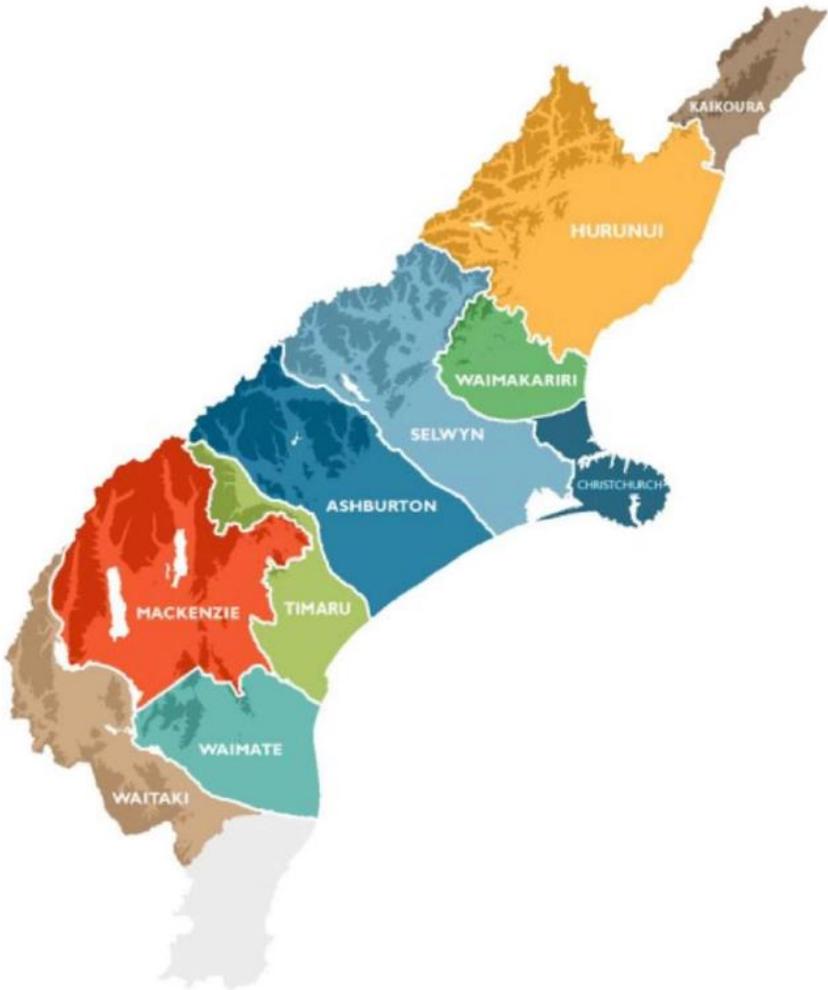


CANTERBURY REGIONAL ECONOMIC DEVELOPMENT STRATEGY

**Canterbury Agriculture:
Improving Productivity and High Value Manufacturing**
Stage 1



THE CANTERBURY MAYORAL FORUM ROAD MAP

The Food and Fibre Industry Innovation towards 2050

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CREDS Project - Canterbury Agriculture: Improving Productivity and High Value Manufacturing Stage 1

Executive Summary

The Canterbury Mayoral Forum, through the Project Steering Committee, appointed a consortium¹ to undertake Stage One of the Canterbury Agriculture: Improving Agriculture and High Value Manufacturing Project – this stage was completed in December 2018. The purpose of Stage One was to lay a practical foundation for the Mayoral Forum to see how they can lead, support and enable the Canterbury community to work together to unlock opportunities across the value chain in the food and fibre, from on-farm to international markets.

The outcome of this process is that the Canterbury Mayoral Forum focus on the following four themes to lead the next three-year stage of the Canterbury Food and Fibre gateway to 2050:

- i. **COLLABORATIVE LEADERSHIP:** Work out and express what we aspire to as a region, incorporating the concept of kaitiakitanga (guardianship)
- ii. **OPEN INFORMATION:** Improve availability of verifiable, agglomerated data
- iii. **INTEGRATED LAND USE:** Create the right mechanisms to leverage regional data and information to form insights and advice, strengthening the sustainable integrated land use policy dialogue.
- iv. **TALENT AND CAPABILITY BUILDING:** Leverage the focus of our regional tertiary and business capabilities on primary production and rural, supporting investments in talent and capability building.

An important element of the first stage of the project has been gathering an on-the-ground view and a real understanding of the issues facing food and fibre production in Canterbury, their causes, and to discuss possible solutions with those who live and work within the area. To do this the Stage I Project Team carried out business case studies and facilitated a series of strategic workshops in each of the districts throughout Canterbury.

Nine stage 1 workshops were carried out throughout Canterbury in Waimate, Hurunui, Mackenzie, Timaru, Ashburton, Selwyn, Kaikoura, Waimakariri and Christchurch City. Waitaki was invited to participate as part of the Waimate workshop. Three further workshops - one with an education focus, one with a CRI/Research Extension focus and one that focused on manufacturing businesses - were also carried out. Further, six high value business case studies were undertaken. A final regional validation workshop was held at Lincoln on 17 October 2018, where the findings and key outcomes from the case studies and the workshops were reviewed and largely validated.

The critical importance of education and the development of a skilled and agile workforce is recognised, and it is noted that work in the Food and Fibre sector will need to be carried out in collaboration with the education and training for a skilled workforce CREDS workstream

The Road Map allows the Canterbury Mayoral Forum to recognise and act on opportunities to reduce risks and to create the most opportune platforms and environment for increasing sustainable regional productivity and GDP growth whilst making the most of Canterbury's

¹ David Rendall and Associates Ltd and Lowe Environmental Impact Ltd

natural advantages and strengths within acceptable environmental limits. Land, its uses, its outputs and intrinsic value forms the basis of the productive heart of the Canterbury economy.

Production in Canterbury is derived from the diverse range of intensive dairy, sheep and beef, and cropping operations on the plains through to extensive sheep and beef farms on the higher land. The Canterbury land-based economy is complimented by increasing domestic and international tourism, especially on high country and the vast array of ancillary services including transport, processing, research & development, technology and industry innovation. Niche agricultural operations in sheep milking, manuka honey and truffles to name a few, add exciting indicators of the needed “transition from productivism to provenancing”¹.

The Canterbury processing and manufacturing sectors have been relatively stable over the course of the 2000-2017 period. Apart from the uplift in employment in the dairy product manufacturing in 2008 and again in 2014, most of the processing industries have remained reasonably constant, in terms of business units, employee count, export earnings and gross domestic product (GDP) contribution.

The rise of the ‘conscious consumer’ places increasing demands on these systems of land use. Progressive environmentally and socially prudent land and resource use holds the key to delivering the 20-year vision outlined in the Canterbury Regional Economic Development Strategy:

“a region making the most of its natural advantages to build a strong, innovative economy with resilient, connected communities and a better way of life for all”.

The future of Canterbury land use is going to be substantially driven by the strategies adopted by companies operating in the high value manufacturing and services industries, because most of the agricultural output finds its way to final demand (largely domestic consumption and exports) via the primary processing sector. From a manufacturing perspective, the inputs are being sourced from the land. As noted, earlier, farm gate output comprises possibly 20 – 25% of the end use retail value.

The significant size of the agricultural sector (and the associated downstream industries) in both New Zealand and Canterbury provide both substantial opportunity and risk. From a wellbeing perspective, the opportunity to see New Zealand and Canterbury increase the level of exports of both agricultural produce (including specifically targeting the high-value / higher margin sector) and innovation overseas is immense. Whilst contributing a relatively large component to the New Zealand and Canterbury economies, our food and fibre produce represents a small amount of international demand. The opportunity exists to meet a larger share of this demand (and the high value sub-sector). This process needs to be carefully so that the production and processing of food and fibre it is not detrimental to the environment.

Canterbury is New Zealand’s third-largest location for technology businesses and has some of Australasia’s most innovative and successful tech companies. There is, however, little available aggregated data/information about the value of the food and fibre sector across the region. It has also been difficult to understand its general connectivity with the primary production sector, a crucial element to underpin how the Canterbury Mayoral Forum can unlock opportunities across the value chain.

Canterbury, with many Research and Development agencies focussed on land and food production, is from a research perspective, well resourced. Amongst these are the seven Crown Research Institutions (CRIs) that carry out scientific research for the benefit of New

Zealand, each aligned with a productive sector of the economy or a grouping of natural resources.

Lincoln University and Canterbury University are home to a range of relevant research centres whilst ARA is becoming increasingly engaged in this area. Within the private sector, Canterbury has access to a range of Technology and Investment platforms.

The food and fibre sector is changing with protein demand increasing, new protein formulations are being developed, meat alternatives are becoming affordable for poorer consumers, causing disruption of the bottom end of the commodities market. In addition, the market is being driven by an interesting and at times conflicting mix of baby boomers, generation X and Y, the conscious consumerism of millennials and the powerful influence of the Asian emerging middle class with their propensity for sourcing “clean, green” products.

Globally the limitations on arable land and challenges in water availability and delivery are widely acknowledged. Canterbury’s water resources are a key element of our comparative advantage and the management and enhanced management of rain-fed agriculture will impact both the brand of the region and the level of future value addition.

The essence of this Stage I work has been to establish robust activities that allow the Mayoral Forum to lead, support and enable the strengthening of a community-based coalition towards an inclusive and sustainable engine for Canterbury – a vibrant food and fibre industry.

Informed by the workshops and other Stage 1 discussions focussing on the opportunities and limitations, it has been possible to clarify what needs to be done strategically off-farm, to create regional benefit. We recommend that the Canterbury Mayoral Forum should support sector growth by:

- i. Clearly articulating and telling the story of their targeted and collective aspirations for the future of the sector and the region;
- ii. Improving access to relevant data by leading the creation of data aggregation and sharing processes;
- iii. Creating a trusted regional investment proposition to support investment from people, businesses and financial institutions;
- iv. Driving each of their own districts’ Long-Term Plans in a way that underpins pride in who we are in Canterbury, where we live and what we do;
- v. Using the planning and investment tools that they have available to them to support primary producers and processors to make the best use of their natural resources;
- vi. Enabling and supporting the implementation of initiatives that help to put innovation and sustainability at the heart of food and fibre production and processing, with a focus on adding value for businesses and for people.
- vii. Working with education and career planners to develop capacity from preschool to the end of effective working careers towards creating a flexible, agile, technology savvy rural community.

Based on the workshop outcomes, the Stage I team insights and guidance of the regional workshop the Canterbury Mayoral Forum Food and Fibre Road Map (a living document and should be under regular review and amendment) has been established that focuses on leadership, information, integrated use of land and building a skilled and agile workforce.

A three-action plan has developed based on the findings of Stage One. The indicative budget is as follows:

The Food and Fibre (F&F) Industry Innovations towards 2050 – Summary Costs

Year	PY I	PY II	PY III	Total
Component	2019	2020	2021	
F & F Collaborative Leadership Initiative				
Charter	69,250	0	0	69,250
Fora	98,400	98,400	73,400	270,200
Advocacy	23,000	23,000	23,800	69,800
Sub-Total	190,650	121,400	97,200	409,250
F & F Open Information and Knowledge Project				
F & F Knowledge Centre	95,000	190,000	190,000	475,000
Information Portal	37,500	267,000	92,000	396,500
F & F Educ Resources	150,050	55,000	55,000	260,050
Sub-Total	282,550	512,000	337,000	1,131,550
F & F Integrated Land Use Workstream - Land and Food Systems Innovation and Policy Project				
Project Design	75,000			75,000
Indicative Budget		200,000	450,000	650,000
Sub-Total	75,000	200,000	450,000	725,000
(resource mobilisation required)				
F&F Talent and Capability Building: under Leadership Initiative and CREDS workstream				
Total - Stage 2	548,200	833,400	884,200	2,265,800

Currently there are enough funds to resource the Leadership and information projects along with the design of the Land Policy Centre. Resource mobilisation will be required to move ahead with that initiative. Key issues discussed that are part of existing CREDS workstreams have not been considered for this Canterbury Food and Fibre road map. These include roading infrastructure; extension and uptake of fast broadband in rural areas, water availability and reliability; barriers to storage and distribution (ground vs surface), skilled workers, cohesive communities agri-tourism opportunities locally on farm and with local produce used.

The study findings have been outlined in this Executive Summary. The detailed discussion of the findings and approaches taken leading to the Canterbury Mayoral Forum RoadMap are presented in this RoadMap – the main report. Detailed insights and discussion of challenges and issues are recorded in Annex A. The supporting documentation is presented a series of Additional Annexures as a Resource Compendium.

The Stage One team wish to fully recognise the collaborative engagement it had across the wider food and fibre industry – constructive contributions and a willingness to share issues and views have enriched the construction of this RoadMap.

Introduction and Background

Land, its uses, its outputs and intrinsic value forms the basis of the productive heart of the Canterbury economy. This production is derived from the diverse range of intensive dairy, sheep and beef, and cropping operations on the plains through to extensive sheep and beef farms. It is complimented by increasing domestic and international tourism, especially on high country. Boutique niche agricultural operations in sheep milking, manuka honey and truffles, to name a few, add exciting indicators of the needed “transition from productivism to provenancing”². The collaborative integration of consumer lead requirements with these systems of land use, in an environmentally and socially prudent manner, holds the key to delivering the 20-year vision outlined in the Canterbury Regional Economic Development Strategy - “a region making the most of its natural advantages to build a strong, innovative economy with resilient, connected communities and a better way of life for all”.

The fundamental objective of the Improving Productivity and High Value Manufacturing Project (a four-year investment by Ministry of Business Innovation and Employment (MBIE) with the Canterbury Mayoral Forum (CFM)), is to highlight agriculture sector growth limitations and opportunities, and then to identify commercialisation and value-added innovation solutions in both the agriculture sector and nascent high value manufacturing across Canterbury. This will allow the mayors to see and act on opportunities to reduce risks and to create the most appropriate / beneficial / suitable platforms and environment for increasing sustainable regional productivity and GDP growth, making the best of Canterbury’s natural advantages and strengths within acceptable environmental limits.

The whole process of increasing regional productivity and GDP growth will be substantially driven by responding to international market needs and changing and more demanding consumer preferences. This will demand on-farm production adaptability and a supportive regional and national development landscape. The contract for the Improving Productivity and High Value Manufacturing – Stage One assignment is focussed on understanding demand and supply limitations, and the opportunities for the Canterbury Mayoral Forum to lead, support and enable initiatives for the Canterbury Agritech sector.

The Canterbury Mayoral Forum, through the Project Steering Committee appointed a consortium² to undertake Stage One of the Project – this stage will be completed by December 2018. It is expected to lay a practical foundation for the Mayoral Forum to see how they can lead, support and enable the Canterbury community to work together to unlock opportunities across the value chain in the agriculture sector, from on-farm to international markets.

During this first stage of the project the following has been achieved:

- i. The form and nature of the sector, both on and off-farm across the region has been reviewed and described;
- ii. Perspectives to broadening and up-scaling the diverse agriculture sector with a focus on Agritech initiatives has been assessed and debated;
- iii. The challenges facing the people, their land and resources have been assessed and drawn together based on the wide-ranging consultations, key interviews and web-based research; and

² David Rendall and Associates Ltd and Lowe Environmental Impact Ltd

- iv. A roadmap for Mayors to lead, enable and support adoption of these relevant initiatives and innovations has been developed.

The work was undertaken in partnership with industry, partner agencies, and others in the Canterbury and national innovation ecosystem. The work has sought to complement and integrate with existing supply-side initiatives such as the Lincoln Hub and collaboratively, will contribute towards the development of increasing value-added exports from Canterbury's traditional and emerging market strengths.

The approach recognised the initiatives, hard work and drive that have led Canterbury to the position it holds as long-term leader of agricultural production and effective business activities marketing Canterbury agriculture and its products globally. A study such as this has not, and should not have, replicated the comprehensive high-quality sector-wide work that has underpinned the 150-year history of the rural sector driving economic progress in Canterbury.

Canterbury's Agriculture Production Base and Agribusiness Environment

Agriculture Production

Canterbury's Primary production scene has been **increasingly dairy focused** for the past 20 years. Dairy is the largest contributor to Total Factor Production (TFP) in Canterbury, with \$913 million of GDP output for year ended June 2017. Combined with sheep, beef and grain sub-sectors, which plummeted during the Global Financial crisis (GFC), TFP has been relatively stable since, these sub-sectors amount to 78% of the GDP for Canterbury's agricultural primary production.

In the same period, Agriculture, Forestry and Fishing accounted for 5.9% of employees in Canterbury, for a total of 19,101 of Canterbury's 322,055 employees. Of these, 5,690, or 1.8% of the total, were employed in the Dairy sector and a further 5,174, or 1.6%, were employed in the sheep, beef and grain sectors. In addition, a further 14,416 employees were working in the processing and manufacturing sectors related to agricultural production, with the largest being Fruit, Cereal and Other Food Product Manufacturing, with 4,021 and Meat & Meat Product Manufacturing with 3,956 employees. When combined, these industries account for 10.4% of Canterbury's filled jobs.

