delivered through the development and implementation of Industry Transformation Plans (ITPs). Ten sectors were initially identified for attention: food and beverage; wood processing and forestry; agritech; digital technologies; tourism; construction; creative industries; renewable energy; aerospace and health technologies.

21. Work on developing plans for five of these is underway: construction; food and beverage; wood processing and forestry; digital technologies; and agritech. A process for selecting other sectors for future ITPs is proposed below in para 77.

22. The ITPs will be an important vehicle for achieving the eight key shifts of our Economic Plan as we transition to a productive, inclusive, and sustainable economy. For example, ITPs will work to ensure strong partnerships with Māori that seek to realise the full potential of our Māori economy, with Te Tiriti o Waitangi underpinning our engagement and partnership activity. ITPs will also have a strong focus on workforce and skills and seek to ensure that our people are skilled and adaptable. Given that sectors are based throughout every part of New Zealand, the ITPs will ensure we continue to strengthen and revitalise our regional economies.

Guiding Principles

23. We have agreed that ITPs will be shaped by the following guiding principles [CAB-19-MIN-033.01]:

- taking a partnership-led approach, developing solutions with stakeholders;
- building and using a strong evidence base to guide our focus and interventions, including robust evaluation and monitoring;
- using specific sector strategies;
- leveraging international connections, and being consistent with our international obligations and trade policy settings; and
- providing clear and consistent signals from the Government on a proposed course of action.

24. These principles remain sound and are being applied across our ITP work as we get this programme underway. However, I also suggest that we add a further principle of ensuring our activity is supporting better jobs, involving decent work and good wages.

Working in partnership

25. The ITPs are a partnership mechanism to transform our economy to be more resilient and future-focused, and to support different groups through this transition. They are a key component of our Future of Work Tripartite Forum work programme for this reason.

26. As I detail further below, we are working with our social partners, the Council of Trade Unions (CTU) and BusinessNZ, to develop a New Zealand "handbook" on ITPs which will outline the purpose and objectives of ITPs, and best practice information on how they can be developed by different parties.

27. The development of an ITP is intended to improve co-ordination within and between government, business and unions, to enhance the wellbeing of New Zealanders – in their capacity as owners of enterprise, or as workers. The value that an ITP framework brings is the ability to bring together (where feasible) all relevant parties around a particular industry to agree a direction of travel for the industry towards long term goals. The ITP will then identify the actions that can be taken by industry, government and others to realise this long term vision.

28. Each ITP will consider opportunities and challenges across a sector depending on the specific circumstances. The scope of an ITP will include perspectives from different stakeholders on topics such as:

- productivity trends
- current and future skills needs and labour market dynamics
- investment attraction, capital constraints, and research and development
- carbon reliance and decarbonisation pathways
- areas of competitive advantage
- use of digital technologies
- export profile, specific goals for each sector, and global trends influencing the sector.

Many of our portfolios are relevant to our industry policy

29. There are a number of existing work areas within government that are highly relevant, including the implementation of the recent Reform of Vocational Education (RoVE). A key component of RoVE is to create between four and seven new Workforce Development Councils (WDCs) that will give industry greater leadership across the entire vocational education system. WDCs will have a range of functions including Skills Leadership which will involve identifying future industry skills needs, and advocating for those needs to be met through their work with industry, schools, providers, regions and government. WDCs will also direct the Tertiary Education Commission on how it should fund providers to deliver skills for its industry (within a fixed funding envelope set by TEC). WDCs will therefore play an important role in supporting industry transformation – these linkages will be made and strengthened as ITPs are developed and as WDCs are established (from April 2020).

30. Our new Research, Science and Innovation (RSI) Strategy is also important. The RS&I system and this strategy will help ensure that we can support sectors to transition over coming years and to reach their full potential within a more productive, sustainable and inclusive economy by 2050. Our science and frontier innovation activity will be vital to solve challenges around emissions for example, and to support businesses to take their products and services to a global market.

31. The ITPs could also include actions to build the capabilities of small and medium enterprises so they are better able to make the transition to exporting to offshore markets. This will complement the government's Trade for All agenda to ensure our trade policy delivers for all New Zealanders.

Status of the ITPs currently underway

32. With the Minister of Building and Construction, I have been supporting the work around the Construction Sector Accord, which is in effect our first ITP. The Construction Sector Accord, launched in April this year, was developed in partnership between Ministers, government agencies and industry leaders from across the construction sector. The Cabinet paper that the Minister for Building and Construction is bringing to this Committee today seeks approval for the delivery phase of initiatives to lift the sector's capabilities, performance, productivity and culture.

33. In this submission I am pleased to attach here a draft ITP for the agritech sector as **Annex Three** (summary below).

34. A summary update on the development of the ITPs for the Construction; Food and Beverage; Forestry and Wood Processing; and Digital Technologies sectors is attached as **Annex One.**

<u>Agritech</u>

35. <u>Key partner and Government lead</u>: Agritech New Zealand in partnership with MBIE

36. Agritech refers to manufacturing, biotech and digital based technology companies that are creating novel product, service, IP and value chain solutions for the primary sector (agriculture, horticulture, aquaculture, apiculture and fishing), with the aim of improving yield, efficiency, profitability, sustainability, reliability, quality or adding any other kind of value. Examples include machinery and equipment, robotics, ICT applications, genetics (pasture, animals, crops, fruit), and new systems such as precision seafood harvesting.

37. Based on engagement with the agritech sector, we propose that the vision for the ITP is:

A globally competitive agritech ecosystem, producing ingenious value-adding companies that provide meaningful jobs, solving New Zealand and the world's sustainability problems

New Zealand Agritech - good for the world

38. This vision encompasses several of the strategic decisions underlying the Agritech ITP, in particular the emphasis on a global approach, addressing the wider ecosystem, the importance of innovation, delivering and enabling delivery of high-value goods and services, the provision of good jobs and a broad approach to sustainability.

39. Following the release of the strategy document for the agritech sector in July, a draft ITP for the sector has been developed in consultation with key parties across the sector. Officials have conducted workshops in Tauranga, Palmerston North, Auckland, Hamilton, Lincoln and the Hawkes Bay to seek feedback on the draft strategy and to inform the development of the action plan in the ITP.

40. The draft ITP outlines the reasons for the selection of agritech, primarily the focus on developing agritech as an economic driver in its own right, and in particular as an export industry. It describes global megatrends, the current state of New Zealand agritech and identifies obstacles and constraints, and advantages and opportunities.

41. An action plan has been developed to support the agritech sector to reach its agreed vision. The action plan is divided into six workstreams aimed at the following: Connecting to global agritech opportunities; improving commercialisation flow; facilitating investment into New Zealand agritech; using interoperability, open data and regulatory settings to promote the agritech sector; skills development for agritech creators and users; and streamlining government support. These workstreams are largely focussed on broader ecosystem development.

42. In addition, we have prioritised three 'high impact projects' to accelerate the sector:

- The development of an agritech-specific venture capital fund in partnership between New Zealand Venture Investment Fund and an international agritech venture capital fund to address the gap in early-stage capital funding for the sector. The proposed fund is expected to consist of a minimum of $30 million in capital from the partner fund, matched by NZVIF at a ratio to be determined through negotiations. Discussions around this opportunity are currently ongoing between New Zealand Venture Investment Fund and a possible partner.

- The development of a horticultural robotics academy as a centre for collaboration between researchers and entrepreneurs in the horticultural robotics space. Horticultural robotics has been identified as an area of significant opportunity for New Zealand agritech where New Zealand has the capability and expertise to take a global leadership role.

- Hosting the Farm2050 Nutrients Initiative, a major joint initiative with a group of global leaders in agritech aimed at identifying disruptive nutrients technologies. Initial focus will be on collaborative trials of technologies across a number of areas related to nutrients use and management.

43. I am seeking agreement to undertake public consultation on this draft ITP. This will provide interested parties with an opportunity to provide formal feedback on the vision and actions.

It is expected that the final ITP for the agritech sector will be launched and implemented in Quarter 1 2020, with project funding subject to Budget 2020 decisions.

Digital Technologies

Key partner and government lead: NZTech in partnership with MBIE

44. The digital technologies sector is challenging to define because it covers a wide range of activities. The term digital technologies can cover everything from well-established but continuously improving technologies such as the internet, websites, communications technology, software and gaming, through to new and emerging technologies such as artificial intelligence, the internet of things, and big data processing.

45. An additional challenge is that digital technologies are becoming ubiquitous throughout the economy, and the line between the digital sector and sectors that were traditionally non-digital is becoming blurred. For example, most banks now offer many of their services in a digital format and financial technology, or fintech, is emerging as a significant sector in its own right.

46. Given this context, a first point of focus has been to agree the scope of the ITP. MBIE partnered with NZTech on this and then tested with sector representatives.

47. The ITP is not intended to explicitly increase the uptake of digital technologies by businesses in other sectors. Various government initiatives already exist to support this, and all other ITPs will also have a focus on the impact of digital technologies in their sectors. The Digital Technologies ITP is aimed at supporting businesses whose core purpose is creating and implementing digital technologies.

48. Consultation with NZTech and the wider sector further defined the scope around four key themes:

- **People:** ensuring there is a pipeline of skilled digital technology workers in New Zealand; developing globally-savvy, digital technology leaders in the sector; increasing diversity, with a particular focus on women, Māori and Pasifika; recognising the important role of Māori in the sector and ensuring that government support is set up to enable Māori success.
- **Government:** coordinating business support that is available for digital technologies businesses, including support for New Zealand firms to grow internationally; ensuring our regulatory and digital trade settings are enabling New Zealand firms to grow and export; and recognising the role that Government can play as a large customer of digital technologies.
- **Infrastructure:** considering the use and availability of data as a critical resource and considering issues around data sovereignty;[1] government coordination to develop a national digital twin[2] for New Zealand; considering the need for infrastructure resilience and choice; ensuring access to digital technology for New Zealanders; identifying and addressing any investment gaps that exist for the sector.
- **Foresight function:** considering how government and the sector can develop a strategic foresight function to regularly assess global trends and emerging technologies where New Zealand may be well-placed to leverage them. This includes New Zealanders being involved in setting international rules and norms around the use of emerging technologies. The ITP will be a living document that can be updated over time based on the insights that this foresight function provides. This will ensure

1 Data Sovereignty refers to the idea that data is subject to the laws of the nation within which it is stored.
2 A digital twin is a digital replica of physical infrastructure, made up of data that can then be used for various purposes e.g. to allow digital consenting, monitor ageing infrastructure or map the impact of natural hazards.

that government and the sector are positioned to take advantage of new opportunities as they emerge (and determine where New Zealand may want to lead, rather than follow).

49. With this agreed scope, MBIE will engage with other agencies to draw together an evidence base that can inform the development of the ITP. The next steps include the creation of a long term vision for the sector, the assessment of key challenges and opportunities for the sector, and the development of the action plan for the ITP.

Forestry and Wood Processing

50. Key partner and government lead: Forestry Ministerial Advisory Group (FMAG) and Wood Processors and Manufacturers Association in partnership with Te Uru Rākau (TUR) (MBIE support).

51. Work underway in the forestry and wood processing sector includes the One Billion Trees Programme, development of the Forestry Strategy and a range of work focused on developing the wood processing cluster in Tairāwhiti, as well as the Wood First policy.

52. Rather than repackaging this existing work for the ITP, we are focusing the ITP on the role that the forestry and wood processing industry will play as a major platform for the productive and inclusive net-zero economy envisaged for New Zealand by 2050. In that respect, the ITP will give effect to the Forestry Ministerial Advisory Group's proposals to transition the forestry and wood processing sector over the next thirty years from one configured to producing lumber and a relatively narrow range of products, including a significant log export industry, to one configured (at least partially) to producing fibre as a feedstock for a wide range of products, including, chemicals, biofuels and bio-plastics. As well as addressing the commercial opportunities in New Zealand, this work will assess the potential to develop export markets for an expanded range of wood and wood-based products in line with the objective of shifting from volume to value.

53. I note that around the world there is growing interest and investment in developing bioeconomy[3] strategies and deploying biorefinery[4] technologies. These are seen as key pathways for transitioning to a low-emissions economy. Similarly, increasing our use of renewable wood and wood fibre to produce food, energy, products and environmental services (e.g. carbon sequestration) is likely be a cornerstone for a net-zero emissions future.

54. Developing the forestry industry to contribute to a bio-economy for New Zealand will almost certainly require very significant private sector investment and associated support from the Government. This will come in the form of new infrastructure, regulations, support for proof of concept phases and pilot or scale-up facilities, as well as support to generate demand and potential co-investment.

55. TUR, MBIE and FMAG have worked to develop a strategy and approach to address major investment uncertainty and information gaps in the emerging bio-technology and bio-products market, under the title The New Zealand Wood Fibre Futures Project. FMAG and MBIE have agreed to jointly fund a global Request for Proposals that seeks to identify the

3 A 'bioeconomy' is the production and utilisation of renewable resources in order to provide products, processes and services in all economic sectors, within a framework of an economic system that is viable for the future. *Bioeconomy and biorefining strategies in the EU Member States and beyond*. IEA Bioenergy December 2018.

4 A 'biorefinery' uses biomass as a diverse source of raw materials for the sustainable generation of a spectrum of different intermediates and products (bio-chemicals, bio-materials (like bioplastics) and bioenergy (like drop-in biofuels), whilst including the fullest possible use of all raw material components.

most viable commercial opportunities for investment in bio-technologies and bio-based products that utilise wood and wood fibre, and facilitate New Zealand to transition to a bioeconomy. This will provide us with an assessment of potential opportunities for investment in New Zealand in the near term (5-10 year horizon) and long term (30 year horizon).

56. This work, expected to be completed in the first quarter of 2020, will provide the basis for advice to Ministers on whether to proceed to the development of a detailed transformation roadmap. Such a roadmap would be developed in close partnership with industry.

Food and beverage

57. The food and beverage sector (including on-farm production) is both large and important to New Zealand as a whole, including both rural and urban centres (a third of food and beverage manufacturing is in Auckland), our exports (around 48% of total exports) and employment. Close to half a million people are directly employed in the industry, one in five of all workers.[5]

58. In addition, the industry is highly diverse with six major sectors: meat; dairy; produce (fruit and vegetables); beverages (e.g. wine, non-alcoholic drinks); seafood and processed foods. Within these are some major sub-sectors, e.g. kiwifruit, apples, honey, avocadoes and nutraceuticals.

59. Furthermore, the industry has developed differently in different regions of New Zealand depending on a whole range of factors. Regions vary dramatically in their natural endowment. Ecosystems tend to develop regionally and are configured to regional activities, rather than having a national reach. Potential transformation paths are likely to have key regional differences.

60. Forty-nine percent of New Zealand's total emissions come from agriculture, particularly through methane from ruminant animals.[6] In many respects this sector will need to undergo the most significant transformation in the next thirty years. The size of the sector and its importance to the regions and to the economy as a whole suggests a strong "just transitions" perspective is required.

61. For these reasons, it will be critically important to develop policies and processes that are directed at providing support, knowledge and resources available at the local and regional level. While strategy is national, e.g. in terms of aligning government programmes, interventions and policies, to be effective stakeholder engagement and implementation needs to be largely local. Individual farmers, rural communities and major processors (e.g. in the meat and dairy industry) are most likely to buy-into and own the transformation process if they are supported in doing so. Leadership and engagement will largely need to be dispersed and localised if the ideal of partnership is to be realised.

Realising "partnership" stakeholder leadership and buy-in in food and beverage

62. In developing the ITP there is a need for clear recognition of three levels of partnership and leadership (recognising the sector's size, diversity and its importance in the regions):

- Pan-industry national level, e.g. Government, central government agencies, overall policy and strategy, funding and programme development. The strategy will focus on

5 Statistics New Zealand, MBIE analysis. This includes primary production, food and beverage manufacturing, food and beverage wholesaling and retailing and food service. It excludes all inputs and support services.
6 Source: New Zealand Productivity Commission. This is on-farm emissions only. Food processing accounts for a further 3.5% of emissions.

the key objectives of volume to value and supporting adjacencies and emerging industries as well as addressing pressing environmental issues.

- Sector level, e.g. most likely via the relevant industry bodies relating to dairy, meat, horticulture, seafood, beverages (wine) and processed foods.
- Local and individual; recognising that while national and sector leadership is important, real change will only occur through local leadership, cooperation and enterprise. Communities and individuals who are engaged in developing transformation pathways for their own businesses, communities and regions will own and drive change. Local organisations such as Venture Taranaki, the Wairarapa Food and Beverage Trust or the Marlborough Research Centre are best placed to engage meaningfully with iwi, unions and with other social partners in their regions.

63. In April 2018, Minister O'Connor established the Primary Sector Council with the task of developing a vision for New Zealand's primary sector. The vision leans on two key concepts:

- Taiao, and the importance of the natural environment to the sector;
- Increasing the value of what we produce and supporting sector growth.