New Zealand farmers are **an ageing demographic**³. The average age of farmers in the 2013 census was 47.7, up from 46.4 in 2006. However, the average age of the employed population (15 years of age and over) in the 2013 census was 41, five and a half years younger. According to Statistics NZ the average age of a beef cattle farmer in 2013 was 56 years, up from 53.5 in 2006. The average age of dairy farmers in 2013 was 41.7, up from 40.8 in 2006, and the average age of sheep farmers was 53, up from 49.9 in 2006. The average age of deer farmers increased from 51.3 in 2006 to 55.8 in 2013, and the average age of mixed crop farmers increased from 43.9 to 49.1 respectively.

Research by Lincoln University based on 2013 census data shows an ongoing increase in average age of farmers since 1981 driven by both fewer younger farmers and an increasing number of older farmers. Whilst these ages are lower than some European and Asian farming populations, this increasing trend is of concern – reflecting the barriers of entry into the sector, as well as the reported (district workshops) reluctance of young people to enter the industry.

The **total land area** of Canterbury Region consists of some 4.5 million hectares³. Key aspects of land use are summarised below:

³ The land area of the Mayoral Forum districts including Waitaki District which falls within the Canterbury ECAN Region.

Table 1: Land Capability and Irrigated Area by District

District	Area of Class 1-4 (Suitable for Arable and Pastoral)		Area of Class 5-7 (Suitable for Pastoral only)		Total Arable Land – Class 1-7		Land area actually irrigated		
	Ha	%	Ha	%	Ha	%	Ha	% of area irrigated	% of Cant Irrigation
Waimate District	144,390	11%	19,970	1%	164,360	6%	36,766	22%	8%
Timaru District	136,730	10%	82,600	6%	219,330	8%	54,514	25%	12%
Mackenzie District	97,250	7%	369,030	25%	466,280	17%	7,154	2%	2%
Ashburton District	305,950	23%	145,310	10%	451,260	16%	180,738	40%	39%
Selwyn District	237,150	18%	154,640	11%	391,790	14%	89,519	23%	19%
Christchurch District	31,000	2%	95,680	7%	126,680	5%	16,950	13%	4%
Waimakariri District	128,120	10%	72,790	5%	200,910	7%	31,258	16%	7%
Hurunui District	213,520	16%	417,320	29%	630,840	23%	41,690	7%	9%
Kaikoura District	10,340	1%	104,940	7%	115,280	4%	2,579	2%	1%
Canterbury	1,304,450	100%	1,462,280	100%	2,766,730	100%	461,168	17%	100%

Source: Statistics NZ 2017

The balance of around 1.2 million hectares comprises approximately 1 million hectares of Class 8 land (unsuitable for arable/pastoral use), 160,000 hectares of rivers, 60,000 hectares of lakes and 20,000 hectares of urban land. Aspects that need to be taken into consideration are that there is likely to be at most a 15 – 20% increase in irrigated area available under foreseeable efficiencies in water use, catchment nutrient cap and societal constraints.

Climatically⁴, summer drought is usual with a strong rainfall gradient from west (greater than 1000mm) to the eastern seaboard (around 600mm). NIWA classifies the Canterbury climate into five main zones:

- i. The plains, with prevailing winds from the northeast and south-west, low rainfall, and a relatively large annual temperature range by New Zealand standards;
- ii. The eastern foothills and southern Kaikoura's, with cooler and wetter weather, and a high frequency of north-westerlies;
- iii. The high country near the main divide, with prevailing north-west winds, abundant precipitation, winter snow and some glaciers particularly towards the south;
- iv. Banks Peninsula and the coastal strip north of Amberley, with relatively mild winters, and rather high annual rainfall with a winter maximum; and
- v. The inland basins and some sheltered valleys, where rainfall is low with a summer maximum, and diurnal and annual temperature ranges are large.

Most of the surface water is found in seven major alpine rivers (Waitaki, Rangitata, Rakaia, Waimakariri, Hurunui, Waiou and Clarence). These rivers come from high rainfall areas in the Southern Alps, often with extensive snow and ice fields sustaining flows through the

summers. These rivers are also an important source of groundwater recharge for the Canterbury Plains. Smaller rivers derive from the foothill mountain ranges (e.g. Pareora, Opihi, Orari, Selwyn, Ashley, Waipara and Conway rivers) which are lower rainfall areas and the rivers often reach very low flows in the summer (LAWA,2018).

A third set of rivers and streams are the groundwater-derived spring-fed streams found near the coast (e.g. Ohapi Creek, Harts Creek, Avon, Styx and Cam Rivers). These spring-fed streams sustain flows through most summers but are also the most affected by extensive groundwater usage.

These water sources combine to provide Canterbury with the largest water resource of any region in New Zealand (LAWA,2018).

In terms of **nutrient losses**, there has been considerable research into the potential losses from different farming systems. A report by Lilburne et al. (2013) used multi-variable modelling systems to estimate the nitrate-nitrogen losses for different pastoral farming systems (dairy, beef, sheep, pigs, deer). They found the biggest factor when considering nutrient losses was the soil type. In any system, going from a light soil (free-draining) such as a "Waimakariri very stony sand" to a deep soil (poorly or imperfectly drained) such as a Barrhill, Templeton, Wakanui at 150 mm resulted in between 13% (sheep rainfed) and 75% reduction (4 cows/ha irrigated) in nitrogen losses.

Soil properties and soil moisture drainage characteristics are very important factors in determining the nitrogen losses from a farm system. For these same farming systems, even differentiating between the extra light soils and light soils such as a Chertsey, Lismore shallow and stony silt loam reduced nitrogen losses between 18% and 63%.

Another factor which influences on-farm nitrogen losses is drainage of water through the soil (whether from rainfall or irrigation). For example, an irrigated beef system loses an average of 30% more than a rainfed beef system. In a sheep system this was even more pronounced as nitrogen losses almost doubled to 97.5% from a rainfed to irrigated sheep system, albeit from a low base N loss. Overall, these differences were less obvious in areas which had higher levels of rainfall as expected due to the smaller proportional increase in soil drainage.

The differences in rainfed to irrigated land increases are not only due to extra water being applied, but irrigated properties usually intensify farming practices, meaning more nutrients are applied to land whether from animal excreta, or fertiliser inputs (especially for arable farming).

Climate Change projections⁵ and the response of both urban and rural New Zealanders will have major impacts on the structure and character of agriculture to 2050 and beyond. These impacts have been summarised as:

- i. Water shortages – Higher temperatures, less rainfall and greater evapotranspiration are likely to cause increasing pressure on water resources, particularly in North Canterbury. Droughts are likely to become more frequent and more extreme;
- ii. Fire risk – Strong winds, combined with high temperatures, low humidity and seasonal drought may result in an increased fire risk in some areas (such as Christchurch, Kaikoura, and Darfield). The length of the fire season is expected to increase;
- iii. Sea level rise – As the climate changes and the sea level rises, it is likely that Christchurch will face increased flooding in some areas, particularly around the lower Avon River. Coastal erosion is likely to increase;

- iv. Biosecurity – Climate change could increase the spread of pests and weeds. Banana passionfruit, a frost-tender plant, appears to be spreading, and argentine ants have survived through two winters, which was previously not thought possible. There may also be an increased threat to native species from a changing distribution of disease vectors; and
- v. Agriculture – Warmer temperatures, a longer growing season and fewer frosts could provide opportunities to grow new crops. Farmers might also benefit from faster growth of pasture and better crop- growing conditions. However, these benefits may be limited by negative effects of climate change such as prolonged drought, increased flood risk, and greater frequency and intensity of storms. There is also likely to be increasing pressure on water resources, increasing the demand and value of water storage facilities.

Manufacturing

At the national level MBIE report ⁶The market is clearly indicating that it sees significant opportunities in New Zealand's 'food and beverage', 'machinery and equipment' and 'chemicals and refining' subsectors. These industries are attracting investment, and are the sectors that have grown firm numbers, employment, innovation rates and research and development in the last ten years.

Despite this trend, in Canterbury the processing and manufacturing sectors have been relatively stable over the course of the 2000-2017 period. Apart from the uplift in employment in the Dairy Product Manufacturing in 2008 and again in 2014, most of the processing industries have remained reasonably constant, in terms of Business Units, Employee Count and GDP contribution. The exception is the seafood processing industry, which while small originally, with an approximate GDP of \$110 million in 2000, had reduced in size by nearly 50% by 2017, with a GDP of \$63.9 million. Dairy Product Manufacturing has seen significant growth since 2000, from a GDP of \$76.3 million to \$183.5 million, increasing employee numbers from 850 in 2000 to 2,140 in 2017.

The future of Canterbury land use is going to be driven by the strategies adopted by companies operating in the high value manufacturing sector. Because most of the agricultural output finds its way to final demand (largely domestic consumption and exports) via the primary processing sector. The 2013 input-output table to quantify these relationships. From a manufacturing perspective, the inputs are being sourced from the land, as such production systems will need to respond to the requirements of food processors. High value manufacturing is defined as the application of leading-edge technical knowledge and expertise to the creation of products, production processes, and associated services which have strong potential to bring sustainable growth and high economic value to Canterbury and New Zealand.

From a manufacturing strategy perspective, key aspects then are successful product introduction, a better factory, integrated logistics, better organization and integrated information. From our case studies, the manufacturing operations are sourcing their inputs from the land. Their place in the market is, however, driven by their manufacturing and marketing expertise as these companies respond to global market requirements.

An issue for the Canterbury Mayoral Forum is where the value is being captured in the value chain. Ownership structure then becomes important. Will we see more cooperatives evolve to ensure farmers get a larger share of the margin? Will the concentration of

processors give them market power? Then aspects of competition policy and market contestability become important issues.

Information, Communication and Technology

Information, Communication and Technology (ICT) is New Zealand's fastest growing sector. ICT exports have doubled over the past 6 years, and are currently number three in export earnings, behind dairy and tourism. Nationally the sector contributes 5 per cent of GDP and employs over 70,000 New Zealanders.

ICT revenue grew 16.5% over a 12-month period (TIN 100). The Government's sector report on ICT confirmed wages and salaries are twice the New Zealand average, and are growing faster than the average growth rate for the country.

"Christchurch is New Zealand's third-largest location for technology businesses and boasts some of Australasia's most innovative and successful tech companies."⁷ A full overview of the 500+ technology organisations in the region and full sector profile report and infographic is available on FluxNZ.com⁸

There are little available aggregated data about the value of the technology sector across the region. It has also been difficult to understand its general connectivity with the primary production sector. Data is not openly available to the degree that is necessary to fully understand the current state assessment. This stifles not only the ability to understand the present framework and therefore develop pathways to create efficiencies and innovation, but reduces the available information to farmers, support agencies, investors and researcher. This in turn diminishes confidence for future investment and increases the degree of inherent risk. Due to this unavailability, it is likely there has been an under-utilisation of data and technology to lift productivity in the sector, which further dissuades incentives for the collaboration required to produce an accurate a useful database. Without open data access that allows for traceability of high productivity output in the agricultural sector, there is serious impediment on the ability of any decision making to actively move in the correct direction.

With the recent creation of Agritech New Zealand, there is an opportunity to develop a more comprehensive Canterbury approach to commercialising the adoption and application of innovations – technical, managerial and financial⁹.

The technology sector in Canterbury is supported by several entities:

- i. Canterbury technology cluster. A recent Alliance Agreement between Canterbury Software and the NZ Technology Industry Association (NZTech) means Canterbury will have a stronger voice through NZTech at a national level. Members of the Canterbury Tech Cluster will become "associate members" of NZTech. NZTech will promote Canterbury Tech on its website which has significant national and international traffic;
- ii. Universities of Canterbury and Lincoln and Ara Institute of Technology;
- iii. Ministry of Awesome; and
- iv. ChristchurchNZ.

There are currently a few more direct linking agencies between the primary production sectors and technology sectors, specifically BLINC (previously the Lincoln Hub) and Lincoln Agritech Ltd, a company owned by Lincoln University.

Collaborative Platforms for moving and selling goods

There is a nascent development of collaborative platforms being created through the technology and software ecosystems that are relevant to the food value web. "Agriculture and the food industry" are entering the era of platform economics as they come into existence as "marketplaces", or virtual meeting places, matching the supply and demand of goods and services by bringing together users and professional suppliers. They are encroaching on wholesale markets. Collaborative sites, a second category of platform, have also emerged in the food industry. There is also another type of collaborative platform that brings together users who are private individuals and professional suppliers. These, known as Crowdfunding platforms, are interested in the agricultural sector and the food industry. In this case, providers are private individuals, consumers or professionals.¹⁰

Research and Development

Canterbury is well supported with Research and Development agencies focussed on land and food production. There are the seven Crown Research Institutions (CRIs) that carry out scientific research for the benefit of New Zealand, each aligned with a productive sector of the economy or a grouping of natural resources. Key amongst these in the off-farm space is Plant and Food Research Institute.

The New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC) was opened on 3 March 2010. The NZAGRC is a partnership between the leading New Zealand research providers working in the agricultural greenhouse gas area and the Pastoral Greenhouse Gas Research Consortium (PGgRc). The NZAGRC is a "virtual" Centre with the research that it funds carried out by researchers working in their own organisations. The NZAGRC is physically located on the AgResearch Grasslands Campus in Palmerston North with some partner providers based at Lincoln village.

Lincoln University and Canterbury University are home to a range of relevant research centres whilst Ara Institute of Technology is increasing engaged in this area.

Within the private sector, Canterbury has access to a range of Tech Investment platforms. A description of the various agencies and platforms recommended for connecting new tech opportunities with investment partners is provided by <http://canterburytech.nz/invest/>.

Interestingly, the ChristchurchNZ publication "Innovation in Canterbury: realising our potential" indicates that there is limited capacity to commercialise inventions and new applied technology in Canterbury, as also applies to the whole country.

21st Century Global Challenges for Food and Agriculture

To meet the challenge¹¹ of sustainably feeding a global population somewhere towards 10 billion people by 2050, the global agricultural sector will need to undergo major transformation. More nutritious food will need to be produced using fewer resources. Achieving this transformation will require new approaches and extensive coordination amongst all stakeholders in the agricultural system. Market-based approaches, while not the only answer, will be an important tool in the “toolbox” to drive change, providing the efficiency. The agricultural production approach is anticipated¹² to be based on: biotechnology, high technology machinery, precision farming, improved crop inputs, larger farms and controlled environments.

The World Economic Forum¹³ envisages the challenge for the Agri-food sector as being “to provide food security for all in an environmentally sustainable manner whilst generating economic growth and opportunities”.

In recognising such challenges and noting that New Zealand’s predominant requirement from its agricultural sector is to provide sustainable economic growth for the nation, it is important to recognise that we are not independent and unaffected by the trends and challenges for food and agriculture as noted in a recent FAO publication¹⁴. Some key highlights especially relevant to NZ include:

- i. The world’s population is expected to grow to almost 10 billion by 2050, boosting agricultural demand;
- ii. Income growth in low- and middle-income countries will hasten a dietary transition towards higher consumption of meat, fruits and vegetables, relative to that of cereals, requiring commensurate shifts in output and adding pressure on natural resources;
- iii. Economic growth and population dynamics are driving the structural change of economies;
- iv. Food losses and waste claim a significant proportion of agricultural output, so reducing them would lessen the need for production increases;
- v. The much-needed acceleration in productivity growth is hampered by the degradation of natural resources, the loss of biodiversity, and the spread of transboundary pests and diseases of plants and animals, some of which are becoming resistant to antimicrobials;
- vi. Climate change particularly negatively affects food-insecure regions, jeopardising crop and livestock production, fish stocks and fisheries;
- vii. Satisfying increased demands on agriculture with existing farming practices is likely to lead to more intense competition for natural resources, increased greenhouse gases; and
- viii. Critical parts of food systems are becoming more capital-intensive, vertically integrated and concentrated in fewer hands. This is happening from input provisioning to food distribution.

Further the limitations on arable land and challenges in water availability and delivery are widely acknowledged. New Zealand’s water resources are a key element of our comparative advantage, with water for irrigation enabling a range of production systems whilst reducing climate risk. Water scarcity¹⁵ already affects every continent. Water use has been growing globally at more than twice the rate of population increases in the last century, and an

increasing number of regions are reaching the limit at which water services can be sustainably delivered, especially in arid regions.

In response to these challenges the FAO advises that the following is needed:

- i. Innovative systems that protect and enhance the natural resource base, while increasing productivity;
- ii. Transformative processes towards 'holistic' approaches, such as agroecology, agroforestry, climate-smart agriculture and conservation agriculture, which also build upon indigenous and traditional knowledge;
- iii. Technological improvements, along with drastic cuts in economy-wide and agricultural fossil fuel use, would help address climate change and the intensification of natural hazards, which affect all ecosystems and every aspect of human life; and
- iv. Greater international collaboration is needed to prevent emerging transboundary agriculture and food system threats, such as pests and diseases.

What is clear - the Agri-food system is changing:

- i. Protein demand is expected to double by 2050;
- ii. New proteins formulations are being developed;
- iii. Meat alternatives are becoming more attractive to environmentally conscious consumers, as well as becoming more affordable for widespread poorer consumers, disrupting the bottom end of the commodities market; and
- iv. The market is being driven by an interesting, and at times conflicting, mix of baby boomers, generation X and Y (who have developed economic wealth before having children), the conscious consumerism of millennials and the powerful influence of the Asian emerging middle class with their propensity for sourcing "clean, green" products.

Three themes that dominated the global agri-food system in 2017¹⁶ are expected to drive the agricultural sector towards 2050:

- i. Globally significant food companies shifting to protein-agnostic positions;
- ii. Proactive investment by major players into disruptive start-ups; and
- iii. Health and wellness playing a central part in shaping company strategies especially those targeting wealthy food and apparel consumer groups.

The Canterbury agriculture sector will need to build platforms with planning horizons that recognise that the regional agriculture economy needs to be:

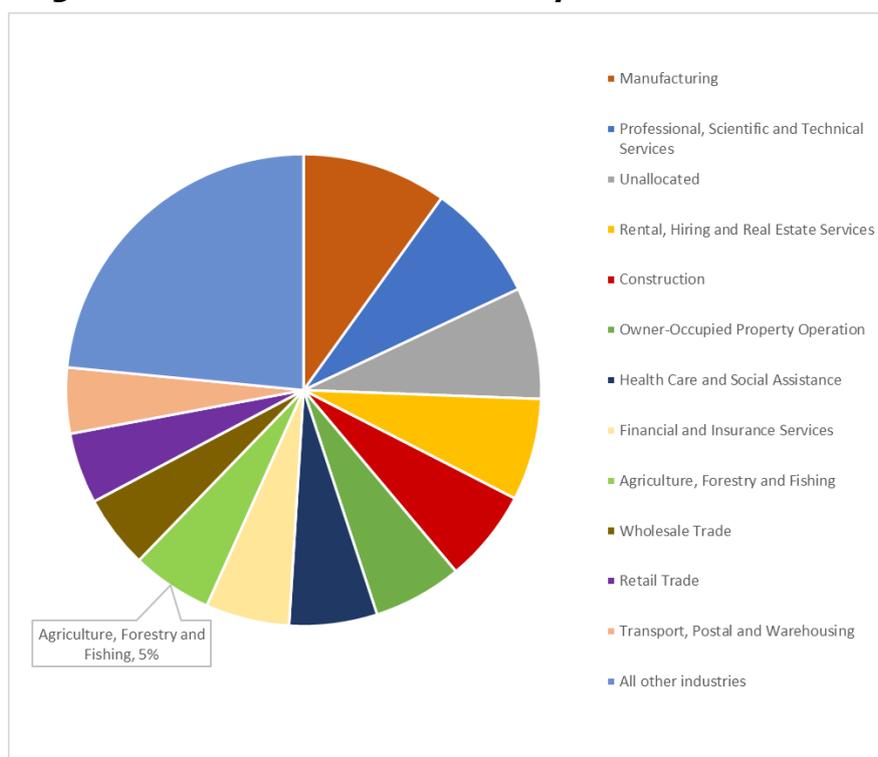
- i. Locally-owned and aligned with NZ development goals;
- ii. Customer-centric, market-driven with projects led by the private sector and rooted in viable business cases;
- iii. Responsive, collaborative and with a growth mindset;
- iv. Multi-stakeholder focussed, with open and inclusive engagement that contributes to the wellbeing of Canterbury;
- v. Holistic and supported by integrated value chains that benefit all participants in agriculture; and
- vi. Nationally (with all parts of NZ society) and globally connected.

Economic Growth Through Agricultural Innovation and Commercialisation

New Zealand: Economic Composition.

New Zealand's economy produced \$235.5 billion of GDP in year ended June 2017. Figure 1 below shows the breakdown of Level 1 industries contributing to New Zealand's GDP. All industries producing under \$10b in GDP were grouped for clarity. The largest two industries were Manufacturing, accounting for \$23.2b and Professional, Scientific and Technical Services, producing \$19.0b of GDP in 2017.

Figure 1: New Zealand GDP Make-Up Level 1 Industries



Source: CHCNZ / Infometrics - 2018

New Zealand has a large Agricultural GDP, with Primary Agriculture, Forestry and Fishing being the 8th largest contributing industry to GDP, with \$12.94 b of production in 2017. This accounted for 5.5% of New Zealand's GDP base in year ended June 2017.

However, this only accounts for the Primary Sectors listed below:

- i. Horticulture and Fruit Growing;
- ii. Sheep, Beef Cattle and Grain Farming;
- iii. Dairy Cattle Farming;
- iv. Poultry, Deer & Other Livestock Farming;
- v. Forestry and Logging;
- vi. Fishing and Aquaculture; and
- vii. Agriculture Support Services and Hunting.

Included in the 54 Australian and New Zealand Standard Industrial Classification (ANZSIC) Industry Breakdown are several processing and manufacturing industries directly related to the primary agricultural industries. These include:

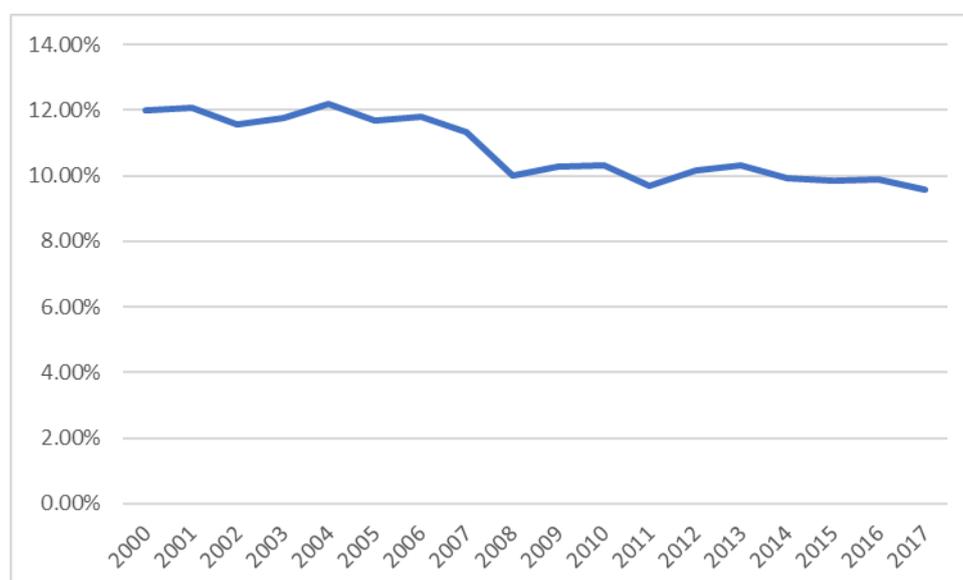
- i. Meat & Meat Product Manufacturing;
- ii. Seafood Processing;
- iii. Dairy Product Manufacturing;
- iv. Fruit, Cereal and Other Food Product Manufacturing;
- v. Beverage and Tobacco Product Manufacturing;
- vi. Wood Product Manufacturing; and
- vii. Pulp and Paper Product Manufacturing

In New Zealand, these industries produced a further \$9.6b of GDP in 2017, with the largest contributors being Meat & Meat Product Manufacturing, at \$1.7b and Wood Product Manufacturing at \$1.4b. Combined, these industries amalgamate to \$22.54b or 9.6% of GDP in year ended June 2017.

These figures only consider the primary and secondary sectors of the Agricultural industry, and don't account for further transport, research & development, education, logistics or other ancillary services associated with the agriculture and food sectors. When considered, the total contribution of New Zealand's agricultural, forestry and fishing industries is likely to be much higher.

Agricultural influence on New Zealand GDP has slowly been declining since 2000 (Figure 2). Still making up almost 10% of GDP, it fell from a high of 12.21% in 2004. It fell sharply from 11.32% in 2007 to 10.01% in 2008, likely due to the GFC diminishing international trade levels. It has since stabilised near 10% for the past decade.

Figure 2: Agricultural Industries proportion of National GDP - Timeline

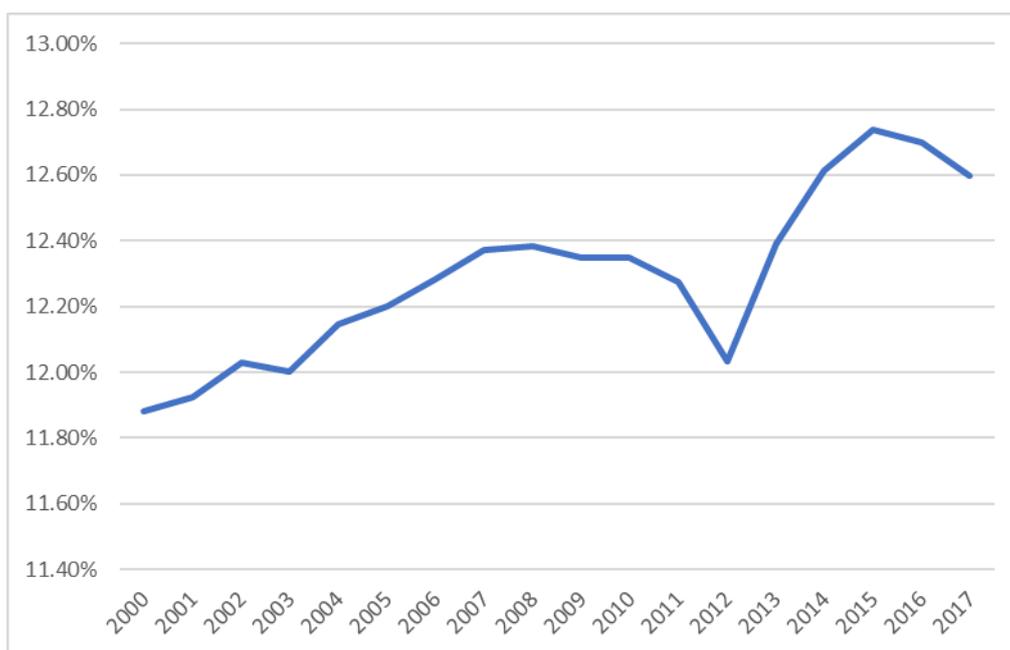


Source: CHCNZ / Infometrics - 2018

Canterbury: Economic Composition

As part of New Zealand’s GDP, the Canterbury contribution has been relatively stable since 2000. There was a large decrease in 2011/2012 immediately following the Canterbury earthquakes, where the GDP makeup fell from 12.35% to 12.03% from 2010 to 2012. It immediately returned to pre-quake levels in 2013, and the construction boom pulled it up to 12.74% in 2015. Since then, it has been slowly returning to historical norms, with a contribution of 12.6% in 2017.

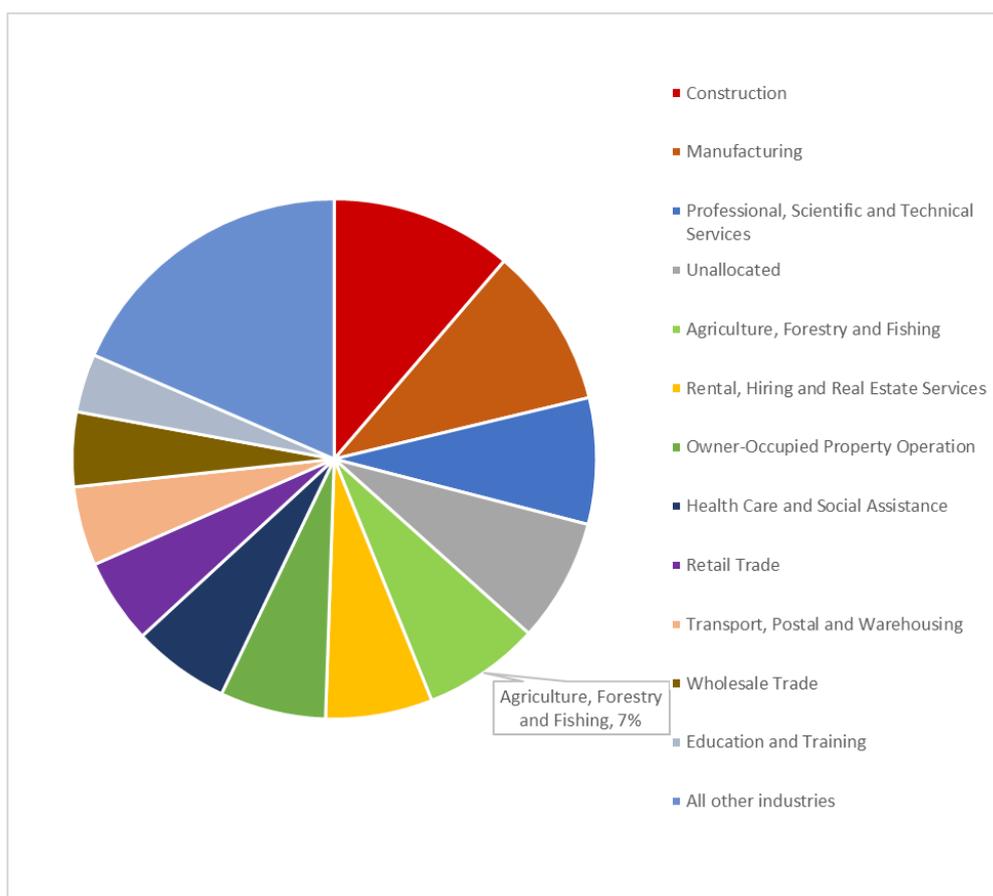
Figure 3: Canterbury GDP as a percentage of National GDP- Timeline



Source: Statistics New Zealand MetaData - 2018

Canterbury’s economy produced \$29.67b of GDP in year ended June 2017. Figure 4 below shows the breakdown of GDP by Level 1 industries. All industries producing under \$1b in GDP were grouped for clarity. The largest two industries were Construction, accounting for \$3.33b and Manufacturing, producing \$2.96b of GDP in 2017.

Figure 4: Canterbury GDP Make-Up Level 1 Industries

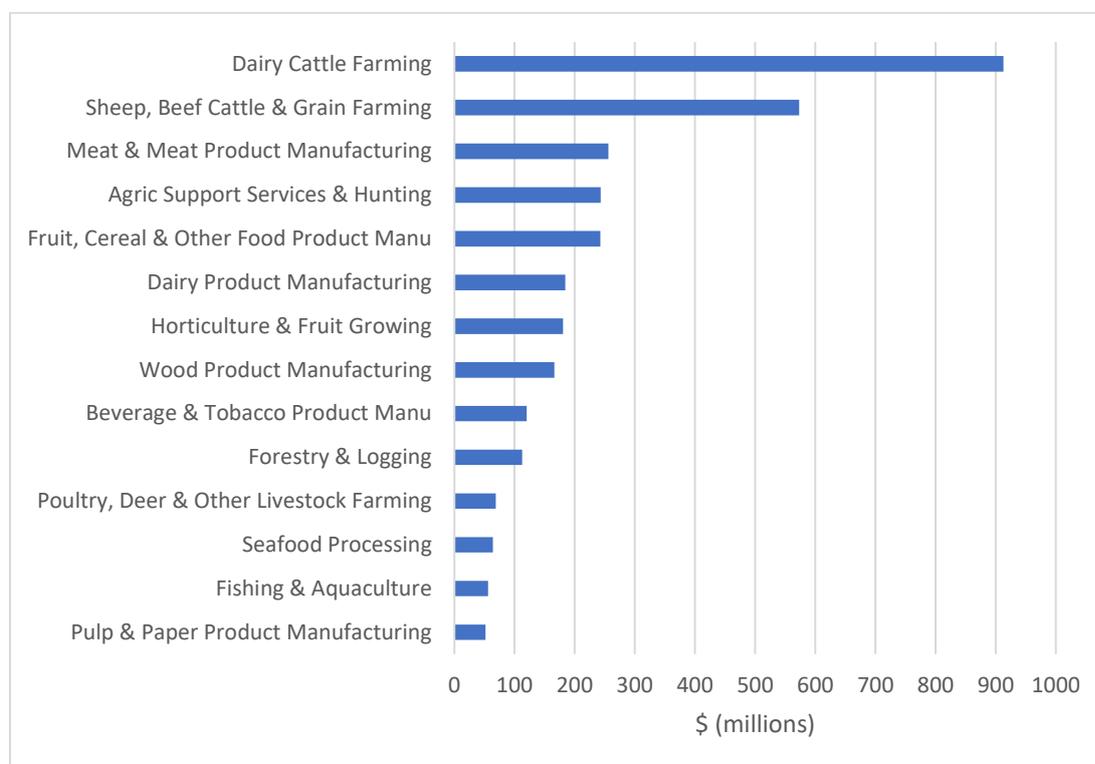


Source: CHCNZ / Infometrics - 2018

Key observations relating to Canterbury GDP are:

- i. Canterbury is more reliant on Primary Agriculture for its productivity than NZ. Agriculture, Forestry and Fishing was the 4th highest contributor to GDP from all Level 1 industries, with \$2.15b of production in 2017. This accounted for 7.2% of the total GDP for Canterbury in year ended June 2017;
- ii. Accounting for the processing and manufacturing industries directly related to the agricultural industries, a further \$1.08 billion of GDP is produced by these sectors. Combined, these industries amalgamate to \$3.23b of GDP production in year ended June 2017, therefore contributing 10.9% of Canterbury's GDP in 2017; and
- iii. Dairy Cattle Farming in Canterbury makes up the majority of the primary Agricultural, Forestry and Fishing sector GDP in Canterbury 2017, accounting for \$914m of GDP (28.2% of total). If this is amalgamated with the Dairy Product Manufacturing sector, it accounts for over a third of the sector's GDP, producing \$1.1 billion.