64. The vision includes the statement: *We are committed to meeting the greatest challenge humanity faces; rapidly moving to a low carbon emissions society, restoring the health of our water, reversing the decline in biodiversity and at the same time, feeding our people*.

65. The Council will be releasing its vision before the end of the year. The ITP framework will be a useful vehicle to progress the implementation of the actions that will be necessary to realise the vision. Currently I see the Food and Beverage ITP and the work of Primary Sector Council as being mutually supportive. The ITP currently comprises several activities and actions that are subject to further policy development and discussion with relevant Ministers and stakeholders (refer **Annex One**).

Construction

66. Key partner and Government lead: Accord Steering Group; MBIE

67. Government and construction industry leaders are working to transform the construction sector through the Construction ITP, which sets out an ambitious government and industry work programme to achieve the goals set out in the Construction Sector Accord. The Cabinet paper that the Minister for Building and Construction is bringing to this Committee today seeks approval for the delivery phase of initiatives to lift the sectors' capabilities, performance, productivity and culture.

68. The construction sector contributes seven per cent of our GDP and employs 10 per cent of New Zealand's workforce. However the sector is facing significant challenges such as skills shortages, unclear regulations and pipeline of work, a lack of trust between participants in the sector, uncoordinated leadership, and poor risk management practices.

69. A well-performing construction sector is critical for our economy and urgent sector transformation is needed to meet high demand, deliver important housing and infrastructure programmes and help ensure New Zealand's future economic and social wellbeing.

70. The Construction Sector Accord was launched in April 2019, and sets out a vision of *"a high performing construction sector for a better New Zealand."* To achieve this vision, the Accord has four strategic goals:

- Increasing productivity
- Raising workforce capability
- Improving business resilience, and
- Restoring the pride of the sector.

71. Since April, the Accord Steering Group has been working across the construction sector to identify tangible initiatives that will achieve these strategic goals.

72. The ITP will communicate new and enhanced initiatives that government and industry will implement over three years. These initiatives will be underpinned by a change programme that supports the behaviours and culture needed to lift performance in the sector.

73. The Minister for Building and Construction is seeking Cabinet's approval of the ITP today. At the same time a funding approach will be outlined to enable government and industry to maintain momentum and deliver on the initiatives over three years. I understand that as part of this, the Accord leaders are exploring a joint government and industry funding model to sustain the Accord programme over time.

Our initial work on ITPs has provided some important insights

Now is an opportunity to confirm our governance arrangements

74. Our governance model needs to be sound to ensure our ITPs realise their full potential. I seek to confirm our arrangements in **Annex two**. I propose that the lead Ministers for the ITP programme are myself, the Minister of Finance, the Minister of Research, Science and Innovation, and the Minister of Workplace Relations and Safety. Working with the Future of Work Tripartite Forum, we will assess ideas for new ITPs over time, involving the relevant portfolio Minister. The lead Ministers will keep the portfolio of ITPs focussed on increasing productivity and transitioning to a low emissions economy, while addressing issues such as workforce disruption.

75. For the development and implementation of specific ITPs, the accountable Ministers are myself as Minister for Economic Development and the relevant portfolio Minister. MBIE will work with the relevant lead agency (which will be MBIE in some cases), partnering with social partners and other organisations as appropriate.

76. Following the co-design process and consideration by the Future of Work Tripartite Forum, the accountable Ministers will bring draft ITPs to Cabinet for consideration prior to their release for public consultation.

There is an opportunity to refine the strategic priorities and criteria to include sectors that are facing significant disruption

77. To date the focus of our Industry Policy has been primarily on industries with potential for growth or emerging technologies. However there is an opportunity to refine the strategic priorities and criteria for sector selection to include sectors that are contracting and/or might face significant disruption.

78. ITPs can be employed as a tool to support the transitions of sectors where workers and/or firms might be disrupted due to changes in labour supply and demand, or technological and demographic changes.

79. The purpose of ITPs can also be expanded to include resolving or mitigating labour market issues (such as skills mismatches or shortages) where improved coordination and collective impact can overcome barriers to sectors changing. ITPs could support these sectors to ensure the growth of decent work and quality jobs as well as supporting the transition of some workers into training or new roles/sectors.

80. On this basis we can consider an additional strategic priority for Industry Policy along the lines of:

- supporting industries to transition towards a more productive future state, including managing the resulting displacement of workers and firms.

81. In addition to the existing criteria for sector selection, we should also think about the potential addition of:

- The sector is facing significant disruption to workers and/or firms, which could be managed through better coordination and collective impact.

82. I will direct officials to continue working with the social partners over coming months on confirming the purpose, scope and process for ITPs in light of this broadened focus. ITPs are already on the work programme for the Future of Work Tripartite Forum (the Forum) and will be on the agenda for the Forum's March 2020 meeting. This will include discussion on scope and development approach for the next tranche of ITPs in 2020, particularly for sectors with a focus on supporting industries to transition towards a more productive future state, including managing the resulting displacement of workers and firms.

83. Due to the timing of the ITPs currently underway and available resourcing, the development of any additional ITPs would not begin until mid-2020.

84. Given the interest in other sectors for their own ITPs, I propose that MBIE works with our social partners to develop an "ITP Handbook", which will set out the overarching purpose and process for development of ITPs. This is with the view to enable others to lead this process on their own behalf, if that was deemed appropriate and feasible.

Stronger engagement with Māori will be an immediate focus over coming months

85. The ITPs will include consideration of how they can support the advancement of stronger outcomes for Māori and iwi in the context of our Māori economy. Māori hold substantial interests in each of the four ITPs currently underway.

86. The draft Agritech ITP incorporates consideration of the role of Māori within this sector. Māori are active across the entire agritech ecosystem, including as successful Māori agritech enterprises. Māori's unique relationship and perspective towards the land is a strong advantage.[7]

87. Initial conversations have taken place across the wider ITP programme, but this important engagement and work is yet to be properly advanced in the context of the other ITPs currently underway. MBIE is progressing an 'Enabling Māori Framework' that will allow for Māori enterprises, businesses and iwi to advance opportunities around capability, investment, and education and information objectives within each ITP.

7 One of the workshops held in the ITP development process was focussed specifically on Māori input on opportunities and areas of action for the agritech sector to ensure this perspective is understood.

88. The Māori economic development initiatives in the ITPs will also compliment the increasing focus of Te Puni Kōkiri, the Ministry of Foreign Affairs and Trade, New Zealand Trade and Enterprise, the Ministry of Business, Innovation and Employment, the Ministry for Primary Industries and other agencies in helping ensure that our policies are helping all New Zealanders succeed on the world stage and that we are maximising the potential of our unique cultural identity for the benefit of Aoteroa whānui (all New Zealanders) including Māori. I also note the relevance of the work that the Ministry of Social Development is doing with Māori through their Te Pae Tata strategy and action plan.

Identifying the key partners for each ITP takes time and should be well considered

89. Each ITP has a different set of stakeholders, and within these, there are different expectations about what the ITP should focus on. For example, there is a tension between partnering with existing industry groups and striving for longer term transformational change, which will necessarily require some disruption to current interests.

90. The Construction Sector Accord work has highlighted the value of partnering with industry leaders who have 'skin in the game' around the longer term future of the industry. This has been achieved by partnering with leaders reflecting the broad ecosystem that makes up the construction sector, including representation for workers, architects, planners, developers, regulators, constructors, trades, clients and health and safety. This partnership works because it combines strong voices in the industry with wide representation. For the other four initial ITPs, we are taking a case by case approach to this, and trying to make sure that we can involve stakeholders who can challenge and motivate a longer-term view.

We need to prioritise to deliver results

91. As noted above, a large portion of our efforts on ITPs has been on our organising framework, including assessing the range of relevant work currently underway, identifying partners in each industry, and engaging with social partners to ensure that our ITPs will ultimately deliver on our shared objectives (including better quality jobs for New Zealanders). While our focus is on the four initial ITPs, other industries are keen to get underway. Given available resources, I have asked officials to prioritise the four ITPs under development and the completion of the "ITP Handbook" noted above. Scope for other ITPs will be assessed in early 2020.

I intend to seek funding through Budget 2020 for initiatives to deliver on the vision of each ITP

92. In order to deliver on the vision, each ITP will identify a range of actions to drive long term transformation towards our objectives. These will involve action by both government and industry to ensure enduring change is achieved.

93. In line with two of the key Budget priorities, Just Transition and Future of Work, I intend to seek funding for ITPs through Budget 2020. As the timing of the development of ITPs is not lined up with the timing of Budget rounds there is a significant risk that there will be lost opportunities if initiatives need to wait until Budget 2021 to be considered for funding.

94. Draft ITPs are expected to be completed in Quarter 2, 2020 for the Digital Technologies and Food and Beverage sectors. The Forestry and Wood Processing ITP will be completed later in 2020, working from the research commissioned in paragraph 55 above. In order to ensure there is a mechanism to fund initiatives that support the government's objective for a more productive, sustainable and inclusive economy, I intend to seek agreement to a tagged contingency for ITPs.

95. I propose a contingency of $84 million over four years which would be managed by the Minister of Finance and the Minister for Economic Development. Joint Ministers will be able to agree to funding for initiatives which demonstrate that the action will support the delivery of the ITP and align with the government's broader objectives. The fund would include a focus on initiatives that support the Māori economy. It would also provide a means to provide support to our partners in ITP development, including iwi, unions and industry partners. Officials are currently working on the mechanics and design of such a fund. This funding will be designed and implemented to be consistent with New Zealand's international legal obligations and trade policy settings.

96. As outlined in the Agritech ITP there are a number of initiatives that have been identified for funding within the first year of ITP funding, including the three initiatives identified in para 42 above. This package is costed at $17.2m over four years.

97. I have asked officials to develop criteria for allocating the ITP contingency and to ensure that funded initiatives are subject to monitoring and evaluation processes. This will include identification of exit strategies for initiatives that are not delivering on their objectives. I will work with the Lead ITP Ministers to finalise this in early 2020.

Consultation

98. The following agencies were consulted on this paper: The Treasury, the Ministry for Primary Industries, Te Uru Rākau, the Ministry of Foreign Affairs and Trade, New Zealand Trade and Enterprise, Te Puni Kōkiri, Callaghan Innovation, the Ministry of Culture and Heritage, the Ministry of Education, the Ministry of Social Development, the Department for Prime Minister and Cabinet.

Financial Implications

99. As noted above, I am proposing to support an initiative through Budget 2020 that would provide funding for actions within the Agritech ITP, as well as a fund for other ITPs as they are progressed. This initiative will be progressed through the Future of Work priority, focused on *enabling all New Zealanders to benefit from new technologies and lift productivity through innovation.*

100. This funding bid will enable us to resource initiatives that arise through the ITP co-design process, where there is a clear role for government to invest in support of transformational change. As noted above, the Agritech ITP has to date identified a package of initiatives costed at $17.2m over four years. Most of these initiatives will require ongoing out-year funding, currently estimated at around $5m per annum. This indicates that the $84m proposed for the contingency is likely to be the minimum required to implement the four ITPs currently in play.

101. Noting that up to ten ITPs are proposed over time, it is likely that additional resource would need to be sought in future Budgets. However, in developing the ITPs, consideration will be given first to existing services and sources of funding, and then whether new initiatives and funding is required, noting that the objective is to both drive and manage transformational change, rather than business as usual growth and innovation.

Legislative Implications

102. There are no legislative implications of this paper.

Human Rights

103. There are no human rights implications arising from this paper.

Gender Implications

104. There are no gender implications arising from this paper.

Publicity

105. The draft Agritech ITP will be released for public consultation on the website of the Ministry of Business, Innovation and Employment. Key stakeholders in the sector will be contacted directly. Following public consultation I intend to release the final ITP in early 2020.

Proactive Release

106. I intend to proactively release this Cabinet paper in early 2020.

Recommendations

The Minister for Economic Development recommends that the Committee:

1. **Note** that Cabinet has agreed that Industry Transformation Plans (ITPs) will be shaped by guiding principles [CAB-19-MIN-033.01].

2. **Agree** that these principles be complemented with the principle of ensuring our activity in ITPs is supporting better jobs, involving decent and sustainable work, and good wages and conditions.

3. **Note** that work is underway on five initial ITPs for Construction (through the Construction Sector Accord); Agritech; Food and Beverage; Forestry and Wood Processing; and Digital Technologies.

4. **Note** that a draft Agritech ITP is now ready for public consultation (refer Annex three).

5. **Agree** that the draft ITP for our agritech sector be released for public consultation.

6. **Note** that ITPs for Food and Beverage, and Digital Technologies will be ready for consultation in the first half of 2020, and that the Food and Beverage ITP will support the realisation of the Taiao vision developed by the Primary Sector Council.

7. **Note** that the Forestry and Wood Processing ITP will derive from research about to be commissioned to identify the most viable commercial opportunities for investment in bio-technologies and bio-based products that utilise wood and wood fibre, and facilitate New Zealand to transition to a bio-economy, and will be developed over the course of 2020.

8. **Note** that there is scope for ITPs to more explicitly consider future labour market dynamics within a particular industry, with the view of being a tool for more effective planning around worker transitions.

9. **Agree** that officials should work with social partners, the Council of Trade Unions and Business New Zealand, to confirm the purpose, scope, common structure and process for developing future ITPs and that the progress of this work be discussed within the Future of Work Tripartite Forum in March 2020.

10. **Note** that following this, Cabinet will be asked to agree which sectors will be the focus of the next tranche of ITPs, being mindful of the 10 sectors that were initially selected as well as others that arise from the work with social partners.

11. **Agree** to the proposed governance arrangements for the ITPs, with the Lead Ministers including the Minister for Economic Development, the Minister of Finance, the Minister of Research, Science and Innovation, and the Minister of Workplace Relations and Safety; and for individual ITPs, Ministers accountable are the Minister for Economic Development and the relevant Portfolio Minister.

12. **Agree** that the Lead Ministers will keep the portfolio of ITPs focussed on increasing productivity and transitioning to a low emissions economy, while addressing issues such as workforce disruption.

13. **Note** that following a co-design process and consideration by the Future of Work Tripartite Forum, the accountable Ministers will bring draft ITPs to Cabinet for consideration prior to their release for public consultation.

14. **Note** that I intend to progress an initiative within Budget 2020 that will provide funding for initiatives within specific ITPs and will also enable the government to provide resourcing to relevant parties to support their participation in the ITP process where this would be otherwise constrained.

Authorised for lodgement

Hon Phil Twyford

Minister for Economic Development

Annex One: Update on ITPs for the Construction; Food and Beverage; Forestry and Wood Processing; and Digital Technologies sectors

Construction	
ITP focus	The Construction Sector Accord was established to strengthen the partnership between government and industry to transform the construction sector. There is an urgent need for sector transformation to meet ongoing high demand, deliver important housing and infrastructure programmes, and help ensure New Zealand's future economic and social wellbeing. A number of initiatives set out under the Construction Sector Accord are already underway. The Construction ITP will incorporate these initiatives, and set out new and enhanced initiatives to lift the performance of the sector and achieve the goals set out in the Accord.
Key Workstreams	The ITP sets out a programme of work across six work streams: • Leadership • Business performance • People development • Health, safety and wellbeing • Regulatory environment, and • Procurement and risk.
Government lead	Ministry of Business, Innovation and Employment.
Work completed	A number of initiatives set out under the Construction Sector Accord are already underway. Key progress since April includes: • The first 'Infrastructure Pipeline' for five government agencies was published in October 2019, to give industry more certainty about upcoming projects; • The Government Rules of Procurement (4th edition) now require government agencies to consider staff training in their tender evaluations for large construction projects; • More than 1,200 people placed in construction-related work through Mana in Mahi and the expansion of Skills for Industry. Industry has also progressed its own commitments, for example by agreeing how firms and industry bodies will participate in, support and promote the Construction Skills Action Plan.
Next steps and timing	The Cabinet paper that the Minister for Building and Construction is bringing to this Committee today seeks approval for government and industry to progress the delivery of the transformational initiatives over three years. Accord leaders are exploring a joint government and industry funding model to sustain the Accord programme over time.