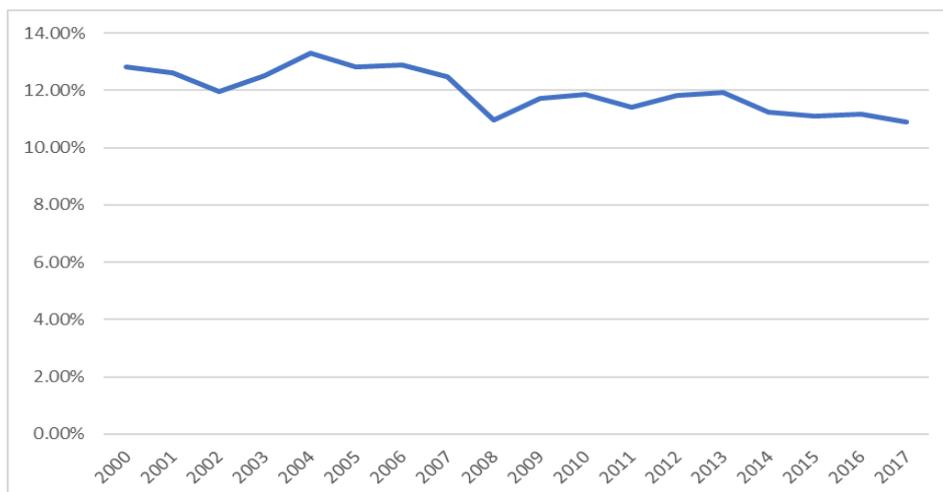
Figure 5: Detailed GDP Breakdown of Agricultural Primary and Secondary Industries in Canterbury 2017



Source: CHCNZ / Infometrics - 2018

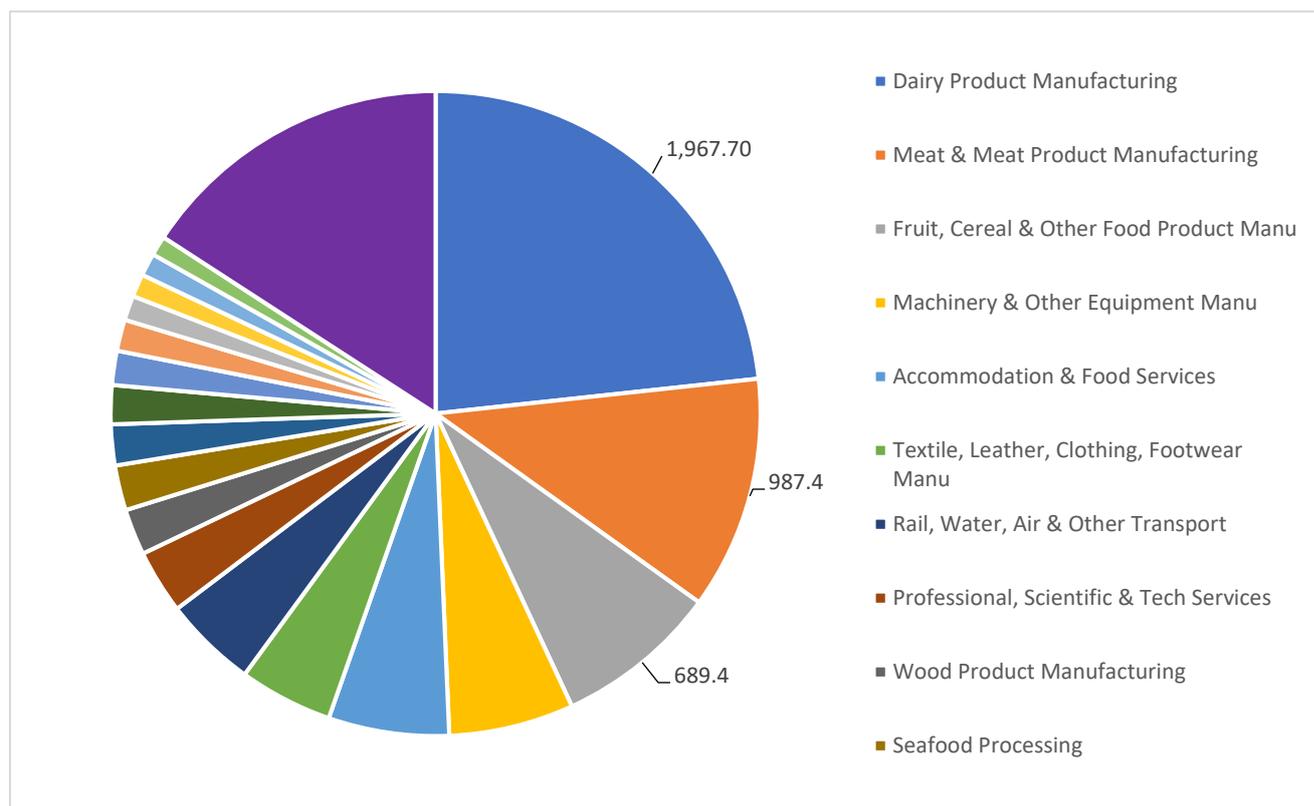
In similar fashion to the New Zealand story, the Agriculture, Forestry and Fishing sector's influence on the Canterbury economy peaked in 2004, comprising 13.29% of GDP (\$2.83b). There was a significant fall from 12.47% in 2007 (\$2.97b) to 10.98% in 2008 (\$2.68b). It recovered to almost 12% in 2013 (\$3.04b), but has since been steadily declining as a percentage of Canterbury's GDP, accounting for 10.9% in 2017 but increasing in nominal terms to \$3.23b.

Figure 6: Agricultural Industries proportion of Regional GDP - Timeline



Source: CHCNZ / Infometrics - 2018

Figure 7: Export GDP Breakdown, Canterbury 2017

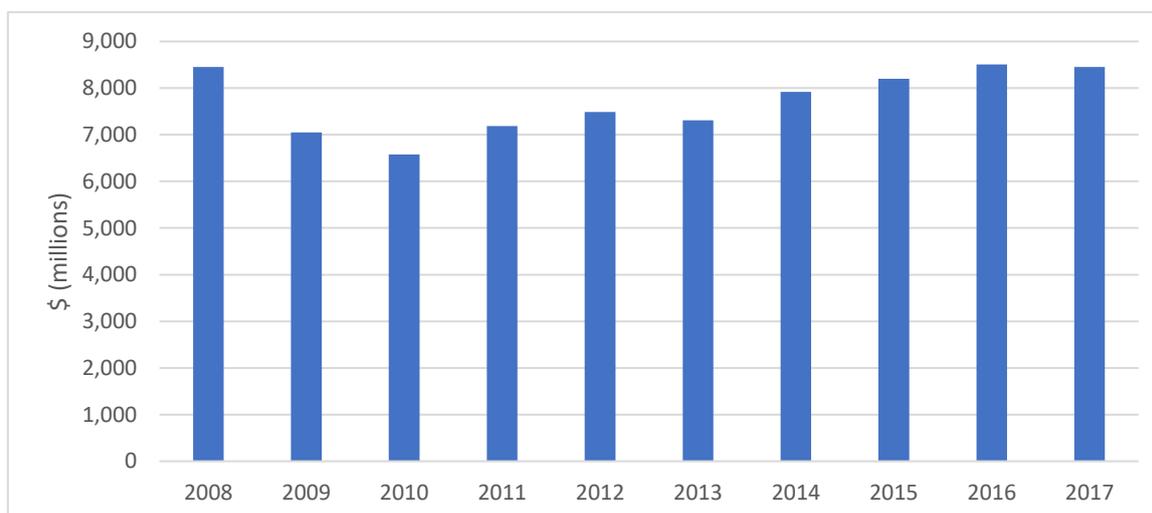


Source: CHCNZ / Infometrics

Agriculture’s importance for Canterbury Export GDP cannot be understated, with the largest three export industries all being agriculturally based. These three industries, being Dairy Product, Meat and Meat Product and Fruit, Cereal and Other Product Manufacturing collectively accounted for 43.2% (\$3.64b) of regional exports in 2017. Accounting for all

primary and secondary agricultural industries, this increases to 70.3% of exports in 2017, at \$5.94b. All industries producing less than 1% of Export GDP were grouped for clarity.

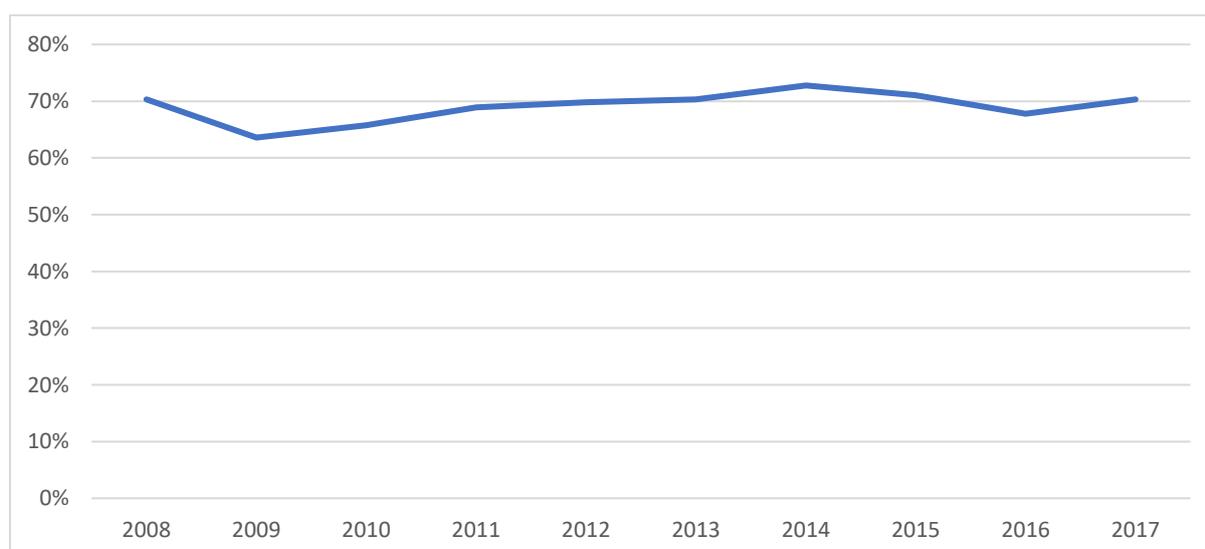
Figure 8: Canterbury Export GDP Timeline 2008-2017



Source: CHCNZ / Infometrics - 2018

Because of the impact of the global financial crisis on international trade, there was a large setback in agricultural export GDP in Canterbury, which has led to a plateau in economic growth being driven by the production and manufacturing sectors. By 2010, export GDP had fallen by over 22%. Only over the last two years has export GDP matched 2008 levels. Because of this, and the continuing surge of primary production in Dairy since 2008, there is likely capacity for growth in the export industry.

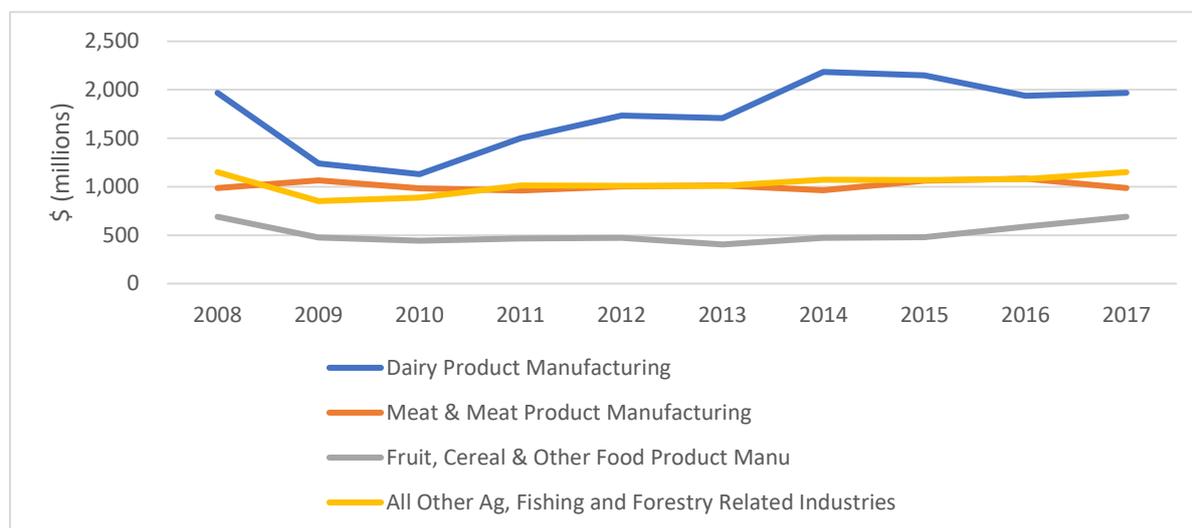
Figure 9: Agricultural, Forestry & Forestry Export GDP as a portion of total regional exports: 2008-2017



Source: CHCNZ / Infometrics – 2018

Agriculture, Fishing and Forestry has remained a key driver of export GDP for Canterbury over the last decade, peaking at 72.8% of regional export GDP in 2014.

Figure 10: Canterbury GDP Breakdown for Agricultural Primary and Secondary Industries



Source: CHCNZ / Infometrics - 2018

Dairy Product Manufacturing accounts for one third of all agricultural exports in Canterbury, exporting nearly \$2 billion of product in 2017. However, due to the GFC, there has been almost no real growth in the export industry since 2008.

Implications

The impact of the Canterbury agricultural sector likely far exceeds the 10% GDP that is currently shown in the data. The data that has been analysed in this section account for two levels of agricultural GDP. This includes the primary production industries such as Dairy Farming, Beef and Grain, Horticulture etc. Likewise, it takes into account secondary industries that are directly related to the processing and manufacturing of the raw inputs into consumable products.

However, there is likely a large amount of GDP being produced in Canterbury that is tied to the Agricultural sector either directly or indirectly that is currently classified in Statistics New Zealand data as related to another industry. Likely industries include Professional, Scientific and Technical Services where industries such as AgriTech and Food Technology are becoming more prevalent. Transport, Postal and Warehousing and Administrative Services likely has a large portion dedicated to agricultural demand. Information and Media Services, Finance and Rental and Hiring services are other examples of industries that could contain the flow on GDP effects of agricultural production.

The significant size of the agricultural sector (and the associated downstream industries) in both New Zealand and Canterbury provide both substantial opportunity and risk. From a

wellbeing perspective, the opportunity to see New Zealand and Canterbury increase the level of exports of both agricultural produce (including specifically targeting the high value / higher margin sector) and innovation overseas is immense. Whilst contributing a relatively large component to the New Zealand and Canterbury economies, our agricultural produce represents a small amount of international demand. The opportunity exists to meet a larger share of this demand (and the high value sub-sector), managed carefully so that it not detrimental to the environment.

Conversely, the extent to which both New Zealand and Canterbury communities rely on the wider agricultural sector for employment and livelihoods presents an inherent risk. As was the impact on the NZ economy when the UK joined the European Economic Community in 1973, over-reliance on one market or sector increases the level of risk. The impact of volatile commodity prices, biosecurity scares (m.bovis), technology, automation and economic factors (demand, supply and exchange rates) can have a significant impact on the wellbeing of these communities.

To the best of the knowledge of the authors, there is no central economic model that can be used to project future growth of the agricultural sector nor the costs/benefits of trade-offs from one agricultural sub-sector to another or from non-agricultural use to agricultural use (or vice-versa). Such a tool would enable policy makers and investors/funders to more accurately assess the positive and negative potential impacts on the New Zealand and regional economies and their associated wellbeing.

The Canterbury Mayoral Forum Road Map for Advancing Canterbury's Food and Agricultural Sector – The Food and Fibre Industry Innovation towards 2050

Approach to Developing the Canterbury Mayoral Forum Road Map

The influencing factors in developing the CMF Roadmap were derived from:

- i. An underpinning body of current thinking around innovation and business growth models and associated methodologies. (These are set out in the Resource Compendium);
- ii. The workshop and case study outcomes;
- iii. Key insights; and
- iv. An assessment of the role and influence of the Canterbury Mayoral Forum.

The workshops recorded the view of informed stakeholders ⁴ about perceptions of key issues impacting on the future for Canterbury Food and agriculture and identified four strategic responses that the Canterbury Mayoral Forum might take. Additionally, the discussion and related research have identified an additional set of factors for the future operating environment – these factors will influence the way in which the strategic responses might be implemented.

The Canterbury Mayoral Forum can lead, support and enable the change process – productivism to provenancing through formal and informal leadership and lobbying. A review of these opportunities provides the basis for prioritising the effort.

The Roadmap recommended later has been developed from a consideration of these interrelated set of key factors.

Workshop and Case Study Outcomes

A key element of the first stage of the project has been gathering an on-the-ground view and a genuine understanding of the issues facing agriculture in Canterbury, from those who live and work within the area.

To do this the Stage I Project Team facilitated a series of strategic workshops in each of the districts throughout Canterbury. The aim was to identify issues, key problems and their causes, and to discuss possible solutions.

Nine workshops were carried out throughout Canterbury in Waimate, Hurunui, Mackenzie, Timaru, Ashburton, Selwyn, Kaikoura, Waimakariri and Christchurch City. Waitaki was invited to participate as part of the Waimate workshop. Two extra workshops, one with an education focus and another with a CRI/Research Extension focus were also carried out. A final regional validation workshop was held at Lincoln on 17 October 2018, where the findings and key outcomes from all the workshops and case studies were reviewed and largely validated.

The workshops have laid a practical foundation for the Mayoral Forum to see how they can lead, support and enable the Canterbury community to work together to unlock opportunities across the value chain in the agriculture sector, from on-farm to international markets.

⁴ We note that further work remains to be done to better capture the perspectives of young people and Ngāi Tahu.

The detailed findings are contained in Resource Compendium Part 2.

The key district issues identified, based on participant votes and in five or more districts were:

- i. **Training and retaining people in Agriculture.** This issue centred on the need for ongoing education and career pathways. A key component of this issue is in the capability building of farm advisors around integrated future tech multi-functional production/food systems;
- ii. **Labour shortage.** Linking to the first issue, there is a need to attract both skilled and unskilled workforce to work and live in the districts. Part of this issue is changing misconceptions around farming and making farming more attractive to those who might consider employment within the industry;
- iii. **Legislation and Regulation.** This issue highlights the high number of regulations that a business or farm must comply with, and that the cost of compliance is high. These rules and regulations may also cause significant limitations to future land use. Within this issue however, was an awareness that water quality is an important factor and that effective enforcement of quality environmental baselines is needed;
- iv. **Water availability and reliability.** There is a strong perception that land use change and higher value production require a reliable irrigation water supply. However, expansion of irrigation is now constrained, with water supplies largely driven by efficiency improvements freeing up existing water coupled with the construction of capital-intensive storage and delivery infrastructure;
- v. **Digital connectivity** (mobile/internet) and the availability and quality. This limits the use of technology on farms in some areas and the ability of farms to access information or tap into new supply chains;
- vi. The **Urban/Rural divide** and the negative perception of farming by wider public, which has the potential to impact on the sectors social licence to operate. It was identified that there is a need to tell the story of farming and to celebrate success. In addition, there is a need to showcase that the urban/rural sectors are based on shared values, and to create a united narrative. The right messengers for the different audiences are essential to the message being received; and
- vii. **Integrated farms** and the need for collaboration between farms and the various agri sectors. This includes farmers, advisors, businesses, industry body, researchers and regulators. Sub-sectors are perceived as being in silos, and there is a need to remove these barriers to create value across the sectors, through shared learnings and actions. There is a need for leadership in the agricultural sector, with vision and connections across knowledge and production areas. There is a need to promote and enable the development of integrated food systems, as there is currently no cohesion to support diversification and transition to new systems or to have combined systems with the farming enterprise.

Other issues that were noted in five or more districts, but not in the top 15 issues based on votes were:

- i. Supply of land for both urban/lifestyle development and for agricultural production. This impacts on the productive capacity of an area and is related to urban/rural zoning and the subdivisions of land;
- ii. Forward planning/strategies for local/national infrastructure and logistics to optimise value. This includes road and town zones. There is a current perceived lack of vision and connectivity/communication throughout whole district. There is a need for land use planning rules that support innovation to increase value; and
- iii. World commodity prices (low return/commodity pricing) and the global market and trading environment possess an inherent risk. Part of this consideration are external factors, such as an over or undersupply of produce; but this also comes down to the flexibility of farming to respond to and/or anticipate market changes.

Other issues that had high votes but were discussed in less than five districts overall were:

- i. Technology and Innovation - the need to create an innovative culture (incubate innovation). There is a recognised need for regional innovation systems to bring together technology, commerce and production innovation. It has been noted that normal/standard business models (value chains) limit innovation and responsiveness. There is a need to integrate new technology and embed it on the farm: Agritech-business, finance, engineering;
- ii. Branding of District – There is a need for the story to help communities value add or create niche products opportunities and promote the development attributes of their district;
- iii. Quality implementation of infrastructure at a local level covering processing infrastructure, environmental and resource infrastructure, tourism and recreational infrastructure (influx of tourists, freedom camping, cycleways);
- iv. Roothing Infrastructure- needs more resilience as it impacts on business resilience/confidence. Critical roading infrastructure needs to be open 99.9% of the time;
- v. Innovation is challenging and complex - it is hard to know what to do and there is a lack of awareness of opportunities, access to technical help and knowledge of who to partner with. It is hard to understand, keep up and adjust to consumer demand/trends to maximise value. There is a need to learn how to do on-farm what the market wants e.g. Alipay/Amazon, using tools for targeting high value agri-food consumer segments;
- vi. Investment, capital, funding and financial support – needed to make it cheaper and easier to access innovative farming practises, and also to help with future-proofing and investment;
- vii. Big data and data through science rather than modelling; data collection systems - IP/IT support; Affordable sensors; Don't know what the costs of production are and do not take one set of truths/instincts; Non-centralised tsunami of data + information; and

- viii. Tourism - integrating tourism with natural beauty and valuing the tourist dollar. Agri-tourism opportunities locally on farm and with local produce used.

All the issues above, apart from investment and financial support for business had components at both a national and local level in terms of where solutions might be found.

The key issues discussed in the education workshop included:

- i. Councils need to invest in agriculture as they do for tourism;
- ii. The need to reposition or rebrand agriculture to improve both labour and urban/rural divide; and
- iii. The aging workforce and the need to retain skilled staff.

The key issues discussed in the CRI/research extension workshop included:

- i. Leadership;
- ii. Science is not trusted;
- iii. The need to reframe the adoption model for science; and
- iv. The need for evidence-based decision making. This links to the issue raised in district workshops around the access to credible information and data.

Of all the key issues discussed, six issues are part of existing CREDS workstreams that don't necessarily have a specific agricultural focus. These CREDS workstreams are:

Integrated regional transport planning and infrastructure investment

Issue identified: Roading Infrastructure; State highway repairs issues - needs more resilience (open 99.9% of time) as these impact on businesses

Digital connectivity; extension and uptake of fast broadband in rural areas

Issue identified: Digital connectivity (mobile/internet) -availability and quality; communication is not meeting needs e.g. internet

Freshwater management and irrigation infrastructure

Issues identified: Water availability and reliability; barriers to storage; distributions (ground vs surface)

Education and training for a skilled workforce

Issue identified: Training and retaining people in agriculture and the need for ongoing education and career pathways. A key component of this is in the capability-building of farm advisors around integrated multi-functional production/food systems.

Newcomer and migrant settlement – skilled workers, cohesive communities

Issue identified: Labour shortage and the need to attract both skilled and unskilled workforce to work and live in the districts. Part of this is changing the misconceptions around farming and making farming more attractive to those who might consider employment within the industry.

Regional visitor strategy.

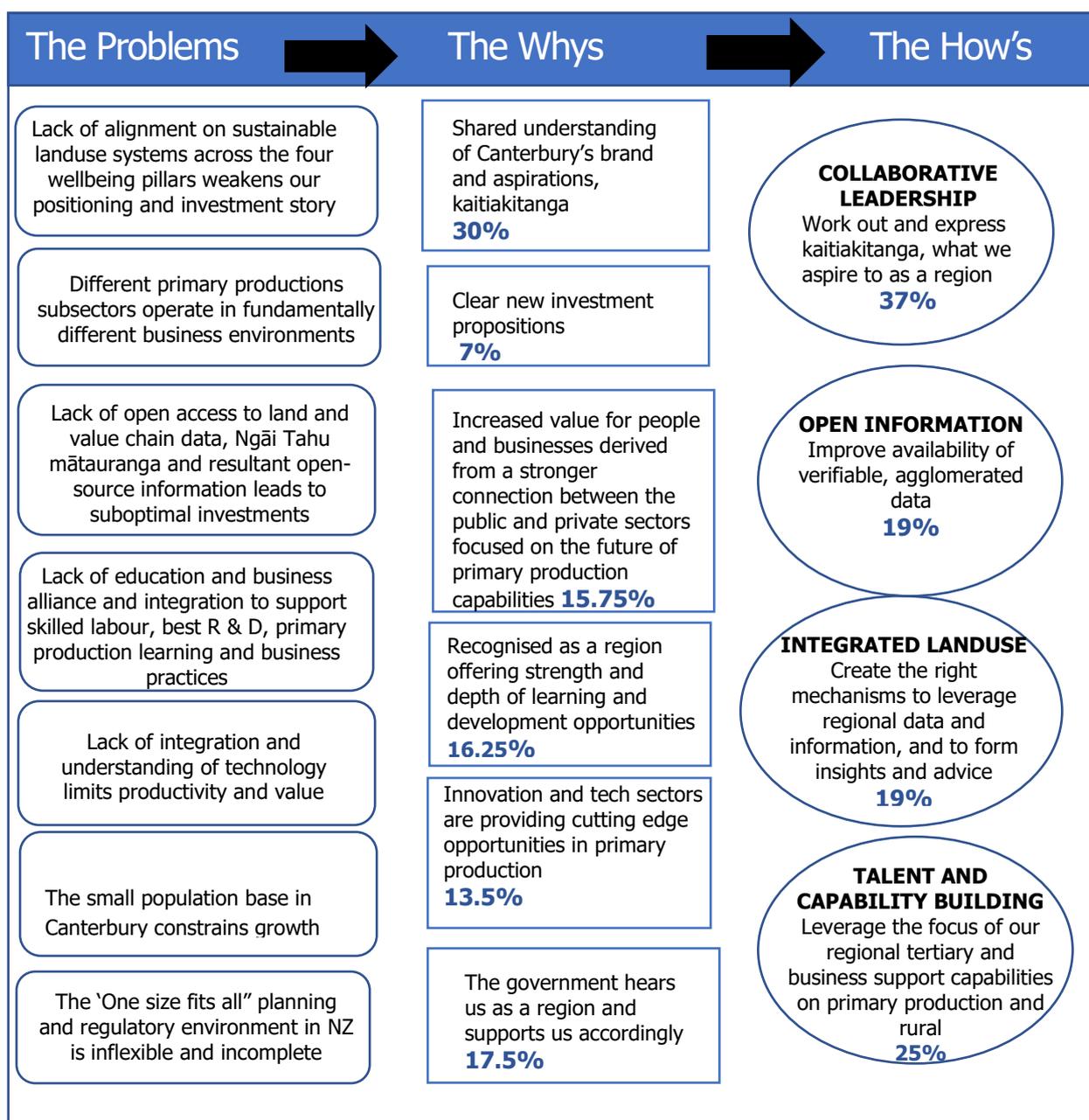
Issue identified: Tourism - integrating tourism with natural beauty and valuing the tourist dollar. Agri-tourism opportunities locally on farm and with local produce used.

Some of the issues raised in the district work shop were also raised in the individual business case studies, such as skills shortages, regulations, market signals, water for irrigation, access to capital and digital connectivity.

Summary Outcomes

The engagement process through district and focused workshops, culminated in the regional validation process. The Workshop Outcomes and research were synthesised into seven major issues with four proposed Strategic Responses. These were shared with the regional workshop and as amended, including the assigned weightings by it, are summarised in Figure 11 below.

Figure 11: Towards the Road Map: The seven major issues, the whys and the CMF Strategic Responses



Source: Canterbury Agriculture: Improving Productivity and Value Addition Project 2018 – Stage I

Key Insights

We need to focus on key basics: Underlying problems/limitations are causing many issues affecting rural businesses and rural communities, but we tend to put much of our effort into managing the issues rather than solving the underlying problems.

There are pockets of brilliance across the region in Agritech development and uptake, with a broad range of R and D institutes. However, a deep and stable innovation and commercialisation environment and culture, with the necessary ability to access robust data and information, focussed on primary production and processing, must be created.

Drivers for Change

Drivers of change are those factors which bring change to the individual and collectively to the sector. Drivers for change are both internal and external.

There are two primary reasons for change:

- Necessity
- Confidence

The mayoral forum can directly influence the necessity for change and indirectly confidence.

Necessity to Change

Necessity to change causes are primarily an external event or regulation that causes the shift in status quo.

Examples of the Necessity to Change include:

- Regulation: the requirement to meet a rule in a regional or district plan, act of Parliament etc. Regulation could also be via permitted activity standards, non-regulatory farm environment plans and industry codes of practice and conduct;
- Climate: change may be forced due to a climatic event or change in climate, such as drought, flood, earthquakes. Increased frequency of flooding, snowfall or drought may cause a traditional farming system to fail more often, forcing the land managers to review and change. The introduction of irrigation to property in response to drought conditions may cause a shift in land use to meet the investment costs;
- Market Demand: changing consumer demands mean that some traditional products no longer have a viable market, while others emerge. Examples include use of palm kernel in dairy, flax harvesting for fibre use, the growing demand for hemp or A2 milk;
- Business ownership: the key example here at the family farm level is succession planning. Future generations introduce new farm systems and practices;
- Financial viability: funders or business owners requiring the business to return a cash profit; and
- Access to resources: A change in the supply of capital, labour, water or nutrients loss rates (environment's assimilative capacity) will affect the land's productive output relative to its potential. The change will cause a corresponding response from the land manager.

Confidence to Change

Confidence to change resides with the land and/or business manager. There are many factors that can affect the confidence to change, both positively and negatively. When change is not actually required of a manager by necessity, they must genuinely want to change before change can occur.

The primary factors influencing confidence are personal to the manager. AgFirst (2017) lists several personal factors such as age, education and experience, family circumstances, attitude to risk, access to capital, access to information, and attitude to change as factors

What is clear is that change is a complex area. Some elements identified in this regard that need to be reckoned with include:

- i. The "One size fits all" national regulation and planning framework;
- ii. The complex and incomplete planning environment;
- iii. Small rate and tax base within the districts of Canterbury;
- iv. Difficulty in scaling opportunities and accessing capital;
- v. Limited central government /local government alignment on regional intentions and aspirations;
- vi. Canterbury leaders are not effectively "owning and communicating the Canterbury evidenced-based story together";
- vii. The different primary production (and related processing) sub-sectors fundamentally have different operational ecosystems;
- viii. There is a chaotic deluge of non-standardised and non-agglomerated data, with gaps and overlaps;
- ix. Research and development funding is silo-ed and research outcomes are not effectively made available as open source information;
- x. There are not strong and trusted relationships between the tech and innovation sector and the primary production sector;
- xi. The plethora of generic business development support tools and opportunities are not well focussed for primary producers; and
- xii. Inequitable access to fast (fibre) connectivity.

Canterbury Mayoral Forum Influence

The Canterbury Mayoral Forum can directly influence the necessity for change and indirectly influence the confidence to change.

Of the factors that create the necessity for change, only components of regulation are in the control of the districts and their councils that the Canterbury Mayoral Forum represents. Regulation of resource use relating to land, nutrients and water is well established across Canterbury and there is broad acceptance that allocation limits are necessary for water and nutrient losses. Changes to these two base resources to create further limits, will directly change the land use mix within the region, with the resource generally moving to the highest value land use. Creating certainty of resource allocation even if restricted is important for investment confidence and land use change.

Focussing on the limitations, which cumulatively impact on confidence, it has been possible to clarify what needs to be done strategically off-farm, to create regional benefit. It appears that the Mayoral Forum should help to:

- i. Clearly articulate and tell the story of their targeted and collective aspirations for the future of the sector and the region;
- ii. Create a trusted regional investment proposition to support investment from people, businesses and financial institutions;
- iii. Drive their own districts' futures in a way that underpins pride in who we are in Canterbury, where we live and what we do;
- iv. Use the planning and investment tools that they have available to them to support primary producers and processors to make the best use of their natural resources;
- v. Enable and support the implementation of initiatives that help to put innovation and sustainability at the heart of food and fibre production and processing, with a focus on adding value for businesses and for people; and
- vi. Work with education and career planners to develop capacity building from preschool to the end of effective working careers towards a flexible, agile, technology savvy rural community.