Food and Beverage	
ITP focus	The Food and Beverage ITP will build on and give effect to the work of the Primary Sector Council (PSC) in developing a sector-wide vision for the New Zealand Food and Fibre sector. The PSC's vision is still being finalised. It is based on the values of Integrity, Guardianship, Ingenuity and Respect. It makes a commitment to the industry playing its part in rapidly moving to a low carbon emissions society, 'restoring the health of our water, reversing the decline in biodiversity and at the

	same time, feeding our people.'
Key Workstreams	Workstreams are in the process of being developed but are likely to be shaped around: sustainable agriculture; globally significant innovation in production and in added value food and beverage products; diversification of land-use and support for new industries; establishing mechanisms to enable small, medium and large manufacturers access to scientific, technical, commercialisation and market expertise and support for capability building, e.g. through extension services, and food and beverage hubs including through FoodHQ and the New Zealand Food Innovation Network (NZFIN).
Government lead	Ministry for Primary Industries and Ministry of Business, Innovation and Employment.
Work completed	• The Primary Sector Council is set to release its vision by the end of 2019. • The New Zealand Food Innovation Network (NZFIN) Review; to determine the future structure of NZFIN and establish NZFIN and its constituent hubs on a sustainable basis. • A significant investment in FoodHQ is under consideration for funding via the PGF, to accelerate rates of science-based innovation in New Zealand food businesses and establish extension services with a focus on regions and small and medium businesses. • An application to the PGF for funding to establish a Wairarapa Food & Beverage Hub with links to FoodHQ is under consideration. • Engagement with Taranaki Food and Fibre working group as part of the Just Transitions programme to establish development pathways for the Taranaki Food and Fibre industry. • Initial discussions with several other regional entities including with Auckland Tourism, Events and Economic Development (ATEED) to determine mechanisms to support the development of Auckland's very substantial food and beverage manufacturing sector.
Next steps and timing	Officials will develop a package of initiatives that could form the basis of an announcement in April 2020. The package would be made up of existing proposals under consideration, e.g. for PGF funding, and new proposals to be determined. Proposals for the future of NZFIN are to be tested with key stakeholders with further advice to be provided to Ministers in the New Year.

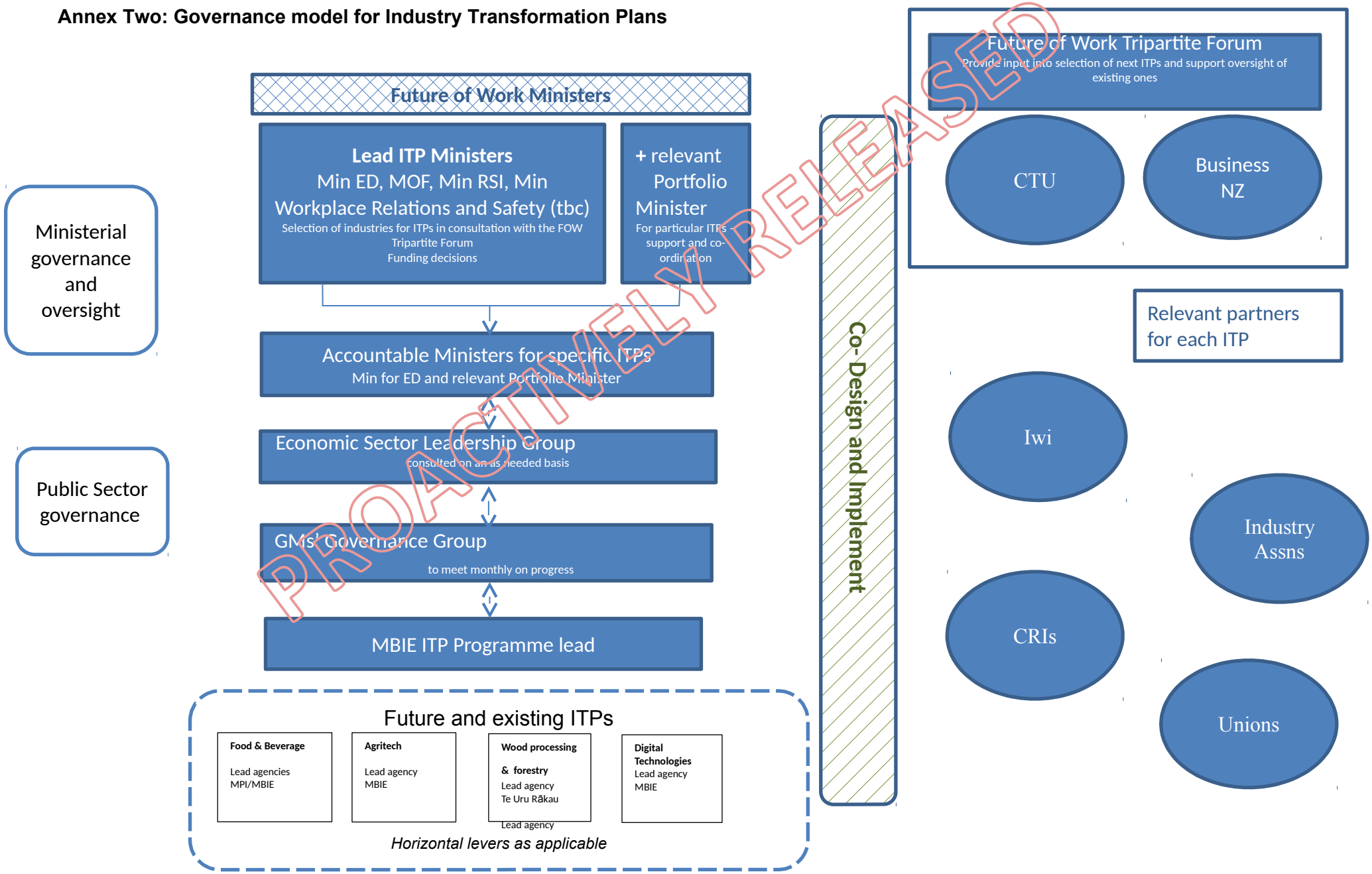
Forestry and Wood Processing	
ITP focus	The ITP for the Forestry and Wood Processing sector is focused on giving effect to the Forestry Ministerial Advisory Group's proposals to advance the transition of the forestry and wood processing sector over the next thirty years from one configured to producing lumber and a relatively narrow range of products, to one configured to producing lumber and a wide range of products such as chemicals, biofuels and bio-plastics. The ITP may also include consideration of the Wood First Policy.
Key workstreams	FMAG have released a Request for Proposals (RFP) document seeking suitably qualified vendors to prepare a report on the internationally competitive opportunities for New Zealand in wood fibre production and processing; and the requirements from commercial parties and the government to successfully execute these opportunities.

	The resulting report will be used to inform the development of the ITP by: • identifying list of potential opportunities for NZ and the skills needed to realise these opportunities; • ranking them, providing detailed analysis for inclusion and exclusion; and • commenting on investor requirements or readiness and what is needed to execute/progress the opportunity.
Government lead	Te Uru Rākau with MBIE support
Work completed	RFP has been issued.
Next steps and timing	The report is expected to be completed by the end of the first quarter 2020, at which point FMAG with support of officials will provide further advice to Ministers.

Digital Technologies	
ITP focus	MBIE and NZTech have consulted with the digital technology sector to agree on the scope for the digital technology ITP. The scope for the ITP will include a focus on three groups of 'enablers' that will support the digital technology sector to be successful: • **People:** ensuring there is a pipeline of skilled digital technology workers in New Zealand; developing globally-savvy, digital technology leaders in the sector; increasing diversity, with a particular focus on women, Māori and Pasifika; recognising the important role of Māori in the sector and ensuring that government support is set up to enable Māori success. • **Government:** coordinating business support that is available for digital technologies businesses, including support for New Zealand firms to grow internationally; ensuring our regulatory and digital trade settings are enabling New Zealand firms to grow and export; and recognising the role that Government can play as a large customer of digital technologies. • **Infrastructure:** considering the use and availability of data as a critical resource and considering issues around data sovereignty; government coordination to develop a national digital twin for New Zealand; considering the need for infrastructure resilience and choice; ensuring access to digital technology for New Zealanders; identifying and addressing any investment gaps that exist for the sector. The scope of the ITP will also include consideration of how government and the sector can develop a strategic foresight function, to stay up to date with global trends and emerging technologies and ensure that New Zealand is positioned to take advantage of these opportunities. Areas of growth within the sector may be identified from this foresight function which could benefit from focused government and industry support.

	The scope of the ITP is clear that the ITP will be a living document, which will be reviewed and updated every few years to respond to sector foresights and modify or add to the action plan to ensure the sector is on track to meet its long term vision.
Key workstreams	It is likely that key workstreams will form around the themes identified in scope for the ITP: • People • Government • Infrastructure • Sector foresight Each of these workstreams will develop a number of actions that will jointly work towards the long term vision for the sector.
Government lead	Ministry of Business, Innovation and Employment
Work completed	Workshops have been held in Auckland and Wellington to consult on the scope of the ITP with representatives of the digital technology sector. The final scope has now been agreed and MBIE is gathering evidence to inform the ITP.
Next steps and timing	MBIE will continue to work with other government agencies to draw together existing data and evidence on the digital technology sector. MBIE and NZTech will hold six further workshops around the country in late November to gather industry input on a long term vision for the sector, gain insights on what are seen as key issues and opportunities for the sector within the agreed scope, and to begin to develop an action plan for the ITP.

Annex Two: Governance model for Industry Transformation Plans



Annex Three: Draft Agritech Industry Transformation Plan

GROWING INNOVATIVE INDUSTRIES IN NEW ZEALAND

Agritech in New Zealand

INDUSTRY TRANSFORMATION PLAN

December 2019









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MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

New Zealand Government

Contents

Introduction

This document captures an overview of the agritech sector in New Zealand and outlines a series of actions to accelerate its growth.

Agricultural technology, or agritech, is an area of significant interest for New Zealand. Historically, agritech has been predominantly valued for its input into New Zealand's food and fibre sectors and as a key driver for increasing productivity, quality and sustainability across the entire food and fibre production and supply value chain for New Zealand. Agritech is central to driving more efficient land use and management for better environmental outcomes spanning water quality, reduced methane, nitrous oxide and carbon dioxide emissions; both domestically and across export markets.

While the above remains true, it is also clear that our strong food and fibre sector and expertise in this area represents an opportunity to grow the agritech sector as an economic driver in its own right, particularly as an export industry. This is the primary reason why the sector has been selected as a priority area under the Government's refocused industry policy.

Through this Industry Transformation Plan (ITP), the Government aims to provide the agritech sector with the support to accelerate its growth, attract necessary investment, increase commercialisation of New Zealand agritech intellectual property (IP), address global opportunities and increase exports, develop needed skills and address regulation and data interoperability issues.

DEFINING AGRITECH

We use the phrase 'agritech' broadly. For the purposes of this document, the 'agritech' sector refers to manufacturing, biotech and digital-based technology companies that are creating novel product, service, IP and value chain solutions for the agriculture, horticulture, aquaculture, apiculture and fishing sectors, with the aim of improving yield, efficiency, profitability, sustainability, reliability, quality or adding any other kind of value. Forestry is excluded because forestry and wood processing is the focus of another dedicated ITP. Figure 1 below shows some of the different aspects captured by 'agritech'.

Figure 1 – Agritech's broad applicability

Document overview

This ITP sets out an approach to the long-term transformation of the agritech sector to make it more productive, sustainable and inclusive as part of a zero-carbon economy. It has been prepared with a cross-government approach and in consultation with industry and the broader agritech ecosystem.

In Part 1 of this document, we present the context, challenges and opportunities for the sector. We start with an overview of the context and history of the sector, outlining why agritech is of importance and interest to New Zealand.

We will examine some of the major factors impacting the sector globally, and their implications for agritech in New Zealand. We look at the constraints and obstacles to growth for the sector and explore why agritech has failed to meet its potential to date. We will also look at New Zealand's advantages and opportunities for growth.

In Part 2 of this document, we propose a vision for the sector, outline a possible response to the issues presented in Part 1, focusing primarily on the factors that industry, government, workers and the broader agritech ecosystem can collaborate on together. We also note the ongoing work in this area by both government and industry.

In the final section, Part 3, we outline a proposed action plan, consisting of High Impact Projects and a broader ecosystem development plan, to help the agritech sector achieve its vision.

Case Study – Halter

Harnessing Natural Intelligence

Halter's innovative animal management system opens up new possibilities for livestock farming.

Halter features a GPS-enabled, solar-powered cow collar that uses sound stimuli to gently direct livestock on-farm and keep them away from waterways or hazards, all controlled via smartphone or tablet.

The system lets farmers shift livestock remotely or bring them in for milking without even stepping outside. It also tracks individual feed intake and gives early alerts for potential health concerns – all adding up to time and labour savings, healthier animals, and the potential to transform pastoral livestock farming.

www.halter.co.nz

Relationship to industry policy

In July 2019, the Government released its refocused approach to industry policy. The core of this new approach is the development of Industry Transformation Plans (ITPs) for selected sectors of the economy where significant growth opportunities exist, or for sectors that are facing significant disruption to workers and/or firms. In February, Cabinet agreed that the strategic priorities for ITPs are:

- moving from volume to value: looking for productivity growth in our high-volume sectors
- leveraging opportunities in adjacent sectors: opportunities arising from our points of expertise and comparative advantage; and
- backing emerging sectors: being prepared to seize opportunities in new sectors of the economy.

For each sector selected, an ITP will be developed. An ITP is a long-term strategy developed with key stakeholders across the wider sector ecosystem that provides a clear picture of the challenges and opportunities faced by each sector, agrees on a long-term vision and sets out an action plan that span a wide range of areas, including research, science and innovation, trade, education and skills.

Agritech was selected as a priority sector because of its importance to New Zealand's transition to a highly productive, low-emissions future, its adjacency to our strong food and fibre sector, and our existing expertise and investment in this area. The emergence of Agritech New Zealand and their role in providing a cooperative partner for the Government in this sector was also an important factor.

New Zealand agritech will be transformed through the application of the guiding principles of industry policy: taking a partnership approach; building a strong evidence base for action; using specific sector strategies/roadmaps; leveraging international connections; and providing clear and consistent signals from government.

We know that a 'business as usual' approach will not result in transformation. Funding the activities and initiatives resulting from this work will be a critical part of ensuring the actions lead to meaningful growth.

Process for creating this Industry Transformation Plan

The ITP process is an iterative and continuing one. We began in February 2019, with engagement between industry and government agencies on the concept of developing a transformation plan. Over the subsequent months, the draft of a strategy was developed and released for comments and consultation. A series of workshops and 1:1 meetings were held over July – October 2019 and a revised strategy emerged, along with a set of activities and actions to complete the first draft of the ITP.

In developing the detailed workplan, it is apparent that this will continue to evolve as we have a number of activities that can be accelerated, and some High Impact Projects that are suitable for focus. In addition, there are other activities we have highlighted that will require further refinement and definition, and workstreams will continue to develop.

Therefore this ITP should be seen as a continuing process of definition, refinement, execution and measurement as we continue to work on ways to accelerate the growth of the sector.

This work in progress ITP will continue to be refined and developed, in consultation with the sector, and a more finalised version, with a detailed action plan, will be released in early 2020.

The Primary Sector Council

The future shape of the food and fibre sector is the subject of a review by the Primary Sector Council.

The Primary Sector Council was established in April 2018 by the Minister of Agriculture for a term of two years. In these two years the Council was tasked with developing a vision for the food and fibre sectors of New Zealand. This vision is to be ambitious and provide a guiding point to the overall direction of the food and fibre sectors. It is important that the agritech actions and industry progress delivers on elements of the overall food and fibre vision.

In many ways, this agritech ITP should be seen as complementary to the Council's work, with clear dependencies and alignment.

Agritech and Mātauranga Māori

We acknowledge the special role of mana whenua in all discussions relating to the land and we believe Māori have important roles across many parts of this ITP.

As a treaty partner, Māori have rights and interests in the development of a vision and action plan for the agritech sector, but beyond this obligation, they also provide a unique viewpoint that improves the ITP as a whole. As such, a deliberate effort has been made to include their perspective in this document and this will continue as the ITP evolves and throughout implementation.

Māori are involved as kaitiaki of the land, as creators of agritech businesses, and as users of technology. They are investors, researchers and help to govern and regulate the agritech ecosystem. In this way, the representation of mana whenua cannot be understated.

In addition, we see that the results of the work outlined in this ITP will help create high-skilled work opportunities both on-farm, and within agritech companies.

We intend to continue with consultation with Māori as detailed actions emerge, and as it becomes clearer how the agritech ITP works alongside other initiatives in the food and fibre sector.

Invert Robotics. Source: New Zealand Story & NZTE

Part 1 – Context, Challenge and Opportunities

Agricultural innovations have long been a vital part of Aotearoa New Zealand's economy.

Context and history

Innovation comes from necessity, and the first Māori settlers to New Zealand were faced with that necessity on their arrival. Finding the climate too temperate for growing their favoured crop, the sweet potato, they created a way to build small walls around the pits the kumara were grown in. This allowed the rays of the sun to be absorbed during the day, and warm the earth in the evening, elongating the growing period.

New Zealand's agricultural technology sector was born.

The story of New Zealand is entwined with the story of the land and sea, and how ingenuity has allowed the last major land mass on the planet to be populated. From the early settlers learning to work with New Zealand's incredibly varied landscapes, to the variety of crops and animals the land has come to support, technological innovation has allowed us to further improve the productivity of our work and serve new markets.