The opportunities are described in the Action Plan, across the four proposed strategic responses themes and the three horizons: short term – the duration of the Canterbury Agriculture – Improving Productivity and Value Addition Project and (2019 – 2022), medium term (2022 – 2030) and long term (to 2050).

Action Plan

The essence of this Stage I work has been to establish robust activities that allow the Mayoral Forum to lead, support and enable the strengthening of a community-based coalition towards an inclusive and sustainable engine for Canterbury – a vibrant agriculture sector.

This will allow the mayors to recognise and act on opportunities to reduce risks and to create the preferred / best / most opportune platforms and environment for increasing sustainable regional productivity and GDP growth, making the most of Canterbury's natural advantages and strengths within acceptable environmental limits.

Some of the suggested opportunities were:

- i. Create a regional agricultural charter – Platform for Canterbury Brand; including advocating for the four key factors of wellbeing: economic, environmental, social and cultural to be the basis for Canterbury Agriculture to 2050;
- ii. Create a mechanism for a coordinated well-being (four pillar) approach to future agriculture planning and investment through building a centre of excellence into an existing institution;
- iii. Create and maintain an open, accessible data/information portal, including relevant regional and district data sets with access to all agriculture data;
- iv. Canterbury Mayoral Forum support for innovation debates and discussions at sub-regional level;
- v. Advocate of Investment fund application for regional priority initiatives;
- vi. Advocate for New Zealand Trade and Enterprise (NZTE) and other market research initiatives to strengthen Canterbury awareness of market trends and opportunities for Canterbury food and fibre enterprises.
- vii. Create a regional "one-stop-shop" information pilot for three years to support and connect small and medium enterprises with market information and commercialisation support:

- a. Support and connect SMEs to move from idea to commercialization, and to support farmers to move from one food sector to another, and to investigate the development of a virtual marketplace to link buyers and growers (think Ali Baba for food); and
 - b. Research-advice credit for use with the Lincoln hub, like the red meat partnership but not restricted to a single sector.
- viii. Promote cross sector collaboration of land use to develop the mixed farming mode - farming systems approach;
- ix. Advocate for demonstration farms leveraging e.g. Lincoln dairy farm example, to have similar open farms for farmers to observe best practice methods in action and associated economics;
- x. Further develop and build up a base of business and industry case studies which demonstrate good practise methods;
- xi. Continue to support initiatives which promote the districts as good places to work and live;
- xii. Look for ways to support companies in writing R&D funding proposals and enhancing access to capital;
- xiii. Explore the possibility of business cluster developments within Canterbury.
- xiv. Support large scale farms and farming business to be the innovation and experimental system leaders, e.g. Ngāi Tahu's trial orchards, leverage Pamu/Landcorp SOE ownership to try new things by lobbying to change and have this included in their state of corporate intent; and
- xv. Engage actively with all education levels and providers for inclusion of the "food and fibre" nexus in all levels of education, building, with industry, appropriate courses across the whole value system including technology;

Based on the workshop outcomes, the Stage I team insights and guidance of the regional workshop the following summary road map (it is a living document and should be under regular review and amendment) has been established:

SUMMARY ROAD MAP: Canterbury Food and Fibre Industry Innovations to 2050

The Problems



The Opportunities



The How's



The What's

Lack of alignment and application of sustainable landuse systems across the four wellbeing pillars

Different primary production subsectors operate in fundamentally different business environments

Lack of open access data, Ngāi Tahu mātauranga and insights to inform decision making

Lack of collaboration between education and business

Lack of insight and signals about domestic and international consumers and appropriate business models

Variable adoption and sharing of innovation limits sustainable productivity and value addition

Scarcity of Accessible Resources – Natural, Human, Financial, and Physical Capital

The nature of the planning, compliance, and regulatory environment in NZ

Shared understanding of Canterbury's brand and aspirations, kaitiakitanga

Clear new investment propositions

Increased value for people and businesses derived from a stronger connection between the public and private sectors focused on the future of primary production capabilities

Recognised as a region offering strength and depth of learning and development opportunities

Innovation and tech sectors are providing cutting edge opportunities in primary production

The government hears us as a region and supports us accordingly

COLLABORATIVE LEADERSHIP

Work out and express kaitiakitanga, what we aspire to as a region

OPEN INFORMATION

Improve availability of verifiable, agglomerated data

INTEGRATED LANDUSE

Create the right mechanisms to leverage regional data and information, and to form insights and advice

TALENT AND CAPABILITY BUILDING

Leverage the focus of our regional tertiary and business support capabilities on primary production and rural

- Establish an agreed Canterbury Food and Fibre Charter
- Establish capacity building initiative for young and emerging leaders
- Ensure regional value addition initiatives focus on market impact
- Establish cogent advocacy for regional food and fibre initiatives
- Lobby central government for Canterbury specific policy and regulatory needs

- Establish an open access Canterbury Food and Fibre Knowledge Repository, incorporating mātauranga and associated principles.
- Build a network of contributing open access datasets and sources that support the further development of Canterbury's value webs and landuse systems
- Establish a sustainable information and communications platform including digital discussion groups
- Produce open access food and fibre learning resources, activities, and events that support the education systems

- Enhance a Centre of Excellence in Land and Food systems innovations and policy, based on kaitiakitanga
- Create primary production and mahinga kai focused services to provide advice and support across production sectors
- Strengthen a regional approach to awareness and accessing early stage capital and knowledge to support new food and fibre investment opportunities

- Support the development of a Canterbury Educational Alliance for a regional talent pipeline and capability building
- Develop an integrated future labour and management capability plan for the sector across the food and fibre sectors, education and immigration
- Ensuring the Canterbury food and fibre sector gains a social license to operate thru improved educational engagement

The resultant short-term action plan is outlined below:

Mayoral Forum Action Plan		
Canterbury Agriculture: Improving Productivity and High Value Manufacturing		
No	Action	Schedule and Responsibility
1	Review and Approve Road map	7 Dec 2018, Mayoral Forum with CREDS Project Manager and Phase I Coordinator
2	Review Project Agreement and Oversight Arrangements	15 Dec 2018 ECAN, Christchurch NZ and University of Canterbury
3.	Revise the remaining three-year work plan and key deliverables	22 Dec 2018 Steering Committee with Phase I Project Coordinator
4.	Finalise the collaborative leadership programme including establishing implementation arrangements with the committee for Canterbury.	31 st January 2019, CREDS Project Manager and Phase I Coordinator
5.	Establish contract to deliver Carbon farming seminars in four regional centres	20 th December 2018, CREDS Project Manager and Phase I Coordinator
6.	Finalise partnership documents for establishing the platform for regional food and fibre information generation and dissemination	31 st January 2018, CREDS Project Manager, Phase I Coordinator and Lincoln Hub
7.	Finalise procurement (design) document for establishing a land and food systems innovation and policy centre (integrated land use workstream)	31 st January 2018, CREDS Project Manager, Phase I Coordinator and management of Lincoln Hub

A key aspect that has emerged from the study has been the need to recognise the importance of investing considerable time and effort to establish meaningful and productive outcomes from consultation with all stakeholders, including Ngāi Tahu and young people. The engagement with these stakeholders incorporated into the on-going work of this project.

The indicative budget for this 3-year action plan is as follows:

The Food and Fibre (F&F) Industry Innovations towards 2050 – Summary Costs

Year	PY I	PY II	PY III	Total
Component	2019	2020	2021	
F & F Collaborative Leadership Initiative				
Charter	69,250	0	0	69,250
Fora	98,400	98,400	73,400	270,200
Advocacy	23,000	23,000	23,800	69,800
Sub-Total	190,650	121,400	97,200	409,250
F & F Open Information and Knowledge Project				
F & F Knowledge Centre	95,000	190,000	190,000	475,000
Information Portal	37,500	267,000	92,000	396,500
F & F Educ Resources	150,050	55,000	55,000	260,050
Sub-Total	282,550	512,000	337,000	1,131,550
F & F Integrated Land Use Workstream - Land and Food Systems Innovation and Policy Project (to be fully developed in 2018)				
Project Design	75,000			75,000
Indicative Budget		200,000	450,000	650,000
Sub-Total	75,000	200,000	450,000	725,000
(resource mobilisation required)				
F&F Talent and Capability Building: under Leadership Initiative and CREDS workstream				
Total - Stage 2	548,200	833,400	884,200	2,265,800

Implementation of this Action plan will lead to the commencement of the Leadership Initiative in the first quarter of 2019, the initiation of the open access Information and Knowledge Platform by mid-2019 and the Centre of Excellence in Land and Food systems innovations and policy in the third quarter of 2019.

Project briefs for the Collaborative Leadership and Open Information Workstream projects as included in Appendix 1. The Integrated Land Use workstream project requires detailed development and associated resource mobilisation beyond the project design budget included.

The Talent and Capability building workstream initiatives will feed into and collaborate with the appropriate existing CREDS workstream.

Currently there are enough funds to resource the Leadership and information projects along with the design of the Land Policy Centre. Resource mobilisation will be required to move ahead with that initiative. Key issues discussed that are part of existing CREDS workstreams have not been considered for this Canterbury Food and Fibre road map. These include roading infrastructure; extension and uptake of fast broadband in rural areas, water availability and reliability; barriers to storage and distribution (ground vs surface), skilled workers, cohesive communities agri-tourism opportunities locally on farm and with local produce used.

It is recognised that this exceeds the immediate budget available under the CREDS agricultural project. It is worth noting that in discussions with key institutions there are strong indications that additional resources up to around \$200,000 is insight for potential mobilisation

GLOSSARY

Canterbury is taken as the area administered by the Canterbury Regional Council and consists of all the river catchments on the east coast of the South Island from that of the [Clarence River](#), north of [Kaikoura](#), to that of the [Waitaki River](#), in South Canterbury. It is New Zealand's largest region by area, with an area of 45,346 km². It comprise 9 territorial districts – Waimate, Timaru, Mackenzie, Ashburton, Selwyn, Christchurch, Waimakariri, Hurunui and Kaikoura.

Ecosystems are dynamic and co-evolving communities of diverse actors who create and capture new value through both collaboration and competition.

Ecosystems typically bring together multiple players of different types and sizes in order to create, scale, and serve markets in ways that are beyond the capacity of any single organization—or even any traditional industry. Their diversity—and their collective ability to learn, adapt, and, crucially, innovate together—are key determinants of their longer-term success.

They are enabled by greatly enhanced connectivity across specialized capabilities and resources, ecosystems develop new, co-created solutions that address fundamental human needs and desires and growing societal challenges. While forging superior ways to create new value, ecosystems also increase the importance of discovering new business models to capture that value in a world of commoditization and “de-monetization.”

Competition, while still essential, is certainly not the sole driver of sustained success. Participants are additionally incentivized by shared interests, goals, and values, as well as by the growing need to collaborate in order to meet increasing customer demands, to invest in the long-term health of their shared ecosystem, from which all can derive mutual benefit.

From Business ecosystems come of age Deloitte University Press

Gross Domestic Product is the monetary [measure](#) of the market value of all the [final goods](#) and services produced in a period of [time](#), typically one calendar year

Total Factor Production Productivity growth not explained by increases in inputs such as capital and labour. TFP captures all other factors influencing growth, such as improved uses of the measurable inputs and general technological progress.

Innovation -is the introduction of something new - new idea, method, or device

Invention is creating - a device, contrivance, or process originated after study and experiment, a product of the imagination

High value manufacturing is the application of leading edge technical knowledge and expertise to the creation of products, production processes, and associated services which have strong potential to bring sustainable growth and high economic value to Canterbury and New Zealand.

Value Chain is a set of activities that a firm operating in a specific industry performs in order to deliver a valuable [product](#) or [service](#) for the [market](#).

Value Web many “supply chains” appear to be evolving into “value webs,” which span and connect whole ecosystems of suppliers and collaborators. Properly activated, these value webs can be more effective on multiple dimensions—reducing costs, improving service levels, mitigating risks of disruption, and delivering feedback-fuelled learning and innovation. This is likely to accelerate as new technologies generate more data, provide greater transparency, and enable enhanced connectivity with even tiny suppliers and partners. The shift can create new challenges for the supply chain profession—but also extraordinary opportunities to play an even more central strategic role in shaping the future of enterprise. Deloitte *ibid*

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APPENDIX

Appendix 1: Project Briefs

- Food and Fibre Leadership Initiative (FFLI)
- Food and Fibre Open Information and Knowledge Platform (FFIKP)

PROJECT BRIEF: FFLI

Project Title: Canterbury Mayoral Forum (CMF) - Food and Fibre Leadership Initiative (FFLI)

Goal and Objectives:

The FFLI has the goal of enhancing the leadership and civil governance of the Canterbury food and fibre sector

The key objectives are:

- i) Enable the CMF to lead, support and enable the Canterbury Food and Fibre Sector
- ii) To build a cadre of food and fibre leaders capable of guiding success for the wider Canterbury food and fibre sector towards 2050 including awareness and support of emerging business models
- iii) To focus these leaders on building economic wellbeing to achieve the CREDS vision of *"a region making the most of its natural advantages to build a strong, innovative economy with resilient, connected communities and a better way of life for all"*
- iv) Establish support mechanisms for emerging leaders grow and accept the responsibilities of leadership in the VUCA (Volatility, uncertainty, complexity and ambiguity) environment

Summary:

This CMF initiative will develop Food and Fibre leaders who:

- i. Are clear on the purpose of the Sector;
- ii. Have an accurate assessment of today's situation;
- iii. Can create and evolve a shared vision of success;
- iv. Are aware of our critical successful factors and barriers;
- v. Are able to define the drivers: our strategies and priorities;
- vi. Are able to monitor and report our results; and
- vii. Have rewards and consequences to build accountability

Challenges To be Addressed

The CMF RoadMap identified the following key leadership areas that need to be addressed. These include:

- i) the need to clearly articulate and tell the Canterbury story of our targeted and collective aspirations for the future for the food and fibre sector;
- ii) the need to create a trusted regional investment proposition(s) to support investment from people, business and financial institutions;
- iii) driving each Canterbury district in a way that underpins pride in what we are in Canterbury, where we live, what we do and what we stand for;

- iv) support primary producers, service providers, logistics operators, traders and processors to make best of our natural resources and comparative advantages
- v) enable and support initiatives that help put innovation and sustainability at the heart of food and fibre production and processing especially after the farm gate and into international markets; and
- vi) facilitate the education sector to align with industry need

Project Description

Results

The key results to be achieved/delivered include but are not limited to:

- i) An agreed Canterbury Food and Fibre Charter with a comprehensive range of signatories including districts, producer organisations, service providers (especially technology and innovators), Crown Research Institutes, processors, logistics operators, education organisations (collectively or individually) et. al.
- ii) Capacity building initiatives for young and emerging leaders focusing on capability to operate in the VUCA environment
- iii) Facilitate and support multi-stakeholder consultation and initiatives on key challenges and issues focusing on effective and sustainable impact
- iv) Cogent advocacy for regional initiatives including fair access to central government funds and resources

Main activities

- i. Create a regional agricultural charter – Platform for Canterbury Brand; including advocating for the four key factors of wellbeing: economic, environmental, social and cultural to be the basis for Canterbury Agriculture to 2050;
- ii. Build a VUCA leadership programme in collaboration with current such programmes
- iii. Create and lead a regular forum across the sector impacting agriculture especially food and fibre;
- iv. Fund and support a series of topical debates which engage the wider community constructively in Canterbury Agri-food challenges;
- v. Partner with Boma/Ministry of Awesome for Agri Innovation and Technology Conference to be held 11 – 12 April 2019; including linking with its key partners;
- vi. Support key national and regional influencers with accurate and timely information;
- vii. Apply to green Investment Fund as a collective to start a regional environmental impact investment fund which would enable a start to a low carbon transition within their own TLA portfolios; and
- viii. Take a regional approach to the Provincial Growth Fund opportunities, coordinating resource to develop an application.

Implementation

1.1 Financing and Necessary agreements

The CMF Secretariat will establish a partnership agreement with the lead Agency that will clearly highlight implementation responsibility with the lead Agency whilst ensuring that oversight and result monitoring are carried out by the CMF Secretariat on behalf of the CMF.

1.2 Indicative implementation period

The project is expected to run for an initial three-year period from 2019 until 2021

1.3 Organisational set-up and Implementation modalities

a. Organisation and Management

i. Lead Agency

The lead agency will be the CMF Secretariat operating through ECAN

ii. Implementing Partners

It is anticipated that that an implementation partnership will be established with the Committee for Canterbury (CfC) that will be responsible for broadening and building its Food and Fibre Forum and that it will manage the range of project activities indicated above.

iii. Cooperating partners

The CfC will establish the necessary cooperating arrangements with partners to carry out specific project activities

b. Staffing: Partners will specify direct management costs. Overheads will not be met due to the partnership nature of the project

c. Procurement: As required the CfC will through the CMF Secretariat apply the required procurement procedures – primarily for services.

Indicative budget

FFLI Summary Cost Table (\$ 000)

Year	PY I	PY II	PY III	Total
Component	2019	2020	2021	
Comp. 1 Charter	69,250	0	0	69,250
Comp. 2 Leadership/Fora	98,400	98,400	73,400	270,200
Comp. 3 Advocacy	23,000	23,000	23,800	69,800
Total	190,650	121,400	97,200	409,250

Performance monitoring and reporting

- a) Work Plan and budgets
- b) Quarterly progress reports
- c) Annual/Completion Report(s)

Review and Evaluation

- a) Baseline
- b) Mid Term review
- c) Completion Report
- d) Ex post Evaluation – within 6 months of project closure

Audit

The Project will be audited according to the prevailing requirements of CMF/ECAN as will be specified in the relevant financing agreement(s)

[APPENDIX] - Indicative Logframe matrix - to be completed during preparation/finalisation of project with CMF Secretariat and implementing partner

	Intervention logic	Indicators	Baselines (incl. reference year)	Targets (incl. reference year)	Sources and means of verification	Assumptions/Risks
Overall objective: Impact	The broader, long-term change which will stem from several interventions Project will (indirectly) influence. Long Term (2050)	Measures the long-term change at Canterbury or sector level.	Ideally, to be drawn from the CMF strategy	Ideally, to be drawn from the CMF Strategy	To be drawn from the CMF strategy.	
Specific objective(s): Outcome(s)	The medium-term effects of the action which tend to focus on the changes in behaviour resulting from project/ programme outputs. The Project will contribute to these changes. Medium Term (2030)	Measures the change in factors determining the outcome.	The starting point or current value of the indicator.	The intended value of the indicator.	Sources of information and methods used to collect and report (including who and when/how frequently).	Factors outside project management's control that may impact on the outcome-impact linkage.
Outputs	The direct/tangible outputs (infrastructure, goods and services) delivered by the action. These can be controlled directly and as such can be linked CMF funding	Measures the degree of delivery of the outputs.	as above for the corresponding indicator.	as above for the corresponding indicator.	as above for the corresponding indicator.	Factors outside project management's control that may impact on the output-outcome linkage.

PROJECT BRIEF: FFIKP

Project Title: *Canterbury Mayoral Forum (CMF) - Food and Fibre Open Information and Knowledge Platform (FFIKP)*

Goal and Objectives:

The FFIKP has the goal of providing access to open source data/information across the total Canterbury food and fibre spectrum for all stakeholders

Key objectives include:

- i) establishing a mechanism for a coordinated approach to future food and fibre planning and investment through building a centre of excellence (into an existing institution) that adopts the well-being (four pillar) approach to Canterbury planning
- ii) building a network of open access contributing data sources throughout Canterbury value webs/chains
- iii) establishing a sustainable information platform and digital "discussion group(s) "
- iv) producing annual food and fibre "resources" that support education (pre-school, primary, secondary, tertiary and "in-work") systems with balanced evidence-based learning tools
- v) facilitating better and more relevant research and dissemination of research outcomes

Summary:

This CMF initiative will develop an open source food and fibre industry information platform that provides ready access to public good information. Further it will lay the basis for the emergence of a "Food Value Policy Centre that incorporates the integrated land policy concept.

Challenges To be Addressed:

The CMF RoadMap identified the following key information areas that need to be addressed. These include:

- vii) the need to clearly articulate and tell the Canterbury story of our targeted and collective aspirations for the future for the food and fibre sector
- viii) the need to ensure open access to appropriate data and information to remove access constraints that limit informed decision making by all stakeholders
- ix) provide unbiased data and information to support the "social licence" for the Canterbury food and fibre

Project Description:

Results

The key results to be achieved/delivered include but are not limited to:

- v) A Canterbury Food and Fibre information and knowledge platform based on open access to public good data and information
- vi) Provision of impartial, evidenced based information and knowledge to fuel informed debate around the land based food and fibre industry evolution

Main activities

- vii) Create and maintain an open, accessible data/information portal, including relevant regional and district data sets with access to all food and fibre industry data;
- viii) develop regional spatial plan to underpin public and private sector investment decisions - strategic food, water, housing, infrastructure build our accessible knowledge base on matters Canterbury rural (are these separate aspects);
- ix) Provide a "one stop shop" that
 - a. supports and connects SMEs to move from idea to commercialisation,
 - b. supports farmers to move from one food sector to another,
 - c. investigates the development of a virtual marketplace to link buyers and growers (think Ali Baba for food); and
- x) work with the Sustainable Business Council to design and publish a regional set of sustainability baselines and targets that TLAs can adopt into their LTPs, aligning with consumer and government expectations.

Implementation:

1.1 Financing and Necessary agreements

The CMF Secretariat will establish a partnership agreement with the lead Agency that will clearly highlight implementation responsibility with the lead Agency whilst ensuring that oversight and result monitoring are carried out by the CMF Secretariat on behalf of the CMF.

Indicative implementation period

The project is expected to run for an initial three-year period from 2019 until 2021

Organisational set-up and Implementation modalities

a. Organisation and Management

i. Lead Agency

The lead agency will be the CMF Secretariat operating through ECAN

ii. Implementing Partners

It is anticipated that that an implementation partnership will be established with the Lincoln Hub(that is focussed on growing and plugging into a global ecosystem where industry, education and science collaborate to solve business problems through science-based solutions for the agricultural sector) that will be responsible for broadening and building its Food and Fibre Forum and that it will manage the range of project activities indicated above.

iii. Cooperating partners

The Lincoln Hub will establish the necessary cooperating arrangements with partners to carry out specific project activities – it will look to draw on the capabilities of Canterbury University in relation to digital data analysis and management (AI and 'big data')

- b.** Staffing: Partners will specify direct management costs. Overheads will not be meet due to the partnership nature of the project
- c.** Procurement: As required the implementing will through the CMF Secretariat apply the required procurement procedures – primarily for services.

Indicative budget

FFIKP Summary Cost Table (\$ 000)

Year	PY I	PY II	PY III	Total
Component	2019	2020	2021	
F & F Knowledge Centre	95,000	190,000	190,000	475,000
F& F Information Portal	37,500	267,000	92,000	396,500
F & F Resources	150,050	55,000	55,000	260,050
Total	282,550	512,000	337,000	1,131,550

Performance monitoring and reporting

- d) Work Plan and budgets
- e) Quarterly progress reports
- f) Annual/Completion Report(s)

Review and Evaluation

- e) Baseline
- f) Mid Term review
- g) Completion Report
- h) Ex post Evaluation – within 6 months of project closure

Audit

The Project will be audited according to the prevailing requirements of CMF/ECAN as will be specified in the relevant financing agreement(s)

[APPENDIX) - INDICATIVE LOGFRAME MATRIX - TO BE COMPLETED DURING PREPARATION/FINALISATION OF PROJECT WITH CMF SECRETARIAT AND IMPLEMENTING PARTNER

	Intervention logic	Indicators	Baselines (incl. reference year)	Targets (incl. reference year)	Sources and means of verification	Assumptions/Risks
Overall objective: Impact	The broader, long-term change which will stem from several interventions Project will (indirectly) influence. Long Term (2050)	Measures the long-term change at Canterbury or sector level.	Ideally, to be drawn from the CMF strategy	Ideally, to be drawn from the CMF Strategy	To be drawn from the CMF strategy.	
Specific objective(s): Outcome(s)	The medium-term effects of the action which tend to focus on the changes in behaviour resulting from project/ programme outputs. The Project will contribute to these changes. Medium Term (2030)	Measures the change in factors determining the outcome.	The starting point or current value of the indicator.	The intended value of the indicator.	Sources of information and methods used to collect and report (including who and when/how frequently).	Factors outside project management's control that may impact on the outcome-impact linkage.
Outputs	The direct/tangible outputs (infrastructure, goods and services) delivered by the action. These can be controlled directly and as such can be linked CMF funding	Measures the degree of delivery of the outputs.	as above for the corresponding indicator.	as above for the corresponding indicator.	as above for the corresponding indicator.	Factors outside project management's control that may impact on the output-outcome linkage.

ANNEX

Annex A: Canterbury’s Production and Agribusiness Environment – Key Insights

Annex A: Canterbury’s Production and Agribusiness Environment – Insights

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Introduction

In this Annex we outline key insights derived from the district, thematic and regional workshops, the case studies, along with findings from various meetings and web-based research. The key findings are considered under the following themes:

- i. The key advantages of Canterbury
- ii. Key challenges and underlying problems to a prosperous future of food and fibre production in Canterbury, including potential game changers or trends to note.
- iii. Focussing on the underlying problems
- iv. Understanding the dynamics of change
- v. Mayoral Forum Influence: Proposed strategic approach

Canterbury's agricultural sector advantages

Canterbury is in a position one of the most productive regions within New Zealand. In Canterbury there are large areas of land with high capability, the climate is temperate and there are significant areas of irrigation.

New Zealand's market positioning advantages are also Canterbury's market advantages, such as:

- an open and transparent democratically elected government;
- lack of corruption;
- a stable currency;
- #1 ranking in the World Bank Doing Business 2018 report for ease of doing business, ahead of 190 other economies;
- a range of free trade agreements;
- counter seasonal;
- good animal welfare reputation;
- great farm systems across the value web.

In addition, Canterbury offers additional advantages such as:

- Robust and influential regional governance structures including, but not limited to, the Canterbury Mayoral Forum; Ngāi Tahu (one iwi covering the whole region); Canterbury Water Management governance system; the Committee for Canterbury (private sector) and the Canterbury District Health Board
- Strong relationships between the local authorities' other two inter-generational partners: Ngāi Tahu and the Crown
- Intelligent and capable farmers, with a deep history of the land and what has happened to it over the last 150 years and what it is capable of;
- A good climate/growing environment e.g. UV, air quality, soils, rainfall
- Access to a large production base – an abundance of land that is high quality (Land Use Capability Class 1-4) with a high proportion irrigated, with additional land use potential and room to grow more
- A hub of national significance, attracting more than our regional share of public investment, in Research and Development capacity, including Agriculture based research institutes and Lincoln/Canterbury University knowledge base and research capability
- A hub of learning, with a range of complimentary tertiary institutes, some with regional spread, including Lincoln and Canterbury Universities, Ara Institute of Technology, the Christchurch Health Precinct (including Canterbury Hospital and the Otago Medical School);
- New Zealand's second largest city and a range of diverse rural towns, offering, among other things:
 - a pool of talent and capacity (median age 37 years in Christchurch)
 - manufacturing and processing capacity
 - related business service sectors including professional services
 - affordable housing
 - an international centre of competence for software and technology
- World-leading lifestyle choice for householders, business owners and investors
- Robust regional advocacy capabilities with central government, such as trade, policy and pastoral farming advocacy
- Strong Connectivity:

- i. 24/7 connectivity through Christchurch International Airport Limited (CIAL): only airport in NZ that has late night flights;
- ii. Air freight capacity, including wide bodied planes that can move fresh and light produce
- iii. Two sea ports with international reach (Lyttleton Port and PrimePort Timaru), with Lyttleton implementing a long-term strategy to future proof for larger vessels
- iv. Direct and timely to eastern seaboard of Australia
- v. Various, competitive, data connectivity offerings
- vi. Large regional sources of renewable energy, with a connected transmission and distribution network across the region

Key challenges to a prosperous future

KEY CHALLENGES OR LIMITATIONS

These key challenges both on and off farm are drawn from a collation of feedback from the district workshops, small group meetings, the case studies, and 1:1 meetings and desk research. Further details of the workshops and case studies are provided in the Resource Compendium that are available electronically.

There are number of key challenges and limitations to increasing primary production and capturing value. Their consequences are often high impact. These challenges appear to fall under six themes:

1. Biophysical environment
2. Planning and regulatory environment
3. Regional governance and leadership environment
4. Cultural and social environment
5. Research & Development; Innovation – the technology and Commercialisation environment
6. Economic and investment environment
7. Other operational factors

We have taken a considered and holistic approach to interpreting challenges, incorporating thinking and feedback on global and local trends and gamechangers, acknowledging that some trends and gamechangers occurring are positive.

BIOPHYSICAL ENVIRONMENT

Water and Climate Variability

Matching farming systems to respond to climate variability to maximise the natural growth rates has underpinned Canterbury historical farming systems. The seasonal nature of our environment, and climate variability and unpredictability due to being on a set of islands out in the South Pacific subjected to Antarctic winds, determines which crops can be grown where under those current farming practices. In addition, single climatic shock events like out of season frosts, hail, flooding and wind currently create too much risk for some horticultural alternatives to pastoral farming as they are too expensive to insure against. There is also anticipated to be more intense weather variation that may impact on the crops that can be reliably grown in Canterbury. There is a need to consider these new long term stressors (under the umbrella of climate change) in future agricultural strategies, incorporating considerations of a likely global and national capital shift into climate aligned investments.

Droughts and their unpredictability impact on farm system performance. Irrigation helps manage the impact of drought. However, land-users' current ability to manage water as a resource is restricted due to limited storage and distribution infrastructure, creating production resilience risks. Also, efficient water use requires detailed science to measure and manage.

The availability of water for irrigation was an issue that came up consistently in the district workshops and also the case studies (See Resource Material). A reliable and secure water supply links to the confidence of farmers to be able to grow consistent quality high value produce. Water availability impacts what land systems can be grown and therefore the potential land use system effects on the environment. However, the quantity of water in Canterbury is only sufficient to serve between 13 and 29% of the productive lands (Land Use Capability Class 1 to 7) needs. While the availability of water is considered a significant issue,

current political and sustainable investment dynamics suggest that there is no way that all the productive land in Canterbury will go under irrigation. This suggests that, to increase productivity on land that will never be able to receive irrigation-supplied water, we may need to determine new farming business models and look to rainfed food and fibre production options that will unlock new sources of funding including climate aligned investment markets.

Between 71% and 87% of Canterbury's land area is likely to remain rainfed. There is currently a lack of research into increasing and advancing productivity with rain-fed agriculture and strategies for managing climatic variability. Research and promotion of rain-fed land-use is essential to broaden land managers confidence to experiment and apply alternative practices without irrigation. It is expected that small gains across our rainfed agriculture system has the potential to generate large additions of value to Canterbury.

Soil type, soil characteristics, topography/slope limitations

Soil type, soil characteristics, topography and slope are traditional farm system fundamentals. They can differentiate what a property's potential performance and output are. Slope limits what and where crops can be sown, how things can be fenced and managed and what can be harvested with tractor technology. The dominant farm aspect impacts on the amount of sunlight that reaches north or south facing slopes and therefore the productive capacity of that slope. The soil's nutrient levels and mineral levels and water holding capacity are also important determinants of productivity.

However, improving technology will shift the land-use system boundaries of what is possible. Creative new management systems and precision farming capabilities will likely improve management of soil viability, nutrient management and increase optional use: more precision water and fertiliser placement; fences could be digital, crops could be aerially over sown with drones, and strategic use of weed specific herbicides/treatments could be delivered at the plant level.

PLANNING AND REGULATORY ENVIRONMENT

The nature of the planning, compliance and regulatory environment in New Zealand

The planning and regulatory environment is complex and incomplete. There are usually financial costs associated with changes in regulations and planning that impact land owners' and managers' confidence to continue to invest or to change production approach. The normal level of uncertainty around future costs of doing business is currently heightened, due to the prolific number of current reviews underway by the Coalition government. This heightened uncertainty will continue until the government working groups finish reporting back on such matters, and they have been priced, including the Tax Working Group outcomes; the three waters service provision review, the introduction of the agriculture sector into the Emissions Trading Scheme. There are also a number of regional reviews underway that may impact business compliance costs, such as the review of the Canterbury Water Management Strategy Interim Targets and transport infrastructure investment review decisions.

Transparent and coherent policy and regulation frameworks are paramount to a thriving primary production sector. Based on the historical capability of Canterbury farmers to get on with it when changes happen, we are confident that the farming community generally has the business and farming skills to adjust and move on. They just need clarity of intention and related costs of both policy and regulatory change proposals. It is the uncertainty that is constraining and impacting confidence.

It has been reported that regulations are becoming hard to manage – there is difficulty in understanding the content, cost and time to do all the paperwork and compliance. All regulations need clear communication of the necessity, practicality and benefits.

At an on-farm level there are numerous different regulations that need to be complied with (see Recourse Material for a list of regulations deemed relevant to the primary industries). For example, on farm there are animal welfare standards, health and safety regulations, environmental regulations and other territorial authority regulations, around things such as amenity values, special ecological areas, zoning, subdivisions, building controls; all which can have a significant impact on the value and potential of the land.

Of specific note are the regulations around water and nutrient management, which are key drivers of the type and intensity of farm systems. Cause and effect research that is accepted by parties is and will increasingly be important in supporting change to sustainable farming practices. The current consenting system creates potential for water and nutrient allocation resources to be treated as assets and held without being fully utilised.