The innovation of refrigerated shipping in 1882 allowed New Zealand to sell meat overseas, adding to the export staple of wool. New breeds of sheep and new farming techniques increased the variety and yield of the agriculture sector. Dairy farming innovations and novel cooperative models allowed New Zealand to establish ourselves as a leading provider of globally trade dairy products.

The 20th century saw the creation and adoption of technology that propelled New Zealand to a leading position in agritech. Innovation such as the electric fence, the milk meter, improved grass cultivars, and selective breeding techniques and understanding of genetics all allowed for higher productivity and helped the food and fibre sector to be the major factor in growing New Zealand's economy.

In response to the shock of the UK's entry into the European Economic Community in the 1970s, and the rapid restructuring of the economy through the 1980s and 90s, the food and fibre sector continued to diversify into new areas like deer farming, wine production, aquaculture, honey and a large variety of horticultural crops. Each stage of growth has required innovation and an increasing reliance on the benefits of technology and an eye to changing global markets.

Source: New Zealand Story & NZTE

In 2001, the country considered the role of disruption and innovation during the 'Knowledge Wave' conference, co-hosted by then Prime Minister Helen Clark. The activities and initiatives set

in motion from that conference set to further diversify the New Zealand economy and reinforce the strategy of a diversified, value added economic development approach.

In 2018, the agritech industry group 'Agritech New Zealand' formed as part of NZ Tech's 'Tech Alliance' and has successfully brought together a number of industry parties and companies. They have also announced a partnership with the Precision Agriculture Association of New Zealand (PAANZ), and this combined industry group provides a good counter-party for government activity in the sector.

DEFINING THE PRIMARY SECTOR AND THE FOOD & FIBRE SECTOR

In the context of this document, when we refer to the primary sector, or the food and fibre sector, we are referring to agriculture, horticulture, aquaculture, apiculture and fishing, and excluding forestry and mining/extraction.

Forestry is excluded because forestry and wood processing is the focus of another dedicated ITP

Agritech and the food and fibre sector

Since 2001 however, while there has been progress in many dimensions, it is also true that we have not achieved the productivity levels expected, given our favourable economic settings. The food and fibre sector has had impressive growth, but not to the degree anticipated. On-farm productivity of the agricultural sector has grown at a compounded annual rate of 3.5 per cent over the ten years to 2018[1]. Yet, when considered alongside related manufacturing, the sector overall is still not reaching its potential, and our farmers continue to face many challenges. So while agritech has enabled improved productivity, quality and yield, it has yet to provide a breakthrough to the levels of sustained growth and value creation the sector would like to see. Nor has it adequately addressed a number of sustainability and environmental issues such as those around water quality, climate change and the provision of secure, high value jobs.

Today, the food and fibre sector remains a huge part of our economy. In addition to the direct benefits the sector provides, there are significant flow-on impacts to the wider economy. The majority of our manufacturing output depends on the food and fibre sector as its key input and a huge number of service industries exist to support either the food and fibre sector or the manufacturers adding value to our food and fibre products. Including processing and commercialisation activities, the sector accounts for 11 per cent of GDP, and 15 per cent of employment[2]. Additionally, the sector contributed $36.3b in exports, or 44 per cent of New Zealand's total exported goods and services in 2018[3].

It is also the cornerstone of our regions. Far and away the majority of economic activity outside of our cities is dependent on our food and fibre sector.

New Zealand's agritech sector

Due to the absence of a universally agreed definition of 'agritech' and the cross-cutting nature of the sector, providing statistics on the make-up of the sector is challenging.

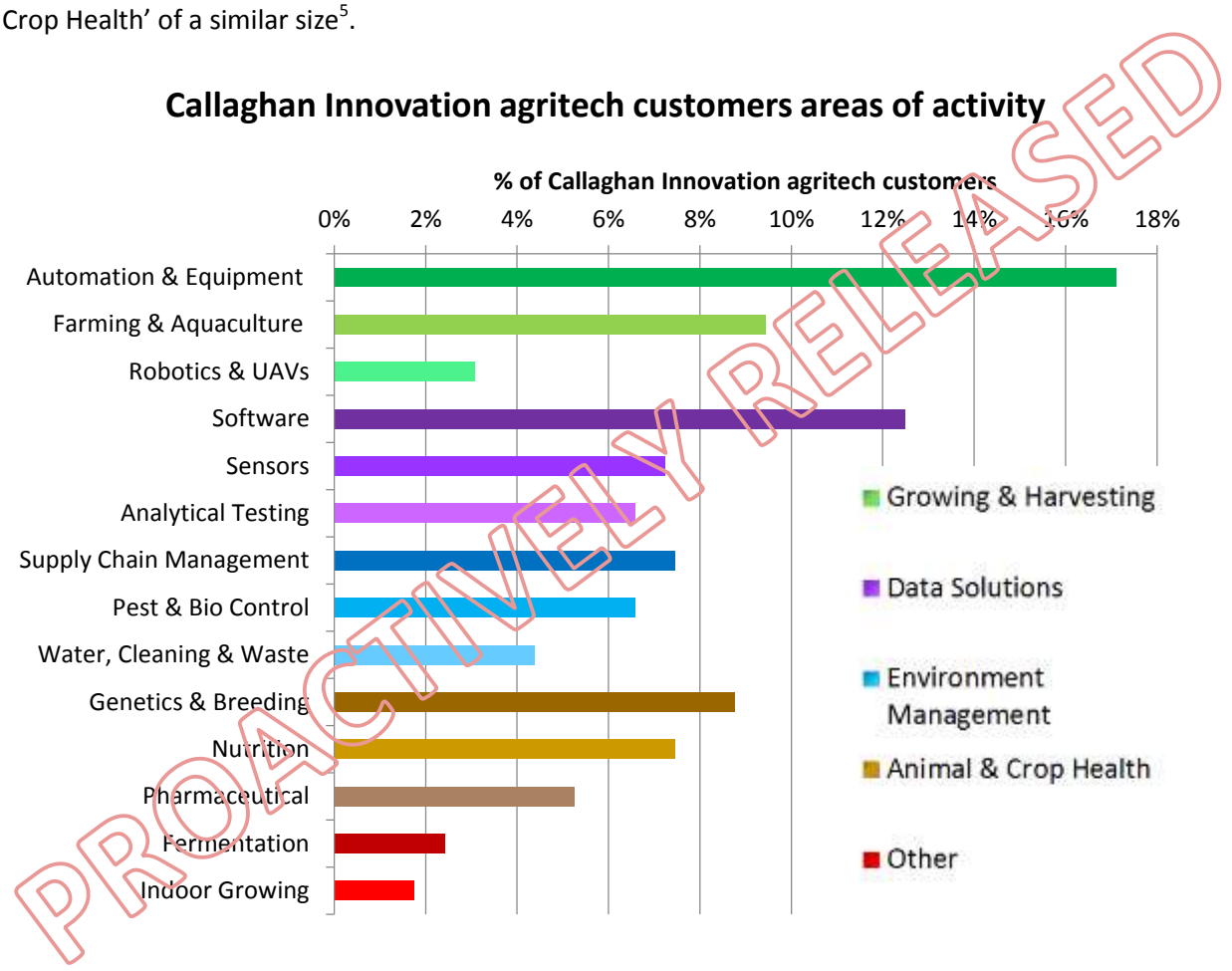
[1] Labour productivity of agriculture 2008-2018, Productivity Statistics, Statistics New Zealand, MBIE analysis.
[2] Due to data limitations, these figures include forestry. Situation and Outlook for Primary Industries June 2019, Ministry for Primary Industries.
[3] Situation and Outlook for Primary Industries June 2019, Ministry for Primary Industries; Goods and services trade by country: Year ended December 2018, Statistics New Zealand.

Size of the New Zealand agritech industry

Government is aware of over 950 likely agritech companies that have engaged with Callaghan Innovation, New Zealand Trade and Enterprise (NZTE) or are members of Agritech New Zealand[4]. This is only a subset of the broader agritech sector but is expected to capture the most significant firms in the sector.

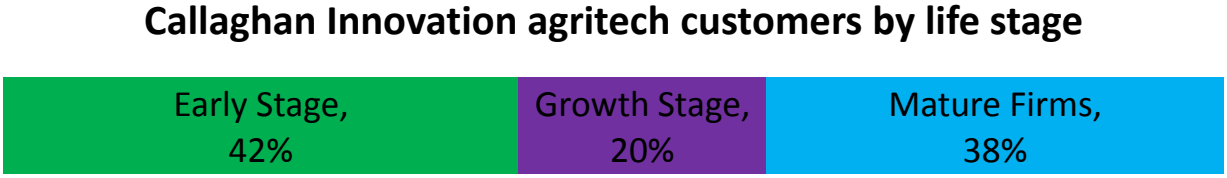
Agritech firms' areas of activity

For Callaghan Innovation customers we can provide a breakdown of areas of activity by firm number. The largest sector is 'Growing & Harvesting', with 'Data Solutions', 'Environment Management', and 'Animal & Crop Health' of a similar size[5].



Agritech start-up activity

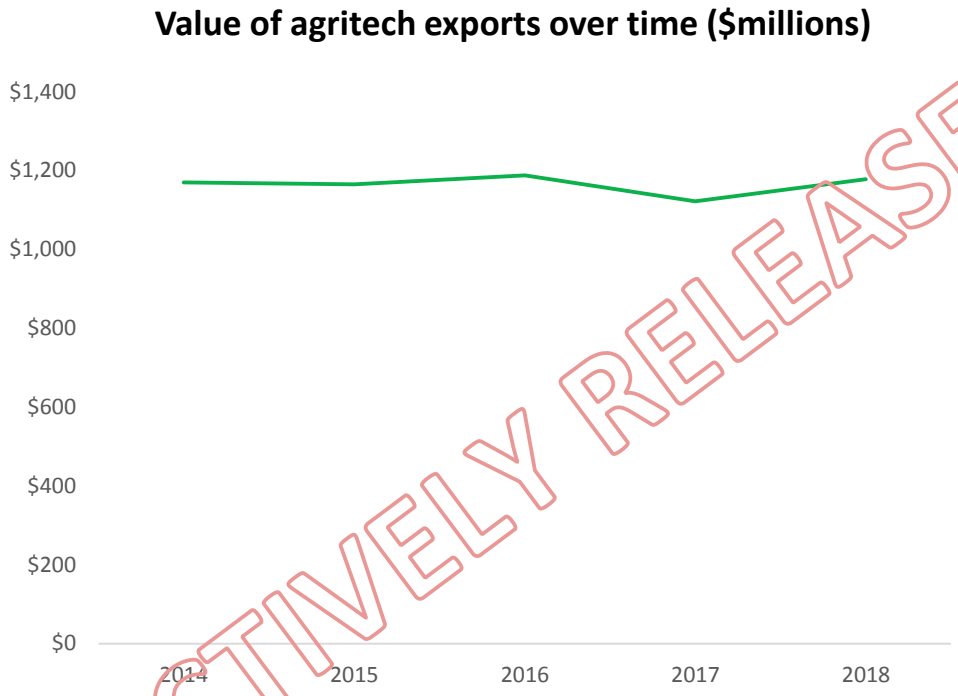
The New Zealand agritech sector is showing a healthy level of start-ups and new entrants actively emerging. These companies outnumber mature firms amongst Callaghan Innovation managed customers[6].



[4] Analysis by MBIE of Callaghan Innovation, New Zealand Trade and Enterprise, Agritech New Zealand databases.
[5] Callaghan Innovation database.
[6] Callaghan Innovation database.

Agritech sector export trends

In terms of export goods revenue (according to limited, but best available data), the agritech sector has remained fairly stable between $1.1b and $1.2b over the last five years[7]. This is a relatively static and unimpressive number when considering the strength of our food and fibre sector, and that the level of investment in agritech worldwide has increased by 36 per cent per year for the five years to 2018[8]. However, it should be noted that this figure only includes goods not services, due to the lack of data specific to the agritech sector.



Why agritech?

The main intention behind the Government's focus on agritech is to grow the sector as an economic driver in its own right, with particular emphasis on high-value export opportunities and further diversifying our economy.

The Government's ambition is to grow the agritech sector so it is better equipped to service both the domestic and international market. New Zealand possesses a number of comparative advantages when it comes to agritech. If we can effectively exploit this advantage, we stand in a good position to increase our share of the global market. Some of these advantages include:

- Our strong complementary food and fibre industry;
- Our small market size – ideal for testing technologies;
- Our ingenuity in developing solutions and world-class research;
- Our strong pasture-based management systems;

[7] Analysis of trade codes by MBIE using the method described by Coriolis, September 2014, New Zealand's Agritech Sector. The estimate relates only to agritech exports for pastoral farming and it should be treated with extreme caution due to the limitations of the analysis.
[8] Upstream Annual Financings, AgFunder, AgriFood Tech Investing Report 2018.

- Increased international investment activity

Digital technology is also a key part of the agritech sector, allowing for 'weightless exports' to be a feature of the sector and helping overcome some the challenges of our geographic isolation.

In addition, growing the New Zealand agritech sector will drive other major benefits for New Zealand:

Improving sustainability and productivity

Agritech provides opportunities for New Zealand to improve the sustainability and productivity of its food and fibre sector. This is crucial for us to achieve many of the goals we have for the sector and the wider economy, particularly in terms of reducing emissions and preventing environmental degradation. These in turn are important for maintaining social license for farming, as well as a competitive advantage as consumers are increasingly concerned with food quality and health, and with the sustainability of the environment.

Additionally, smart use of technology, together with a skilled workforce, will enable industry and companies to move beyond volume, to value, in their output and exports, supporting a broader aim to move New Zealand up the value chain globally. As markets are increasingly more sophisticated, and business models expand (eg to include service elements), innovation in technology will allow New Zealand businesses to retain leading market positions.

Contributing to global challenges

The global market for agritech is driven by increasing food demand resulting from population growth and increasing environmental challenges, linked to climate change impacts. In order to meet the nutritional needs of up to ten billion people by 2050, food production will need to increase drastically. Clearly, New Zealand cannot feed the world on its own. However, New Zealand has the ability to develop production-improving technology that could conceivably have a global impact. Adopting a more global focus will help us break out of our domestic-market-oriented path dependency, which is particularly focused on pastoral based systems. As agricultural emissions make up nearly half of our greenhouse gas emissions[9], agritech also represents one of our most powerful tools for reducing emissions and combatting climate change.

Megatrends affecting agritech

The landscape of the food and fibre sector and agritech globally is changing rapidly. There are a number of ongoing trends that will impact our agritech companies and farmers.

Changing consumer preferences are impacting demand for food and fibre products

With a growing, increasingly urban middle class, especially in our key Asian markets, the demand for safe, healthy and convenient food is increasing. There is a growing preference for spending on services and experiences rather than basic nutrition. This includes a drive towards convenience meals and other value-added foods as well as products for restaurants and hotels, which are driving changes around food presentation and packaging, business models and the operation of global value chains.

[9] New Zealand's Greenhouse Gas Inventory 1990-2017, published April 2019.

Growing awareness about the pressures that food and fibre production is placing on the environment and communities is also driving demand for sustainable, ethical, low carbon production and processing techniques, including fair treatment of workers. We are already seeing the impacts of changing consumer demands in New Zealand, as well as internationally. Provenance and traceability from farm to plate is also growing in importance. These trends are being amplified by social media and community opinion on purchasing decisions, requiring the food and fibre sector to be better able to demonstrate its credentials and tell its story more effectively than in the past.

Increased market risk due to global political shifts and volatility

Along with increased market demand, we expect to see increased market risk. Increasing protectionism, threats to multilateral institutions and geopolitical volatility are all likely to disrupt market access and the competitiveness of commodity products. Continued investment in supporting rules-based international trade systems and agreements, reducing risks by diversifying markets and products and shifting to value-added products and services will be the best way to insulate ourselves from these threats.

Demographic changes are affecting the available workforces for agritech and adjacent sectors

Whereas a changing population in market will impact the sector, our changing demographics and culture will also have an impact, particularly across agritech and adjacent sectors workforces. Our future is likely to be more culturally diverse; with an increasing proportion of the workforce identifying as non-European. And as their participation in the workforce increases, our young people have different expectations and aspirations for the work they want to do and the sectors they work in. Sectors, including the food and fibre industry and agritech, will need to adapt to match those expectations and aspirations if they wish to attract upcoming talent. Some of this is driven by perceptions around social licence and working conditions in the food and fibre sector.

Policies to support skills and workforce development will need to reflect the cultural shift in our workforce and better meet the needs of different cultures and ensure that they are developing the wide range of skills needed to participate in meaningful employment across the agritech, and food and fibre sectors.

Labour supply shortages are affecting the agritech and food and fibre sectors

Another key factor impacting the global food and fibre sector is the increasing labour shortages that occur, particularly around key seasonal demand peaks. The labour issues act both as a constraint to the sector, and a major motivator for innovation. We are already seeing some businesses in the sector struggling to find seasonal staff, often in low wage positions. This situation raises questions about the sustainability of such business models and the typically regional communities that may rely upon such work.

There are additional shortages of higher skilled labour, both in the food and fibre sector (where it is needed to facilitate uptake of agritech) and in the agritech sector itself (where it is needed to develop agritech). Shortages exist in a number of areas, including robotics, data science and software development.

Climate change is changing growing conditions for the food and fibre sector and adaptation is required

How the food and fibre sector interacts with the environment is a major driver for change. The changing climate is already resulting in more frequent and severe extreme weather events, as well as rising sea levels and more destructive storm surge events. Over the medium to long term, changing rainfall, temperature and drought patterns are changing growing characteristics in some regions. These changes also increase the risk of biosecurity incursions and have flow on effects onto biodiversity outcomes. All of this requires an agritech driven adaptive response to increase the resilience of our farming and processing systems.

Technology and business model innovations are evolving rapidly, posing both threats and opportunities

Globally, new business models, technologies, and processes are reinventing food and fibre production and consumption, posing both a threat and opportunity to the food and fibre sector. Examples of trends that are likely to disrupt the way food and fibre are produced in the future are:

- Changes to production processes, such as internet enabled sensors, data analytics, artificial intelligence, robotics, high tech extraction/packaging techniques, increased automation, gene editing and biotechnology;
- Relocated and replicated farming environments – vertical urban farming, hydroponic greenhouse production;
- Reinvented food production techniques – lab grown meats, genetically synthesised foods and 3D printed food; and
- The emergence of new business models (eg social enterprise, change in ownership models such as corporate farming) and platforms (eg blockchain).

Some of these trends will mean that the food and fibre producers and workers of the future will not necessarily emerge from the current food and fibre sector but rather, the biotechnology or digital sectors.

Obstacles and constraints

There are several obstacles and constraints that have held back New Zealand's agritech sector, which help create an evidence base for action.

In considering the current state of the agritech sector, we have developed a base hypothesis for the slow growth of the sector. There is no single factor; rather there are a number of interrelated issues, as outlined below. Some of these are contextual and high level, while others are more specific issues where government intervention is warranted. In Part 3 of this document we will build on this to create an action plan to address the key issues.

Case Study – Tiaki : Precision Seafood Harvesting

A new approach to an old way of fishing

The Tiaki modular harvesting system is an innovative new fishing method and handling system with the potential to change the way the world fishes.

It uses Precision Seafood Harvesting technology. With this technology fish are contained and swim comfortably underwater inside a large flexible PVC liner, where the correct size and species can be selected before being brought on-board the fishing vessel.

The design of the harvesting system allows fishing vessels to target specific species and fish size, and greatly increases protection for small fish that can swim free through 'escape portals' and non-target fish (by-catch), which are released unharmed.

Developed in New Zealand and driven by the desire to deliver better quality seafood and safeguard the future of our oceans and fish stocks, Precision Seafood Harvesting is a great Kiwi story; the outcome of a Primary Growth Partnership programme between the Ministry for Primary Industries, Sealord Group, Moana New Zealand and Sanford Ltd.

www.tiaki.com

1. Our agritech expertise has historically been in relatively specialised areas

New Zealand's agricultural expertise has predominantly been in pasture-based management systems, reflecting the country's longstanding economic comparative advantage in this area. Sheep and dairy farming have relied on a pastoral model which has led to technology being developed to support this approach.

This has had two impacts:

Firstly, a lack of applicability to a broad range of international markets. Only a relatively limited number of international markets have similar pastoral systems to New Zealand (eg Ireland, Chile, Argentina and Uruguay) and the predominant farming systems used globally (ie feed lots and animals housed in barns) largely do not utilise the same sorts of technology developed in New Zealand. This has led to a limited global demand for New Zealand agritech.

Secondly, the product spaces where expertise has been developed do not have straight-forward adjacencies in these more common systems. Developing expertise in pasture-based systems doesn't mean we easily have the ability to apply these into other farming methods (partially because, for example, we lack the production testing facilities).

2. Agritech innovation has been for largely domestic use

While there have been a large number of technological innovations, many have primarily focused on domestic production and haven't sought out international markets. This can be seen in two distinct forms: New Zealand products and innovations are not being adapted for offshore markets; and New Zealand innovators are not looking outside of New Zealand for problems to solve. There are obvious and clear counterexamples to this, but the domestic ecosystem has tended to dominate activity.

Large players in the agriculture and food and fibre sectors have not necessarily had the mandate or desire to develop technology with a broader focus than their own production needs, meaning large potential contributors to the innovation-export ecosystem are not participating.

Both the commercial and innovation sectors have limited international links and exposure to global agritech issues. Significant effort and investment is required to develop these links and to sufficiently understand issues and be in a position to develop solutions.

The Innovative Partnership's model led by MBIE has created successful frameworks and models for addressing the challenges of working with international partners to focus on global opportunity. More can be done to build on this work.

In addition, some of the actors in the innovation ecosystem are directed by legislation, and by historical priorities, to focus on the domestic market. This means that developing tech for a global market will be a significant shift in operating model and structure for many of them.

3. A disconnected flow of commercialisation activity

Our research institutes are producing high quality, valuable research, a significant proportion of which has applicability into the food and fibre sector.

Though New Zealand is significantly underperforming on R&D spending as a proportion of GDP compared with the OECD average, agritech and food and fibre sector R&D is one area of strength. $640m was spent

on R&D for the food and fibre sector in 2018[10] ($310m by business, $260m by Government and $70m by higher education). R&D for food and fibre sector made up one-third of Government R&D spending in 2018.

However, there is a sense that New Zealand struggles to bring research-based agritech ideas to market, meaning they are not fully exploited or commercialised into finished products and services.

This could be for a number of factors, including gaps in required commercialisation skillsets and experience, or regulatory settings. There could also be a disconnect between the actual market demand for research/IP versus the perceived demand, particularly if product development is not sufficiently informed by customer/user needs. Further work needs to be done to better understand these constraints.

Organisations like Kiwinet and Return on Science as part of the Commercialisation Partner Network address some of the challenges in this area, and progress has been made, but it is clear that more is required to smooth out the commercialisation flow.

The Government's recent introduction of the R&D tax incentive is expected to increase private sector investment in R&D and consequently increase commercialisation but will not solve other constraints.

4. A shortage of growth capital

There is a general lack of growth capital in the New Zealand technology sector, particularly in the venture capital / series A space. This general shortage is also true in the agritech space, and there historically haven't been specialist funds or investment expertise to fund products and international growth. Government's recent announcement of a new $300m venture capital investment fund will be significant in addressing this capital gap, but further work will still be required to attract additional necessary capital and expertise.

There is also a perceived gap in seed funding for the agritech sector that is hindering growth and limiting commercialisation and the emergence of spin outs. More work is required to determine the existence or size of any gap in seed funding.

To some extent the flow of commercialisation activity is curtailed by a relatively lower amount of corporate venture activity (eg intrapreneurship) in New Zealand compared to other countries, which in turn has some connection to our large cooperative based organisations, which dominate the agritech sector.

5. Geographic spread and lack of collaboration (weak agglomeration)

To some extent, New Zealand's geographic spread has hindered collaboration between parties, leading to some duplication of effort, and a lack of innovation diffusion. We have a small number of clusters of expertise nationally, particularly around Lincoln University outside Christchurch, around Massey University outside Palmerston North, and lately (particularly in the horticulture sector) in the Bay of Plenty. However, these are generally sub scale and tend to be missing components that would be present in similar clusters globally where national centres of expertise form more naturally due to a smaller geography eg the Dutch Wageningen University & Research (WUR) centre.

6. Barriers to uptake of some technology innovations by the farming sector

Though innovations are being developed, uptake of some technology amongst New Zealand farmers has been slow. This inhibits both the growth of agritech companies and improvements in on-farm productivity and sustainability. Landcare research's 2017 Survey of Rural Decision Makers asked about uptake of precision agriculture and automation and robotics. Overall uptake of precision agriculture was low, with almost 90% of respondents indicating no use of precision agriculture, and 97% indicating no uptake of

[10] StatsNZ and Ministry of Business, Innovation and Employment R&D Survey, 2018. Due to data limitations, figures include spending on forestry R&D.

automation or robotics. Uptake varied by sector, with 44% of arable farms reporting uptake of some novel technologies, while only 19% of dairy farms reported uptake. Some of the reasons for this include:

- Owner/operators tend to rely on their peers rather than experts as a key source of information when making change; new ideas take time to gain favour;
- Production systems based on biological systems tend to be more difficult to adapt to change because of their complex nature and long production timeframes;
- New ways of doing things can introduce risk (even if it is just perceived risk) into the system (especially when it comes to food safety), potentially damaging the integrity of the food system, so risk and change need to be balanced carefully;
- There are difficulties accessing relevant independent advice or capital to adopt innovations;
- Many farmers already have significant amounts of capital tied up, reducing their appetite or ability for further investment;
- The skills required to implement significant change are quite different to those required for traditional food production;
- Skills shortages overall in the food and fibre sector;
- There is uncertainty about whether change will actually deliver benefits or create stranded assets in the face of other requirements (this is a particular issue when considering efforts to deal with water quality and climate change mitigation);
- Some rural infrastructure limitations (such as rural wifi) hinder uptake; and
- Some technologies are not being developed with the needs and abilities of the end user in mind; if the value proposition is not clear, then uptake will be limited.

However, we must recognise that in many areas, New Zealand farmers are rapid adopters of technology, especially relative to their overseas counterparts. This is particularly true where there is a clear value proposition and the impact is proven and understood.

We should also note that there is a significant response in progress to these issues from the Ministry of Primary Industries, through its Extension Services Model, and in time they will publish more information on this initiative.

THE EXTENSION SERVICES MODEL

The Extension Services Model is a farmer-led, farmer-focused approach to support sustainable land use decisions and improve economic, environmental and well-being outcomes for farmers and their communities. It has been developed by the Ministry for Primary Industries (MPI). Extension is about farmers working together in their community groups along with rural professionals, industry groups, and government to ask tough questions of one another within trusted circles and coming up with practical solutions to issues. The programme aims to help:

- Expand and deepen the skill base among farmers through peer to peer learning;
- Support coordination and sharing of ideas; and
- Build on existing capability and networks within local communities.

7. A lack of openness, interoperability and defined standards for technology and data

Currently, in order to incorporate the range of technologies available to improve food and fibre production, it is necessary to use a variety of systems which may not be cross-compatible eg an irrigation management platform, fertiliser management platform and animal tracking platform all on one farm. This means farmers are required to learn and operate multiple systems simultaneously. This is challenging, inefficient, and inhibits adoption of these technologies. This is particularly true when the data produced by systems cannot

be easily integrated into other systems. Data standards exist but are commonly passed over in favour of individual approaches.

Data related to agritech is sometimes locked in silos with limited data sharing occurring. This protective approach inhibits innovation, and companies and researchers are not able to generate benefit from data that lies dormant and may be of limited benefit to the data holder. This approach occurs because of the investment required to produce data and related free-rider problem, and the reluctance of giving up any possible competitive advantage.

8. A lack of skills and focused skills development approach

The skills required to create high-value agritech businesses come from a mix of disciplines: a knowledge and empathy for the real-world problems of food and fibre production, plus a deep knowledge of technology, and in particular emerging technology such as the Internet of Things, 5G data exchange, and blockchain technology. This needs to also be coupled with good insights into human behaviour and decision making, and of course how to run a strong and growing business. At a number of levels, skillsets need to be consciously lifted.

Other countries have specific initiatives to lift skillsets across the range of required disciplines (eg Wageningen University & Research in the Netherlands) focused on agritech.

In New Zealand, there are some attempts to address skill development, and some universities have some programs to address gaps, but not on a national or sustained scale. Recently announced reforms of vocational education may assist in this area.

9. A lack of sustained and coordinated commitment from Government and industry

To some extent the lack of growth in the agritech sector is due to the lack of a clear signal from government through policy and other mechanisms about the importance of the sector to New Zealand. Agritech has been largely neglected as a focus while the agricultural sector has received more attention. Initiatives have not been looked at as multi-year interventions, leaving them vulnerable to change.

Similarly, it has only been very recently that the agritech industry has coalesced into an industry representative group focused on the common issues and opportunities for the sector. The completion of an agritech ITP should address this issue, setting a long-term vision for the sector and the actions to realise it.

10. Measurement

The agritech industry is not clearly defined. Agritech is a crosscutting industry that includes goods and services across a wide range of sectors. The lack of an agreed definition of the agritech sector makes it difficult to quantify and to track the sector's growth and this in turn may inhibit investment into the sector. These issues have also led to a lack of data sharing on agritech, which limits coordination and effective government work in the area.

11. Regulatory differences, both at a national and regional scale

Differences in regulations occur both domestically, making for an uneven playing field and hindering adoption, and internationally, making it difficult for New Zealand agritech companies to export overseas. When seeking to register new products and innovations in foreign markets there are often strict regulatory settings that have to be met, and which typically vary from market to market. This means agritech exporters must invest significant time and resources to fully understand and navigate the regulatory environments of each new market. Our international engagement systems, run by NZTE and the Ministry of Foreign Affairs and Trade (MFAT), have a key role to play here.

12. Complacency

There appears to be a common perception among the wider New Zealand population that we are already a world leader in agritech. This is an assumption which is not borne out by the evidence (eg exports, level of investment). To some extent this is a factor in the lack of focus on agritech and lower-than-expected activity and investment into the creation of novel technologies.

In contrast with other global agritech leaders, such as Israel, the Netherlands or Singapore, New Zealand hasn't had a significant and immediate crisis or constraint in our food and fibre sector that often motivates action. New Zealand has relatively large, naturally productive land and sea resources, meaning historically we were less reliant on agritech and have now fallen behind global leaders in food and fibre productivity.

Advantages & opportunities

We enjoy some advantages and opportunities when it comes to the agritech sector. These should provide conditions and incentives for growth.

1. New Zealand's strong agricultural reputation in pastoral systems

We are known for our agricultural excellence and our products have a reputation for being high-quality, ethical and environmentally friendly. This reputation also extends to agritech products and provides a strong foundation for future expansion. Maintaining and building this reputation will become increasingly important as traceability becomes more ubiquitous; the New Zealand brand will grow as a selling point in itself, as long as this reputation is maintained.

2. Existing world-class research

We have collectively invested substantially in agriculture and agritech research. We have a high level of expertise in the research space, and also develop a lot of IP. If commercialisation skills and funding gaps are addressed, the scientific foundation for commercial opportunities is already in place. This is more a matter of long-term focus and direction, rather than needing to build new capacity.

3. Geographic advantage

New Zealand's geography also offers a unique opportunity for increasing two-way tech transfer. New Zealand provides a base for ongoing research & development as well as testing during the northern hemisphere's 'off-season'. By leveraging this dual seasonal dynamic, New Zealand has the opportunity to attract more offshore investment into its agritech sector, as northern hemisphere businesses look to capitalise on our geography.

New Zealand's geographical proximity to Asia and cultural proximity to Europe and the United States puts us in an advantageous position from a trade perspective. To the extent that New Zealand firms can effectively use these dual links, it provides them with a comparative advantage over many other global players. Companies who target both the Asian and American markets benefit from favourable time zone overlaps.

4. Existing Free Trade Agreement (FTA) framework

We are party to a number of trade agreements (eg CPTPP, China FTA) providing favourable terms with some of the largest markets in the world. This means that New Zealand agritech firms will have broad

preferential access to global markets. Work is also underway to expand this access further through additional agreements such as the FTA with the European Union.

5. Strong supporting institutions and responsive regulatory models

Our institutions have a reputation for being robust and reliable, but also adaptive when it comes to regulations. This allows New Zealand to be highly flexible to market changes and acts as a strong encouragement to investment and partnership with overseas firms looking for testbeds or other opportunities. In some cases, joint recognition of regulatory approvals can mean no additional testing is required in some markets.

In addition, as shown later in this document, there is already some significant work and programmes from government (central and local) to assist the agritech sector's growth.

6. New Zealand as a testbed/knowledge partner

New Zealand has established itself as a good proving ground and testbed for new technologies, generally, as in the IT and space sectors, and in agritech, including the integration of drone technology into food and fibre production systems. Our small, advanced economy offers the opportunity to test products and approaches in a mature environment with relatively little effort in terms of managing compliance issues and low consequence of failure.

Source: New Zealand Story & NZTE

7. Structured towards a long-term approach

There are a significant number of organisations across the food and fibre sector that are run as cooperatives. Notwithstanding pressures around debt repayment and the need to maintain dividends and pay out, cooperatives are generally less focused on short-term performance for stock price gains, they are more able to invest for the long term.

This long-term planning approach is also a feature of Te Ao Māori, and Māori make up a significant part of the food and fibre and agritech sectors.

8. Links to foreign markets and knowledge of supply chains and regulations

Our existing strengths in the agribusiness and food and beverage sectors mean that we have strong institutional knowledge of global supply chains, and market access requirements and distribution networks, including dealing with complex regulations. MFAT and NZTE have significant links and knowledge of other markets, and work closely with companies to transfer this knowledge. The more this can be diffused throughout the sector, the more it will provide opportunities across the agritech industry and allow for more partnership-based approaches to exports.

Source: New Zealand Story & NZTE

Part 2 – The Response

To respond to these challenges and opportunities a cross-agency agritech Taskforce has been formed with the aim of engaging with the broad agritech ecosystem and designing and coordinating an agritech ITP.

The Taskforce includes representatives from: the Ministry of Business, Innovation and Employment (MBIE); New Zealand Trade and Enterprise (NZTE); Callaghan Innovation; the Ministry for Primary Industries (MPI); the Ministry of Foreign Affairs and Trade (MFAT); and the New Zealand Venture Investment Fund (NZ VIF). MBIE is the overall lead agency responsible for the development and execution of this ITP.

This Taskforce has worked closely with Industry on the creation of this ITP.

Vision

The vision for the agritech sector shared by industry and government is:

"A globally competitive agritech ecosystem, producing ingenious value-adding companies that provide meaningful jobs, solving New Zealand and the world's sustainability problems"

New Zealand Agritech - good for the world

Strategic decisions

The vision statement outlined has some embedded strategic decisions:

Thinking globally

A measure of success for the agritech ITP will be our impact globally, not just on New Zealand's production processes. Our aspiration is to create a sector that is good for the world and has global relevance, especially as a provider of solutions to global productivity and sustainability challenges.

An ecosystem perspective

The agritech sector is an ecosystem with many players, and any intervention needs to take into account the multiple parties and the interplay between them. See figure 2, on page 23, for more detail.

'Companies' as a unit of measure

The unit of measure for our work will be the companies: the economy and sector will grow as the result of growing individual, and groups of, companies. We wish to increase both the size of individual companies (eg through revenue, value, employment) and number of companies in the agritech sector. The interventions and actions need to ultimately have impact for companies; specifically, companies that contribute positively to the wellbeing of New Zealanders.

Choice of value-adding

One of the key themes of the Government's industry policy is to move from volume to value. We will support companies to deliver, and enable their customers to deliver, high-quality and highly valued goods and services.

Importance of quality employment

The types of companies that we want to support are those that grow inclusively and provide high-skill, high-value, secure and rewarding jobs.

Sustainability at the core

Sustainability is at the core of the Māori value of kaitiakitanga, an idea which New Zealand is embracing more fully. We feel there is a significant advantage and resonance in positioning New Zealand as a home for highly sustainable products, and that we need to keep a broad definition as to the meaning and interpretation of sustainability. This links in with MPI's Sustainable Food and Fibre Futures (SFF Futures) programme.

This definition should not be limited to environmental issues but include business models that support high value employment and thriving regional economies.

SUSTAINABLE FOOD & FIBRE FUTURES

Sustainable Food & Fibre Futures (SFF Futures) funds innovative projects that will increase sustainability and create more value from the food and fibre industries.

Projects could be about developing new products or services, or ideas for creating new jobs, increasing skills and capability, or encouraging better collaboration and information sharing. They can range from small, one-off initiatives requiring a small grant, to long running, multi-million-dollar partnerships.

For example, one recent SFF Futures project is investigating how farm data can be used to inform land diversification on remote Māori farms and aims to ensure that farms without ICT connectivity will be able to be part of a traceable New Zealand story.

SFF Futures supports projects from all over New Zealand, created by businesses, non-government organisations, researchers, training institutions, Māori landowners, community groups, and industry bodies. Applications are expected to prioritise value over volume.

The agritech ecosystem

In developing this ITP, we considered the overall interdependent system for the agritech sector. We cannot make a transformative change by addressing parts of the ecosystem in isolation and must develop and implement actions that address the broader agritech sector.

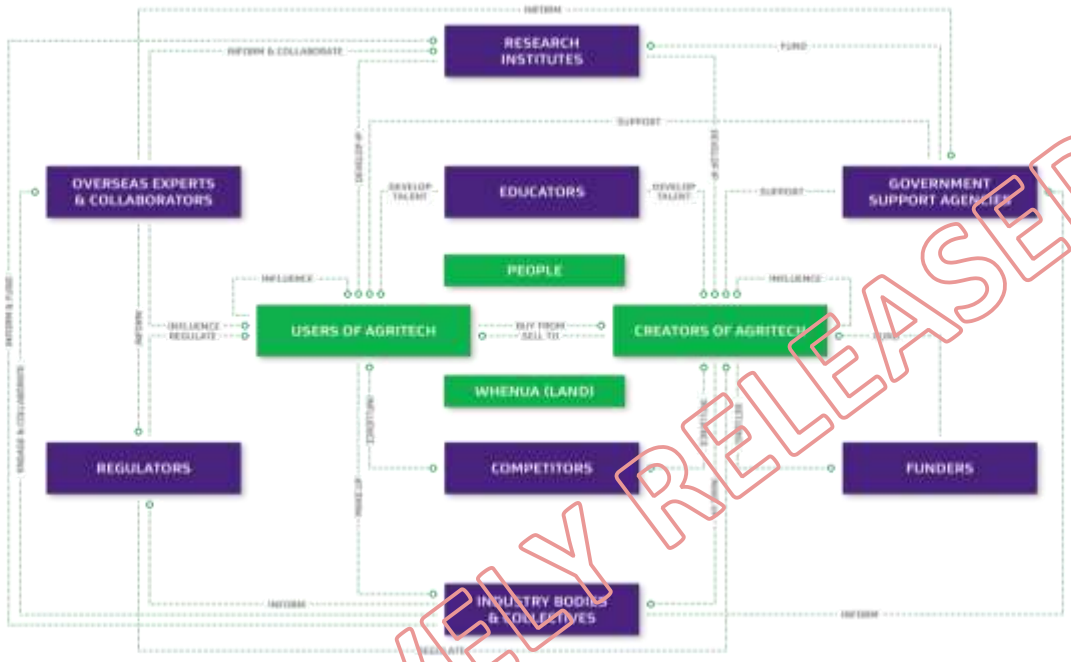


Figure 2 – The Agritech Ecosystem

Simplistically, the system involves

- People: these are the consumers of the food the agritech system contributes to. People are looking for safe and healthy food and the overall system needs to contribute to that. Additionally, they are the workers across the ecosystem, enabling the creation, development and use of agritech;
- The whenua / the land and sea; virtually all agritech will have a relationship with the environment, and protecting the natural environment needs to be a core consideration of agritech;
- Users of agritech: typically workers, and also purchasers of agritech;
- Creators of agritech: typically (though not exclusively) companies, often in partnership with the science system and through international technology transfers;
- Industry bodies and collectives;
- Funders of agritech companies;
- Educators and academia;
- Research institutes (universities, Crown Research Institutes, and Independent Research Organisations);
- Regulators (eg MPI, MBIE);
- Government support agencies (eg NZTE, Callaghan Innovation, MPI, MBIE);
- Offshore expertise and collaborators; and
- Competitors (learn from best practice, be early adopters).

THE ROLE OF MĀORI IN AGRITECH

Māori are a key part of the overall agritech ecosystem (see figure 2), having a core role across many aspects of the food and fibre sector and related activity. As well as historical contributors to the use of technology in farming, Māori have key roles as producers, consumers and funders of technology, and across most associated activity. Māori are holders of significant primary industry assets, have rights and interests in key resources (e.g. water), and are cultural/spiritual kaitiaki.

Dependencies and linkages

This ITP is linked to a number of adjacent strategies, plans and policy programmes, including:

- The Primary Sector Council review;
- The Te Hono programme;
- Sustainable Food & Fibre Futures;
- The Forestry Strategy;
- The One Billion Trees programme;
- Future of Work, including the Future of Work Tripartite Forum;
- Just Transitions work;
- Early-stage capital;
- The Green Investment Fund;
- The Provincial Growth Fund;
- The International Growth Fund;
- The Research, Science and Innovation work programme, including R&D Tax incentive;
- Renewable Energy strategy work programme; and
- The existing research and innovation ecosystem (Crown Research Institutes, Independent Research Institutes, Universities, Science policy).

The agritech ITP is just one of four initial plans to be developed, with other sectors to follow over time. Those responsible for the agritech ITP are coordinating with those leading the development of other plans to ensure synergies are identified to maximise the effectiveness of plans. Areas where common solutions may be required should also be explored to ensure that work is not replicated, and cross-industry solutions can be developed.

Outcomes

It is important that we are able to measure and evaluate the effectiveness of our actions; to identify where we are succeeding and where there are still issues to overcome. Our efforts are only one of many factors influencing the outcomes for the sector and so we cannot definitively evaluate our efforts solely based on outcomes, and should also consider evaluating our own processes and outputs.

The net result of our actions compared with the status quo should be:

- A measurable growth in export revenue for companies in the sector;
- A measurable increase in jobs, and in particular high-value jobs, coupled with increased skill levels;
- Wages growing faster in the agritech sector than other sectors.
- A measurable growth in productivity of companies utilising agritech, both in New Zealand, and globally;
- A more rapid uptake of technology for productive purposes;
- An increased flow of investment into the sector and into our regions;
- An increased number of new companies and coalitions formed, and new products launched;
- An increased amount of IP taken through the research and commercialisation system to prototype or Minimum Viable Product (MVP) stage;
- An increased number of international connections and parties collaborating and active in New Zealand;
- Improved environmental outcomes from the food and fibre sector; and
- Improved economic stability in the food and fibre sector through more efficient land use and more sustainable business models.

The above list is indicative at this stage. A detailed measurement and evaluation approach will be developed to ensure ongoing accurate evaluation of the effectiveness of our actions, overall and in distinct workstreams.

Existing agency work programmes

It is important to acknowledge the breadth of support that already goes into the agritech sector. This support extends from early stage research, all the way through to increasing farmer adoption, or accessing foreign markets.

R&D and Innovation support

At the R&D stage there are broad programmes to support R&D that also benefit agritech research, such as the R&D tax incentive or MBIE's Endeavour Fund, Partnerships Scheme, National Science Challenges and Strategic Science Investment Fund, which have supported specific agritech research. More agritech specific is MBIE's investment through the Regional Research Institute Fund in the PlantTech Research Institute. PlantTech is focused on digital automation of devices in horticulture.

Another key initiative is MPI's Sustainable Food & Fibre Futures programme (which superseded the earlier Sustainable Farming Fund and Primary Growth Partnership programmes) to co-fund innovative projects to increase the value of the food and fibre sectors.

Increasing adoption

There are also efforts underway to increase uptake of agritech technologies such as Callaghan Innovation's Emerging Technology workshops, MPI's Extension Services Model and MBIE's arable farming small business uptake of ICT pilot. Also included in this is the vital sponsorship that a number of agencies provide to Fieldays, including support for specific agritech content and other promotion for agritech at events such as technology showcases or Innovation Walks/Tours.

Direct firm support

Agritech businesses receive support in a number of ways, particularly through the efforts of NZTE and Callaghan Innovation. Callaghan Innovation works directly with approximately 300 New Zealand agritech organisations and supports initiatives such as the Sprout Accelerator, the Capital Education Workshop and overseas Missions. These Missions, often run in partnership with NZTE, include on farm visits and innovation centre tours based around targeted events, eg evokeAG (Australia), Forbes Agtech (USA) and Irish Ploughing Competition (Ireland).

NZTE works directly with approximately 130 New Zealand agritech companies, primarily supporting individual businesses' global growth strategies. They have supported the staging of, or New Zealand participation in, a number of events and workshops, both in New Zealand and internationally. This includes supporting New Zealand agritech businesses at Irish Plough, Agroleite Brazil, Dairy Day in the UK and many more. NZTE also runs market research into specific markets for the benefit of the agritech sector as a whole. NZTE manages the International Growth Fund, supporting NZ businesses including in the agritech sector, through co-investment in international growth projects that will have a positive impact on the New Zealand economy.

Industry (Agritech New Zealand) Workplan

Agritech New Zealand (the industry body for agritech in NZ) has developed and is executing the following workplan:

Partnering with the Precision Agriculture Association of New Zealand (PAANZ)

A key milestone for Agritech New Zealand in 2019 is its partnership with PAANZ.

PAANZ's focus is on promoting the adoption of agritech by New Zealand farmers and growers. This compliments Agritech New Zealand's mission, which is to scale New Zealand's agritech sector to grow export sales and become a more significant player in the global market.

PAANZ will become the 'adoption of agritech' workgroup within Agritech New Zealand. By combining the skills and resources of both organisations into a single entity, Agritech New Zealand will represent the widest interests of the country's agritech community.

New Zealand Agritech Story

Agritech New Zealand has been working with NZTE since the end of 2018 to build a compelling and cohesive New Zealand Agritech Story. The Agritech Story was previewed on June 2019 at National Fieldays by the Minister for Trade and Export Growth and formally launched in New Zealand and at the Irish Ploughing Championships in September 2019.

The intention is to transfer the New Zealand Agritech Story portfolio to Agritech New Zealand for ongoing development.

National Fieldays 2020

Agritech New Zealand hosted 'agritech Unleashed' at Mystery Creek in June 2019. A memorandum of understanding with National Fieldays is designed to provide further collaboration in 2020 and 2021.

Provisional support for a $250,000 investment prize has been received from an international partner for Fieldays 2020.

Farm2050 Country Partnership

In August 2018, New Zealand became the first 'country partner' of Farm2050. Farm2050 is a global agritech initiative that brings together world-leading researchers, farmers, entrepreneurs, manufacturers, and distributors to solve the global food challenge by accelerating the path for new disruptive AgTech ventures. Agritech New Zealand is working pro-actively with multiple Farm2050 partners around future initiatives including;

- Identifying disruptive technologies around nutrients: a 3-year initiative that will see New Zealand and offshore agritech companies field trialling nutrient technologies in New Zealand to improve plant yield and mitigate against negative environmental impact such as run-off. See the High Impact projects section below.
- Potential focus on automation.

Western Growers Partnership

In August 2018, Agritech New Zealand signed a partnership agreement with Western Growers. Western Growers members produce 50% of all North American fresh produce: vegetables, fruit, nuts & organics. The key purpose and focus of the Agreement is for New Zealand agritech companies to provide automation solutions to Western Grower members. This provides a significant commercial pathway for New Zealand agritech researchers and companies working in the robotics & automation space. A recent asparagus harvester initiative with the University of Waikato and Western Growers is a template for developing such opportunities.

Following a visit to Salinas in June 2019 for the Forbes Live event and a few days meeting growers 'on-farm', the opportunity to establish a New Zealand Robotics, Sensing & Automation Academy was discussed. This is an ongoing conversation with Callaghan Innovation taking the government lead. Callaghan, together with Agritech New Zealand, have hosted post-Forbes workshops in New Zealand to develop the concept. A further workshop is scheduled for November 2019 in Hawke's Bay.

The Australia New Zealand Agritech Council

The Australia New Zealand Agritech Council was launched at the Australia New Zealand Leadership Forum (ANZLF) meeting in Auckland in September 2019. The Council will work closely with Agritech New Zealand, but it is a distinct separate entity. Its first mission is to promote the trans-Tasman region's agritech sector to global investors.

The Council provides several other opportunities to scale New Zealand's agritech sector through co-operation with Australia's agritech ecosystem. The intention is to develop a desk in both San Francisco and Singapore in its first year of operation to support this work. Other opportunities include the potential creation of landing pads in target markets to ensure that agritech companies from both countries can receive in-market support. In all its work, the Council intends to work with the appropriate government agencies from both countries.

The Council supports the vision of the ANZLF and plans to work with both public and private sector partners on both sides of the Tasman. Its immediate mission will scale through 2020/2021.

EvokeAG 2020 & 2021

Almost 100 New Zealand agritech researchers & entrepreneurs attended the inaugural evokeAG conference, held in Melbourne, in February 2019. Although organised by AgriFutures Australia, the intent is for evokeAG to be viewed globally as a trans-Tasman agritech vehicle.

Agritech New Zealand's Executive Director sits on the evokeAG steering committee. Working closely with the AgriFutures leadership team, he is working to develop more trans-Tasman (New Zealand) content into the evokeAG program.

Supporting Inbound & Outbound missions

Agritech New Zealand works with Callaghan Innovation and NZTE to support inbound and outbound missions. In 2019, outbound missions included:

- evokeAG in February;
- Forbes Live, Salinas in June; and
- Irish Ploughing Championships in September;

Agritech New Zealand also supported in-bound delegations, including Innovate UK in March and an international delegation (through Finistere Ventures) during Fieldays week.

Case Study - Bluelab

Smart simplicity for water-based growing

Hydroponics are enabling a new wave of urban-based, clean food production with less water use and environmental impact, but accurate sensors and automated processes are vital for good results.

Bluelab is a world-recognised leader in meters and controllers for water-based plant growing systems – offering accurate controls for digital pH, conductivity, nutrient formulations, temperature, analysis, and automation technology.

Its products include the Pulse handheld root zone meter, which provides moisture, nutrient and temperature information with a single button press – all collected on a dedicated smartphone app for instant crop health management.

www.bluelab.com

Source: New Zealand Story & NZTE

Part 3 – Action Plan

In addition to the existing work plans for government, and for the industry group, we have highlighted new activity that will accelerate the growth of the New Zealand agritech sector.

Some of the actions require further detailed definition and implementation planning, while others can begin execution more quickly. A programme plan has been established to manage a number of workstreams and some high impact projects, to maximise the opportunity to move quickly where possible.

The programme action plan has two major components: actions that grow the overall ecosystem, and so may be longer term and require coordination across agencies; and some projects which can be accelerated for high impact in the near term.

High Impact Projects

A number of projects have been highlighted as having the opportunity for making significant impact in a short period of time and have been selected for further exploration as part of this plan.

Project 1 – Horticultural Robotics Academy

The opportunity exists for New Zealand to develop a Robotics, Automation & Sensing Academy to take a global leadership role in this significant area of agritech.

New Zealand already has a number of outstanding research teams working in this space, providing an opportunity for New Zealand to take a global leadership role in horticultural robotics. Found in universities, CRIs and private companies, the challenge has been that these teams are small in size and much of the research has been focused on addressing New Zealand food and fibre sector problems.

The Academy would help to address this. As a centre for collaboration it would help to overcome the issues of scale, emphasise more of a global focus and ensure that New Zealand researchers and entrepreneurs can lead the world in this space.

Horticultural labour remains the most significant issue in the sector globally. In New Zealand this is felt particularly for the kiwifruit, apple and grape sectors. The need for on-farm and on-orchard automation to help address this issue is only going to grow, providing New Zealand with a multi-billion dollar commercial opportunity.

Globally, awareness of New Zealand's capability in this area has grown.[11] In August 2018, Agritech New Zealand signed a strategic partnership agreement with Western Growers. Western Growers members account for approximately 50% production of all fresh produce in North America (fruit, vegetables, organics). They are looking to New Zealand to help their members address the major challenge of labour shortages and costs by automating a number of on-farm processes.

A delegation of over 20 New Zealand robotic and sensing researchers and entrepreneurs visited Western Growers in Salinas, Northern California to understand the scale of the problems Western Grower members

[11] This has been assisted by Yamaha Ventures NZ $12M investment into Bay of Plenty-based Robotics Plus, together with Finistere Ventures more recent investment into Invert Robotics.

are facing and how New Zealand research and robotics and automation could help address them. This partnership offers a significant new commercial pathway for New Zealand researchers and businesses to scale their sights.

Development of a New Zealand Horticultural Robotics, Automation & Sensing Academy will help industry to seize this opportunity. It will act as a means of collaborating across the sector, help to foster greater innovation and knowledge sharing, grow capability and drive New Zealand's international competitiveness.

The Bay of Plenty has been identified as a potential venue for such a site. It is home to the regional research institute, PlantTech, as well as leading robotic and automation companies such as Robotics Plus, BlueLab & GPS-it. These companies are already commercialising the robotic and automation research output of several of New Zealand's universities and research institutes.

An early area of focus is likely to be the commercialisation of an automated asparagus harvester developed by Waikato University researchers. This is an existing project with strong potential that can be maximised through Academy support.

Project 2 – Hosting the Farm2050 Nutrient Initiative

Farm2050 is a global agritech initiative that brings together world-leading researchers, farmers, entrepreneurs, manufacturers, and distributors to solve the global food challenge by accelerating the path for new disruptive AgTech ventures.

Identifying disruptive technologies in nutrients is the first major joint initiative being proposed for New Zealand's agritech sector by Farm2050 and Agritech New Zealand. How to achieve more sustainable farming is a key issue, not only in New Zealand but globally, and will help address some of the serious environmental concerns that the poor application of traditional nutrients can create, such as run-off.

As government and the public's focus on the negative environmental impact of farming increases (specifically the dairy sector), this Initiative provides a significant proactive opportunity for New Zealand to address these issues. It also provides New Zealand with the opportunity to take a global lead in this work and is an area that has significant commercial export potential.

To achieve this New Zealand needs to create scientifically valid/statistically significant trials that allow for analysis, optimisation and automation of farming activity, coupled with exploring new biological methods of improving soil nutrition. The Initiative will focus initially on trials of technologies across:

- soil sensor technologies to accurately measure water and nutrient movement, supported by sampling;
- imaging analysis of crop/pasture biomass, nutrient uptake and correlation of soil data;
- automation of irrigation/fertigation based on agronomic prescriptions generated from analytics/sensors to improve yield/uptake and test minimisation of runoff;
- biological/microbiome soil amendments to increase soil health and productivity including alternative nutrient technologies (vs fertilisers); this could also include increasing carbon sequestration; and
- a practical working solution for management with New Zealand application (in line with Agritech New Zealand's participation in Farm2050).

These trials will be undertaken collaboratively, with a number of potential partners in New Zealand having already been identified. Field trials will start with 50-75 farms across representative grower areas, including Pamu, Māori farm groups (including PKW Farms, Taupo/Turangi (Tuwharetoa) farms, Wairarapa Moana,

Project 3 – Creation of a specialist agritech venture capital fund

Lack of available investment capital is a key constraint to the emergence and expansion of start-ups, and the commercialisation of research in the New Zealand agritech ecosystem. While globally investment into the agritech sector has exploded in recent years, we haven't seen the same level of investment into the New Zealand domestic sector (according to Pitchbook), although there have been notable exceptions, such as recent international investments into Invert Robotics and Robotics Plus.

In May 2019, Government announced the establishment of a $300 million, 15-year venture capital fund as part of Budget 2019. This fund will be managed by the New Zealand Venture Investment Fund (NZVIF) and governed by the Guardians of New Zealand Superannuation. This fund includes the possibility of the development of specialised funds within the larger venture capital fund.

A number of parties have approached NZVIF expressing interest in establishing a specialised New Zealand agritech venture capital fund. It is hoped that given this interest, a significant fund could be established with matched funds from a partner and the venture capital fund. Such a fund would be effective at addressing the gap in early-stage funding for New Zealand agritech.

Discussions around this opportunity are ongoing between NZVIF and possible partners.

Ecosystem development plan

A series of actions have been prepared to grow the New Zealand agritech industry. These actions have been developed to address the constraints and opportunities identified in Part 1 of this ITP, and help achieve the vision described in Part 2. These actions cut across the wider agritech ecosystem and have been grouped broadly into six workstreams. These workstreams overlap and are complementary, both to each other and to the existing work identified above.

Workstream One: Global

Global Lead Agency: MFAT

There are three areas of focus within the Global workstream:

- Connecting the New Zealand agritech ecosystem to global opportunities
- Learning from global agritech leaders
- Collaborating with Australia

Improve awareness and engagement with global opportunities amongst the New Zealand agritech ecosystem

Currently New Zealand agritech researchers and firms are overly introverted, focusing primarily on the problems and needs of the New Zealand food and fibre sector, and largely ignoring the broader global issues that could be addressed. Due to the relatively specialised pastoral nature of the New Zealand farming system, there are limited opportunities to export these domestic-focused solutions to the profitable international market. Increasing the focus on international challenges and opportunities for New Zealand agritech can provide significantly larger economic returns due to the larger possible target market.

We see a major opportunity in better connecting local agritech firms and the innovation ecosystem to international demand and opportunity, as well as seeking international collaborations. This may be achieved by fostering direct connections or by using government as an intermediary, working to understand international agritech needs and problems and relaying that information through to the New Zealand ecosystem.

Work is also required to ensure that New Zealand agritech companies can go out to foreign markets and receive the support they need to succeed and develop export opportunities.

The global agritech market is diverse, with different requirements, methods of farming and challenges for the food and fibre sector. Therefore, to achieve any meaningful success, targeting is necessary to identify focus geographic locations and agritech areas.

Actions in progress

1. Define global problems which match our vision for New Zealand's impact (eg robotics/automation, nutrients, clean water).
2. Agree, in consultation with the agritech sector, a set of priority geographical markets to focus on (interventions, business development, New Zealand capability promotion, trade diplomacy, etc.).
3. Consolidate a shared NZ Inc feedback loop of global opportunities in offshore markets, for the New Zealand agritech ecosystem (key trends, evolution of regulations, etc.).
4. Develop a framework for improved information sharing and closer ongoing cooperation across NZ Inc to more effectively and consistently support New Zealand agritech businesses with global ambitions.
5. Continue our work examining trade policy settings to ensure they are meeting the needs of the New Zealand agritech sector.
6. Ongoing development of the New Zealand Agritech Story, leveraging the Agritech Story with collateral and a toolkit companies and agencies can utilise quickly.
7. Define a joint approach to NZ Inc planning for International Promotion: starting with developing a clear plan for promoting the Agritech Story in a set of offshore markets in the next 18 months, and identifying events leveraging opportunities.
8. Define a joined-up NZ Inc partnership development strategy (to provide routes to accelerate New Zealand agritech businesses go-to-market), based on existing models within NZ Inc agencies, and define targets for business development and partnerships in the next 18 months.
9. Establish a central fund for international events leveraging between agencies.
10. Create relationships and New Zealand presence with key international Landing Pads (a number of possible locations have been identified).

Improve understanding of world-leading agritech policy practice

There is also benefit to be gained from policymakers looking beyond our borders and understanding how success is being achieved in the agritech sector in other countries.

A number of other countries have identified agritech as key focuses for their economies and have developed comprehensive strategies to support the sector including the UK, Australia and Ireland. Others have identified specific areas of disruption and are investing heavily into those.

Understanding the activities of countries considered global leaders in agritech can provide vital insights for future policy design and action development. Five such leaders that, like New Zealand, are also small advanced economies have been identified. We are in the process of assessing their critical success factors and whether there are lessons that could be applied in the New Zealand context. The five countries are:

- **The Netherlands** – second largest exporter of agriculture products in the world, after the United States, due to strength in agriculture and food processing technology. Home to the world's number one ranked agricultural university and a large number of agriculture innovation hubs.
- **Ireland** – pastoral farming style and strength in agritech means we have a close comparator and potential collaborator. Ireland is potentially further ahead of us in several areas of agritech.
- **Israel** – world leading research in agritech with high level of commercialisation, investment, incubators and accelerators and multinational involvement.
- **Denmark** – major food and dairy producer supported by food tech and agritech innovation.
- **Singapore** – investing significantly and considered a leader in vertical farming and agritech more broadly, particularly aiming to tackle problems of lack of space, labour and water.

Actions in progress

1. Gather in-depth knowledge, including through our relevant offshore posts, to develop a detailed overview of each leading country's agritech infrastructure and support systems by February 2020.

Based on this work:

2. Identify and implement suitable changes to New Zealand agritech policy and work programmes where overseas experiences and approaches can be effectively applied to the New Zealand context.

Collaboration with Australia

Improving collaboration with Australia in the agritech sector provides both countries with advantages, efficiencies and opportunities. A stronger relationship can improve our attractiveness to foreign experts or investors, provide for more affordable/achievable engagement in overseas markets and identify areas for joint research or development.

This work is well under way with several strands strengthening the relationship.

There is a commitment from Australia to create a trans-Tasman innovation ecosystem following the 2017 Science Agreement between New Zealand and Australia. Agritech is an area the Ministry of Business Innovation and Employment and its Australian science counterpart – the Department of Industry, Innovation and Science – have identified as a potential area for further collaboration.

The Commonwealth Scientific and Industrial Research Organisation and its New Zealand partners, particularly AgResearch and Plant & Food Research, have been working together for the past two years to identify and roll-out new initiatives in related science areas. MBIE is considering how these initiatives can be integrated with the agritech ITP.

The Australia New Zealand Agritech Council was launched at the Australia New Zealand Leadership Forum in Auckland in early September 2019. It aligns with government priorities and will increase trans-Tasman collaboration. Its objectives are:

- that Australia and New Zealand collaborate to promote the agritech sector; and
- to position Australasia as an attractive destination for investment.

With only a fraction of the $6.9 billion global investment in agritech in 2018 being invested in Australia and New Zealand, New Zealand and Australia need to work together to develop scale and have the ability to attract venture capital funds from offshore.

New Zealand is planning a stand at evokeAG, the major agritech trade show in Melbourne, in February 2020 (as outlined on page 27).

Workstream Two: Commercialisation

Commercialisation Lead Agency: Callaghan Innovation

There are three areas of focus within the Commercialisation work stream:

- Accelerating commercialisation of research institute IP
- On-farm technology prototyping
- International research collaboration

Accelerating commercialisation and spin-outs of research institute IP

Innovation is the engine of productivity. Fundamentally, the growth of the sector must be driven by a fast path from research idea, to new product in market.

The current state of agritech innovation is not achieving this. Furthermore, New Zealand's significant investments into agritech R&D are not resulting in a significant flow of companies and product spinouts. More work is needed to increase our understanding of commercialisation of research, and ensure our world-class research is well utilised and exploited.

Government's draft Research, Science and Innovation strategy also sets out the importance of connections as a central theme. This includes proposed actions to develop a world-class research commercialisation system, and ensure knowledge is able to flow easily and fluidly both domestically and internationally.

Stimulating the development and diffusion of innovation and growing companies are the core of the system. Part of this will require a better visibility of others' work so that duplication can be avoided, and collaboration encouraged.

There is currently IP in research institutes that has the potential for commercial value. This IP may not have been commercialised due to a number of reasons including undervaluing or overvaluing the IP; lack of effective mechanisms for researchers to transition into and/or back out of a new business; lack of effective commercialisation partners and/or business models.

We can build on the work done by the Commercialisation Partner Network to look into the systemic issues for commercialisation, learning from the work of organisations such as Kiwinet and Return on Science.

Actions in progress

1. Hold a detailed design workshop with representatives of the research community along with key officials, to highlight issues and look for solutions to improving the rate of commercialisation and spin-outs from research.

Based on this workshop:

2. Promote better linkages between industry and research organisations' IP eg joint Return On Science and Kiwinet agritech event with industry
3. Investigate new models for research organisations to transition into and out of spin out companies
4. Investigate new models for research organisations' employee incentives/payments for spin out companies
5. Investigate the creation of a specialist agritech 'Activator' (resources charged with partnering with research organisations and industry to ensure IP is commercialised).
6. Set targets for commercialised agritech ventures in collaboration with relevant parties.

Prototyping technology in partnership with farmers

Adoption of new technology is both a constraint and an opportunity when it comes to agritech. As has been outlined above, farmers are naturally cautious and conservative in adopting new technologies or practices that are unproven, or with unclear benefits, and so care must be taken to make it easy for farmers to trial new agritech products. Likewise, for creators of agritech the opportunity to prototype and pilot technology usage in a real world environment is a key step to scaling their impact.

A number of organisations exist in New Zealand that are concerned with technology adoption on-farm[12], and the opportunity exists to partner with these organisations to accelerate prototyping of solutions to address adoption barriers, and also provide real-life test scenarios.

Actions in progress

1. Establish better (and more formal) linkages into farmer groups for education; idea generation; and testing new products and services
2. Develop specific initiatives with these organisations eg technology showcases with Federated Farmers and Young Farmers at Fieldays.
3. Look into the creation of 'demo farm' and 'test farm' facilities to facilitate research and development, and farmer uptake within New Zealand as is done in other parts of the world ('Centers of smart farming').

International research collaboration

Given the imperative for international focus, it will also be key for creators of New Zealand agritech to have access to international markets to trial and test their technology, and to understand the nuances of markets. Without direct experience, it can be challenging for researchers and smaller agritech companies to understand the commercialisation opportunities in international markets.

There is opportunity to leverage the growing international networks of MFAT, NZTE and Callaghan Innovation, as well as the industry-led international partnerships, to streamline access to offshore test markets and collaborations.

Actions in progress

1. Government agencies to further coordinate and collaborate on major international events and missions (possibilities include EvokeAG; Forbes Agtech; and Irish Plough/UK Dairy Day) including pre and post engagement.

[12] Examples include: Rural Innovation Lab, PIRIC Collaborative Innovation network, Precision Agriculture Association New Zealand, Future Farm, Foundation for Arable Research, New Zealand Wine, Dairy NZ.

2. Establish international research collaboration eg with the United States Department of Agriculture and Innovate UK to allow New Zealand companies to work in partnership with international organisations
3. Investigate New Zealand joining international online collaboration tools eg www.smartagrihubs.eu
4. Formalise 'paths to market' alongside larger or more established New Zealand agritech companies who have international presence, to look for opportunities where smaller companies can learn from their experiences and opportunities.

Workstream Three: Investment

Investment Lead Agency: NZTE

There are two areas of focus within the Investment workstream:

- Specialist early-stage capital funding
- Maximising global funding links and opportunities

Specialist early-stage capital funding

A lack of investment capital, significantly in the series A stage, but according to some, at seed stage also, is commonly cited as a major impediment to the creation of new products and companies. In particular the need for 'smart, connected capital' is regularly raised for consideration. While global venture investment over the past 5 years has increased exponentially into the agritech sector, New Zealand has only attracted a very small percentage of this funding. One key trend over the recent years is that venture investment deals have grown in size per investment deal vs pure volume of deals. This reflects a maturing investment landscape where Series B and C deals are becoming more common. This trend has not been reflected in New Zealand to-date where dealflow tends to be earlier stage.

This investment is essential to helping companies grow. The key action to address this issue is the creation of a specialist agritech venture capital fund, as described in the High Impact Projects section. However, more work can also be done to understand additional capital issues, and in particular the need for an agritech seed fund.

Actions in progress

1. Document and respond to any remaining issues around the capital landscape for investing in agritech beyond those being addressed by the specialist venture capital fund.
2. Investigate the possibility of a specialist seed fund for New Zealand agritech.

Maximise global funding links and opportunities

Access to capital provides for more than merely investment dollars; the right investment partner also brings networks, experience and skills to the deal and can work in partnership with New Zealand-based capital providers to accelerate a company's progress. Offshore funds with these skills and attributes are valuable in the New Zealand marketplace and can bring new capability to the investment landscape in New Zealand.

In addition, there are existing mechanisms within government for helping fund, or coinvest with companies, into global growth. Where possible, we will further develop and focus these mechanisms to help the agritech sector grow.

Actions in progress

1. Strengthen the pipeline of offshore investment capital into the New Zealand's agritech sector by strengthening connections to global capital pools and VCs and maximising investment opportunities that arise.
2. Further promote to industry New Zealand Export Credit, government's existing loan guarantee scheme.
3. NZTE, Callaghan Innovation, MPI and MBIE will examine their funding models for companies, and their grant programmes, to look for opportunities to accelerate company growth

Workstream Four: Data Interoperability and Regulations

Data Interoperability and Regulations Lead Agency: MPI

There are two areas of focus within the Data Interoperability and Regulations workstream:

- Data interoperability and open data
- International and regional variations in regulatory standards and requirements

A lack of agritech offering and data interoperability and openness limits uptake and innovation

Agritech systems, machinery and services are often designed in isolation without considering how one agritech offering will operate alongside other offerings as there are no uniformly recognised or adhered to standards for agritech products to ensure interoperability across offerings. This results in a fragmented market where products and services are not interoperable or cross-compatible. A modern farmer who is incorporating agritech across his operations may be asked to use a large number of different systems that do not communicate, which produce data in different formats, which cannot be easily amalgamated and analysed. This results in decreased on-farm productivity, lower uptake of agritech and limited innovation as complementary services are more difficult to develop due to the fractured market.

In addressing this issue several considerations must be made. Government is not seeking to arbitrarily designate certain standards and enshrine those into law, as a flexible approach that can keep up with rapidly evolving technology is needed. Any approach to standards must also consider international approaches, to ensure that products and services developed in New Zealand can be exported overseas, and so that our food and fibre sector that links into global supply chains will have agritech systems that are internationally compatible. Better and directly linking interoperability with commercial incentives could be effective at creating an agritech ecosystem that is better aligned, compatible with overseas offerings and encouraging increased uptake and usage on farm.

The issue of open data remains actively debated within the agritech industry. Proponents for open data claim that increasing the openness and sharing of food and fibre sector and agritech data is essential for innovation, encouraging competition and developing a secondary market that uses this data to produce valuable services for the food and fibre sector. Data that could be of broader use is often locked in silos. Others would say data is a key commercial advantage generated through long-term investment by companies. Making that data open would reduce or eliminate the incentive to invest in gathering this data in the first place and stifle the innovation that results from it. An ideal solution must find a balance between these contrasting perspectives.

Also to be considered is the ownership of farm data generated. Does the farm owner have a right to ownership over data produced from their farm? Do they have the rights to receive and share data collected from their farm? If this is the case, then the possibility of a farm data exchange platform that follows the same principles as 'open banking' could be explored.

Actions in progress

1. Hold a workshop to explore the issues of interoperability and open data and identify possible solutions that would encourage cooperation and openness within a commercial framework.
2. Look into the barriers to the adoption of existing standards (both global and NZ-based standards) and better understand the appropriate use cases for standards.
3. Review international best-practice policy settings around interoperability and open data as part of the Global workstream focus on improving understanding of world-leading agritech policy practice.

Based on this work:

4. Define a future state for adoption of standards and create an implementation plan in collaboration with industry and other stakeholders.

Case Study – LIC Automation

Connected thinking, by farmers, for farmers

LIC Automation provides advanced farm automation and sensor technology systems for dairy farmers around the world.

LIC Automation is a subsidiary of New Zealand's Livestock Improvement Corporation, a farmer owned cooperative that's delivered world leading innovations since 1909. Over 1,700 New Zealand farmers use LIC Automation technologies.

LIC Automation's Saber modules form a connected system that gives farmers access to powerful information about their cows, enabling better herd management, easier decision-making, and increased profit.

www.licautomation.com

Regional and international inconsistency in measurement and reporting requirements inhibit product development

There is a lack of consistency across the measurement and reporting requirements of councils across New Zealand, particularly with environmental standards. This is contributing to the fragmenting of the agritech market as agritech companies are unable to produce one product that will address the regulatory needs of farmers across the country. Having a large number of small markets with different needs means that the possible return for any product is reduced and investment is disincentivised. Differences between New Zealand regulations and international regulations similarly reduce the possible application of agritech products. Eliminating these differences where possible can make agritech products designed for New Zealand also applicable offshore.

Actions in progress

1. Examine the drivers behind regional variations in regulations, data standards and measurement methods.
2. Explore approaches to encourage or require national alignment.
3. Examine drivers behind differences between New Zealand and international standards and explore opportunities to improve alignment.

Workstream Five: Skills and Workforce

Skills and Workforce Lead Agency: MBIE

There are three areas of focus related to agritech skills and workforce

- Skills required to develop agritech
- Skills required to use agritech
- The impact of agritech on the workforce

Specialist skills are required to develop agritech products and services

A wide range of skills are required to create high-value agritech products and IP, particularly a knowledge and empathy for the real-world problems of food and fibre production, and a deep knowledge of technology, including emerging technology.

Anecdotal evidence from industry suggests that a shortage of specialist skills is an issue for the sector, particularly in the fields of data science, robotics and product management, as well as software development more generally. From the broader ecosystem, there also appears to be a shortage of commercialisation skills in research institutes.

There is evidence for a shortage of these types of specialist skills globally, as well as within New Zealand. Global market research with 100 large agritech businesses found that 55 per cent of agritech companies reported a shortage in cyber security personnel and 53 per cent a shortage of analytical and data science skills.[13] Our shallow labour market makes it even more challenging to find specialist skill sets. The 2018 *Digital Skills for a Digital Nation* report concluded that not enough local, digitally skilled people are being developed, the sector lacks diversity and there is a high reliance on skilled immigration (5,500 technology visas were granted in the year prior to publication, more than the 5,090 computer science and information technology graduates in 2015).

[13] "Research finds skills shortages in agritech holding back Internet of things innovation" in UK Farmers Guardian, 16 Jan 2018.

Skills shortages are known to exist in New Zealand's manufacturing sector, which encompasses some agritech firms, primarily in trade/technical and leadership roles.[14]

Actions in progress

1. Survey agritech firms about current and likely future demand, the skills they need most and the skills that are hardest to find.

The answers will inform further actions we prioritise to address any skills gap. We also propose the following actions:

2. Agritech New Zealand will input to the Reform of Vocational Education currently underway, to ensure future agritech skills needs will be considered. This includes identifying and providing input to the establishment of Workforce Development Councils and Centres of Vocational Excellence for the food and fibre, and technology sectors.
3. Agritech New Zealand will input to the development of the skills component of the Digital Technologies ITP to ensure agritech skills needs are considered.
4. Agritech New Zealand will consider developing a coordinated, agritech branded presence in the Summer of Tech to raise the industry's profile.
5. Callaghan Innovation will work with Agritech New Zealand to assess the applicability and uptake of Student Grants for agritech firms, and promote their value, to improve pathways from study to work.
6. Callaghan Innovation and Agritech New Zealand will utilise the skills of alumni of networks such as the Edmund Hillary Fellowship, Nuffield New Zealand Farming Scholarships and the Kellogg Rural Leadership Programme, including creating a skills list and highlighting agritech expertise.
7. As part of its 'peer to peer networks', NZTE will establish a network for leaders in agritech to share best practice and learn from each other.
8. Explore new types of degrees and teaching that combine technological skills such as engineering, data or biotech with agriculture.
9. Increase student grants and student hackathons with industry.

Digital literacy and information are required to inspire investment in, and best use of, agritech

While agritech generates a wide range of benefits for the food and fibre sector, these benefits are contingent on workers in the food and fibre sector being able to understand and operate these new technologies. An increasingly technologically complex workplace requires higher skilled food and fibre workers. In order for agritech uptake to increase digital literacy is essential and other higher skills such as data management and analysis are also required.

The Food & Fibre Skills Action Plan 2019-2022, launched on 29 October 2019, was developed by the Primary Industries Skills Leaders Working Group. The Plan aims to support the development of a workforce that has the skills to deliver on the current and future needs of the food and fibre sectors, including dairy and meat processing. Many of the actions proposed in the plan are highly relevant to agritech. A more highly educated, skilled and informed workforce is more likely to understand the potential benefits of new technologies and feel comfortable using them.

One example is the action to commission research into the current state of university-based agriculture and horticulture education. This would include looking at the current courses available, their relevance to industry, and delivery models, as well as overseas models (eg Wageningen University). There is an opportunity for Agritech New Zealand to co-ordinate with, or participate in, the Partnership Group that has been set up to implement the Action Plan.

[14] "Securing a Bright Future for Manufacturing in New Zealand" presentation by Dieter Adam, Manufacturers' Network, 21 July 2018.

Actions in progress

8. The Ministry for Primary Industries and Agritech New Zealand will work together to ensure farmers' Extension Services have access to impartial information about available agritech solutions and identify regional successes to promote.
9. Agritech New Zealand will identify opportunities to engage with the Establishment Group for the Food & Fibre Action Plan 2019-2022 to discuss potential involvement in delivering relevant actions and how to ensure agritech needs and priorities are recognised in delivery of the Action Plan.

Agritech is likely to impact on some workers, particularly those in lower skilled and seasonal roles

All jobs will be impacted by increasing automation and digitisation, but some will be impacted more than others. Jobs that are routine, dangerous or highly labour intensive are more likely to be automated.

Horticulture, in particular, experiences large seasonal fluctuations in labour demand and a shortage of labour to undertake routine picking, harvesting and packing roles.

Current means to address this seasonal labour requirement include Ministry of Social Development (MSD) declarations of seasonal labour shortages and the Recognised Seasonal Worker Scheme. In April 2019 MSD reported that 375 people were placed in horticultural work between January and March, and the Bay of Plenty had a current shortage of around 3,800 people.[15]

The Recognised Seasonal Worker Scheme allows the horticulture and viticulture industries to recruit workers from overseas for seasonal work when there are not enough New Zealand workers. The cap of 14,400 places in October 2019 will be extended to 16,000 for 2020/21. The Minister of Immigration has challenged the industry to make the sectors easier and more attractive for New Zealanders to work in, including considering paying more and increasing the use of automation.

We expect that automation in the horticulture and viticulture industries (and more widely across agriculture) will increase and that this will likely reduce the demand for these low-skilled routine jobs in these industries.

Workstream Six: Government

Government Lead Agency: MBIE

There are three areas of focus within the Government workstream:

- Promoting and improving transparency of government support
- Encouraging communication and streamlining across government
- Improving understanding of the agritech sector

Promoting and improving transparency of government support

Government support for agritech companies can appear fragmented and unclear. Companies are expected to navigate government agencies and processes, often without visibility of the overall support system. Within the agencies involved in the Taskforce we have the opportunity to streamline and increase transparency of the government support provided to the sector, to further enhance the strong institutions we have, and to drive coordination and support in a sustained way.

[15] Ministry of Social Development "Seasonal Labour Shortages in Hawke's Bay and the Bay of Plenty" 5 April 2019.

Actions in progress

1. Develop a simple guide to make agritech resources, support and funding more transparent and accessible. This guide will also link to suitable resources around standards, legislation and compliance.
2. Develop a national technology platform view for agritech, outlining where expertise, equipment and support exists and how it can be accessed, along with a roadmap for further development.
3. Examine any systemic infrastructure barriers to the creation and adoption of agritech (eg rural wifi/broadband) and develop a plan to remediate with relevant parties.

Encouraging communication and streamlining across government

Improved coordination and alignment within and across government agencies working on agritech can improve the policies and actions developed by government and enable government to better support the agritech sector. It can also improve productivity within government as work is not duplicated and the different specialty knowledge and connections of different groups/agencies contribute to a more efficient overall process for supporting agritech. The Agritech Taskforce will play a key role in improving communication and coordination across Government.

Actions in progress

1. Government will share information among agencies on funding provided to agritech companies.
2. Create a shared knowledge base across government so that agency insights for the sector can be accessed and used easily.
3. Define the growth enablers, and common constraints for companies to inform creation of new services and interventions.

Improving understanding of agritech sector

Currently data and evidence for the agritech sector is difficult to obtain due to the cross-cutting nature of the sector. Agritech does not match with conventional industry, occupation or export statistical codes. This not only limits our understanding of the industry, its challenges and needs, but also impacts on our ability to accurately track the impact of government work to support the sector. Developing approaches to better measure agritech could lead to a more accurate picture of the sector in New Zealand and more targeted and effective actions. It will also allow us to evaluate the effectiveness of the actions of this ITP, with a specific measurement and evaluation plan to be developed for this action plan.

Actions in progress

1. Callaghan Innovation and Agritech New Zealand to create a registry of agritech companies and products as part of Scaleup.nz.
2. Government will work with the TIN200 to publish a report on the agritech sector.
3. Callaghan Innovation and NZTE will develop a playbook for setting up an agritech company.
4. Create a customer journey map, to understand a company's experience and constraints, including understanding the barriers to adoption of technology.
5. MBIE will lead work to improve measurement of the New Zealand agritech industry to improve our evidence base and understanding of the sector, including exploring the possibility of a survey of agritech companies.

Conclusion and next steps

In this Industry Transformation Plan we have outlined our approach to the long-term transformation of the agritech sector to make it more productive, sustainable and inclusive as part of a zero-carbon economy.

We have described the context, challenges and opportunities for New Zealand's agritech sector and, in response, proposed a vision for the future of the sector.

To help achieve this vision, and building on existing work by both government and industry, we have outlined a proposed action plan including High Impact Projects and ecosystem development across six workstreams.

All of the above remains in draft form including actions, which at this stage are only proposed and should not be considered Government policy. We invite feedback and suggestions on all parts of the ITP to ensure that the key issues are being addressed, and that the actions that Government and the agritech sector carry out will help us transform the agritech sector as outlined by our vision.

We will continue our active engagement with the agritech sector to obtain this feedback, but also invite written feedback to industrytransformationplans@mbie.govt.nz. We will be seeking feedback until February 2020, following which a final version of the agritech ITP will be prepared.

Case Study – Ubco

Smart simplicity for water-based growing

UBCO was founded on the idea of a two-wheel drive Utility Electric Vehicle (UEV) that would transform the way people ride, work and play. Since then it has evolved into a digitally connected UEV platform including on- and off-road transport, portable power, accessories, and cloud-based software.

The UBCO 2x2 is a lightweight, quiet vehicle that produces zero emissions in use and is safe and easy to operate – making it ideal for a wide range of applications.

In 2017, UBCO raised US$1 million from American investors to support the company's efforts in the United States, with an additional $9.2 million since raised from New Zealand and Australian investors to aid growth in those markets.

www.ubcobikes.com

Appendix 1: Parties engaged

In the development of this ITP, the following parties have been consulted.

Organisation / person
Agritech New Zealand
MPI
MBIE – Science Policy
MBIE – Industry Policy
MBIE – He kai kei aku ringa
NZTE
Callaghan Innovation
Te Puni Kōkiri
MFAT
MFE
Treasury – Export Credit office
New Zealand Story
Primary Sector Council
Te Hono
Federation of Māori Authorities
Office of Hon David Parker
Office of Hon Damien O'Connor
Office of Hon Megan Woods
Office of Hon Chris Hipkins
Council of Trade Unions

New Zealand Government