Another area to note, is the significant uncertainties arising from the possibility of new regulation and policy compliance arising around biosecurity control and management. Biosecurity is important to maintaining New Zealand's competitive advantage and linkages between on and off farm practices are important. Simple and robust systems are not yet in place to ensure poor performance doesn't cost all.

Biosecurity is also important for market access. This was highlighted in the case studies, with the challenge coming up as both a current and on-going issue. For dairy farming M. Bovis is a current risk and farms may have had to change systems to address this issue. There are issues around the current stock tracing system NAIT which need to be addressed and the current government has recently made changes to allow this to happen. For cropping farms, biosecurity is important for crop protection. Also, New Zealand is in a unique place in terms of being relatively disease free. There is a risk of losing market access if certain diseases do make it into the country.

The case studies highlight the cost implications of complying with policy and regulations. It was noted that the costs for small organisations are high and can act as an investment deterrent, reducing the uptake of new ideas and opportunities.

Similarly, there are opportunities for those who can successfully operate within restrictions. Business may need to change its farming practice to help meet regulatory demands, whilst regulations are likely to impact off-farm business decision as drive what decisions are made on-farm. Difficulty around working out the consents/Risk management plans need for new activities was mentioned by the emerging industry.

As discussed in the KPMG 2018 Agribusiness Report, it is now recognised that the license to farm is not a right but a privilege granted by the wider community, and that it can be controlled by policy and regulation. If the community believes farmers are not acting in the best interest of the natural environment or in the best interest of wider community needs, the simple way to restrict that license is for Government to implement one size fits all legislation.

“However, the reality is that cookie cutter regulation damages good producers as well as poor ones, constrains investment and innovation and is, ultimately, unlikely to deliver the environmental improvements all New Zealanders want to see”¹⁷.

Within this one-size-fits-all national model, it is hard to leverage Canterbury’s regional strengths (such as to change land use to meet new production demands) and to minimise regional weaknesses (such as attracting the labour we need).

To minimize the risk of more one-size-fits-all control, finding a way to prove to the regulators (and the consumers) that farmers can be and are good custodians is paramount. Evidence of intention and progress may be the way, through communicating clear aspirations and intentions, supported by progress indicators and targets, on issues that matter to consumers and to the community.

Government policy and investment

Previously, government investment has primarily focused on the impact on GDP. However, the Government has indicated through current policy statements that it expects to focus investment more sustainably, through a quadruple bottom line lens, with stronger social and environmental outcomes and expectations than was previously the case. This is manifesting in new policy and legislation and the requirement for Treasury to prepare the “2019 Wellbeing budget”. The Sustainable Development Goals, which are setting new political and consumer expectations, and the Treasury Living Standards framework are re-setting how the public service plans to address the government’s expectations for a more balanced approach.

This change of approach is currently creating uncertainty around where future government investment will be directed. This makes it difficult for those trying to develop investment propositions that may rely on an element of government funding.

As well as a change of investment approach, the government is introducing some significant new policy considerations which are likely to have direct impact on the primary production sector. Two such significant considerations are the proposals for:

- Zero Carbon Act and Net Zero emissions, both environmental protection mechanisms. These will directly impact current production outputs. Plans to place the agriculture sector within the Emissions Trading Scheme will also directly impact current production outputs. This will likely require a change in farming practices or production types. Although emissions intensity – the emissions required to produce a kilogram of meat or milk powder – has improved, overall emissions from agriculture continue to climb because farmers are producing more. Growing fruit and vegetables produces no methane and significantly lower levels of nitrous oxide for most crops. In a low-emissions future economy, the Productivity Commission forecasts that the land area used for horticulture could double, or even triple.

- Employment Law/Living Wage:
The proposed employment law will focus on wellbeing and will possibly move to a baseline Living Wage.

REGIONAL GOVERNANCE AND LEADERSHIP ENVIRONMENT

Central, regional and local government alignment

We have touched on the advantages that Canterbury has through its current regional governance structures. However, there are also some constraints emerging. There appears to be limited central government/ regional government /local government alignment on regional intentions and aspirations. Long-term public-sector expectations for the region, and resultant investment intentions and priorities across the region, are unclear and at times unaligned. There are inconsistencies in aspirations and future investments described across the nine district councils (described in their Long-term Plans 2018-2028 various sector or area development strategies), ECan's various strategies and plans. The lack of clear, aligned, regional aspirations or strategic collaborations risks a coherent and efficient development pathway forward, to grow opportunities and markets.

In addition, the regional government approach seems unbalanced. The latest report of council assessments through the local government excellence programme CouncilMARK™ for Environment Canterbury (ECan) was released in August 2018. Areas of improvement included the comment: "ECan needs to improve its communications to demonstrate a balance between environmental protection and economic development."

This lack of public sector clarity results in limited articulated regional sustainable development (economic, environmental, social, cultural) baselines, targets and indicators to inform primary production investment decisions.

A key aspect that has emerged from the study has been the need to recognise the importance of investing considerable time and effort to establish meaningful and productive outcomes from consultation with all stakeholders, including Ngāi Tahu and young people.

Canterbury business leaders are not effectively "owning and communicating the Canterbury evidenced-based story together"

There is also no clearly articulated regional aspirations from primary production leadership to inform primary production investment decisions. There are also few collaboration mechanisms across supporting sectors (such as the tech sector) and with the primary production sector.

There appears limited value for collaboration for those involved in the primary production subsectors

The different primary production (and related processing) sub-sectors fundamentally have different leadership and operational ecosystems. This silo-ed ecosystem does not promote collaboration. In fact, in the 2018 KPMG Agribusiness Report, it states that: "Surprisingly, the priority focused on increasing commercial collaborations with partners throughout the value chain shows the largest drop in priority ranking. It declined nine places to 22, despite broad recognition among industry leaders that markets and consumers are becoming increasingly complex".

This constrains sectors of primary producers in their ability to think about or embrace diversification. There is a natural desire to protect market share, especially in niche markets.

This results in a natural inclination to protect new farming ideas and IP, risking the ability for scaling and transferring new opportunities and limiting the economies of scale.

CULTURAL AND SOCIAL ENVIRONMENT

Attracting enough skilled staff members

Attracting and retaining skilled staff has been identified as a key issue for businesses. For certain districts this was more of a challenge than others and relates to attracting people to come and live in rural areas. The uncertainty associated with staff, influences investment decisions when additional or more high skilled staff are required.

Skills shortages was flagged by most firms in the case studies and also in the emerging industry case study. This is becoming so in the face of increasing more sophisticated technologies being employed in the sector along with the general feeling that young people don't see a future (or understand the opportunities) in farm employment. For some firms the availability of 'unskilled' workers was also an issue. Finding those who are happy to work within processing factories but do not need to be highly educated. Whilst for the emerging industry (sheep milking) it was finding people with existing skills in sheep milking, as sheep milking is different from dairy milking.

Current immigration policies were mentioned as being a challenge. One-year visas are restrictive for settling and developing the skills of migrate workers.

Growth in the Canterbury dairy sector has had a major impact on employment growth with flow on positive impacts on rural businesses, school enrolments etc. However, the case studies indicated that, if labour costs get to the point it makes robotics profitable in the milking sheds, this will have a significant flow on effect through communities.

Following on from labour shortage and important to all case studies is the need for on-going relationships with and the existence of good training providers and research organisations within Canterbury.

Education

To be successful on the local and international scenes, the Canterbury Agriculture production and manufacturing sector (sector) needs to have the labour market supply and people capability to be able to ensure high levels of productivity.

An aligned sector needs to have the means by which they can forecast labour needs and numbers in the short, medium and long term. They also need to be able to forecast skill and knowledge requirements of the current and future work force. Having done this they then need to communicate that information to the wider Canterbury, New Zealand and International labour markets. These markets consist of:

1. Local and International education
2. Immigration both inside NZ and internationally
3. Local and National job changers

Whilst points ii and iii will be factors in the labour market supply, the greatest potential is in educating local and international students based on sector intelligence, specifically for the Canterbury market. This will require the sector working with national and local authorities, and educators about enabling the labour market supply. Having secured an adequate labour market supply then relationships and partnerships with education providers, enabling worker

capability to be enhanced over time to meet changing job demands and requirements, is critical.

From discussions during the education workshop, it was clear that the sector relationship with local and national education sectors is essential in delivering the majority of outcomes needed. This success of this relationship is dependent on:

1. An aligned Tertiary Education network in Canterbury to:
 - a. Be able to work with Tertiary Education Commission to ensure resources are available to support employer demand.
 - b. Strategically and operationally respond in an appropriate and timely manner to the messaging from the sector
 - c. Ensure the resources coming into the Canterbury region are used efficiently and effectively to support the sector.
 - d. Respond, in a forward-thinking way, to the skills and knowledge demands of the sector
 - e. Work with the sector to modernise learning to allow the sector to be world leading in productivity and innovative practices.
 - f. Provide an active conduit between the secondary education system, adult learners retraining and the sector to ensure the pipeline is sufficient in meeting employer demand
4. An aware and aligned Secondary Education network to:
 - a. Understand the Canterbury landscape and need in this sector
 - b. Promote this sector through career advice, contextualised curriculum, access to timely and adequate intelligence about the sector and its needs.
 - c. Interface with local employers to ensure there is a clear understanding by students, parents and teachers of the nature of the employment, the possibilities and potential in the sector, and the clear pathways in.
 - d. Allow schools to understand the knowledge, skills and key competencies (employability skills) required for all aspects of employment in the sector
5. An enquiring Early Childhood and Primary Education system to:
 - a. Know about what is happening in the wider Canterbury region at a social, economic, cultural and environmental level.
 - b. Utilise these elements for contextualising their learning.
 - c. Be committed to utilising the sector to engender a much wider understanding and knowledge of this sector to Canterbury, New Zealand and globally
 - d. Using the food story as a key theme for experiential learning
6. A well-informed Canterbury and New Zealand society to:
 - a. Enable individual people and groups to better understand the challenges, the innovative research, the creative safe solutions and the sustainability of the sector
 - b. Dissolve the rural/urban divide that is developing
 - c. Garner more support for the sector that will soften attitudes and encourage more people to seek meaningful and sustainable employment in the sector

Allow all of society to understand the dependencies and inter dependencies of their own world and that of the Primary Sector

While there are pockets of collaboration and partnerships (all producing great outcomes) there is no cohesive leadership and collaboration within the education sector nor between the sector, education sector and local authority. Currently education services, such as business capability development support, are silo-ed and agnostic. There is a plethora of opportunities which may be confusing and not well focussed for primary producers. The potential of such leadership and collaboration has the potential to be a game changer.

Personal Factors

The key to increasing productivity lies with people. An individual attitude towards risk/change controls the amount of change occurring. Change at scale cannot easily be forced on an individual or sector. The red meat industry research (RMPP 2017) found that top performance doesn't happen overnight. There isn't one single defining action, no grand program, no one killer innovation, no solitary lucky break, no miracle moment that allowed businesses to go from a mid-tier performer to a high performer.

The RMPP research found that there is a hierarchy of drivers within agricultural businesses. The primary driver is supporting outcomes that are aligned with family and a way of life that is supported by profitability. This then allows other drivers to feed into the business as shown in the Figure 1. Figure 1 illustrates that money isn't the most powerful motivator when it comes to top performance; close management and understanding of profitability of on-farm practices is the key. The secondary influence of money and profitability means that not all businesses act in economically rational ways as maybe assumed by economists and Government officials.

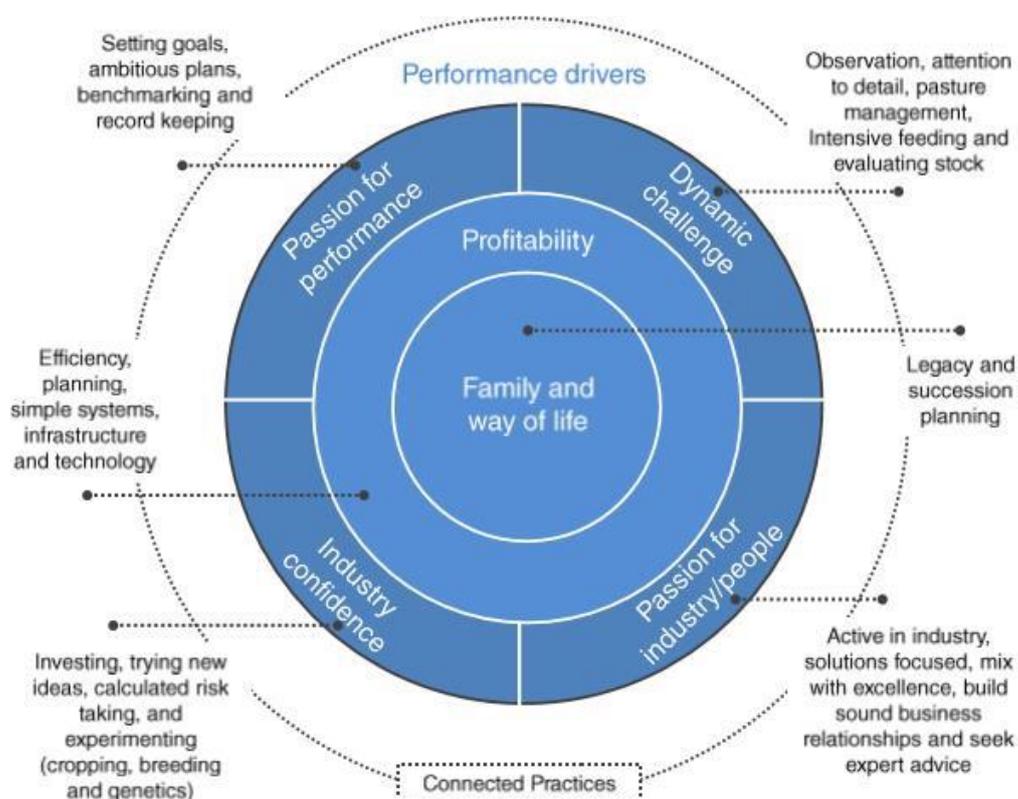


Figure 1. Farming Business Driver Hierarchy (RMPP 2017)

AgFirst (2017) lists many of the personal factors that can impact landuse. These are dominated by confidence factors;

- Age and education level of the landowner
- Shifting perception from what is 'normal'
- The need for evidence that a change will work within existing operations
- The need for understanding on how to monitor new land use practices

- Concern around the cost of implementation and lack of long-term financial security once new land use embedded
- Concern about increased labour requirements to implement
- Uncertainty regarding long-term viability of land use
- Concern around impact on neighbours
- Impact of the family's lifestyle
- The need for clear guidelines as to what determines sustainable land use
- The need for skills, knowledge, technology and experience to implement changes

- Challenges identified include:
 - Confidence in the markets
 - Confidence in their farming abilities
 - Attracting enough skilled staff members
 - Over complicating before doing the basics
 - Farmers not accepting of being told what they can and can't do on farm
 - Reluctant to stand out - risk of putting head up!
 - Limited attitude to use data and technology to lift productivity. Of note, there is variation in the use of technology and data within sectors to lift productivity. For example, the dairy sector more advanced with animal related factors that other sectors i.e. herd testing, daily milk production information, while cropping seldom use yield mapping. Significant productivity increases could be gained in sectors that currently have limited use of data and technology.
 - Measuring success for individual's families and businesses is not always possible in tangible terms. What matters more is what is important to individuals.

Consumerism and the conscious consumer – public perception of sustainable production, and traceability

The changing nature of consumerism presents a risk for current business models. A good summary of the impacts of the changing nature of consumerism for the agriculture sector is provided in the KPMG report Agribusiness Agenda 2018. "It is becoming increasingly clear to us that the traditional concept of a lineal value chain is rapidly being replaced by a much more complex "value web" that is built around satisfying the needs of a consumer. Given that the consumer sits at the centre of the [value] web, every participant organisation should be focused on understanding their expectations for a product".¹⁸

The key change in recent years from a consumer value chain to a consumer web, driven by the ability for consumers to connect directly to producers through new technology. "Consumers are increasingly buying products to align with their values and we must make the most of our natural advantages such as pasture-fed livestock, environmental sustainability and good animal welfare..."¹⁹ Consumers want to know that both farmers and the wider agriculture community are being good corporate citizens"²⁰.

There is a changing driver for consumers, specifically environmental consciousness leading to:

- (1) demand for food traceability and attribute validation
- (2) intolerance for issues such as:
 - (a) Poor land and water management
 - (b) intolerance for bad animal management

- (c) GMO
- (d) Hormones

Consumers are also being increasingly aware of potential health impacts of food and fibre, and are now exposed to a far wider range of potential influencers than they were in the past.

Currently, it is difficult to forecast where consumer preferences are going to lead. Environmental changes in quality (Air, water, land), and reporting of changes, along with resources user's compliance with regulation feed into and are driven by public perceptions. The perception of farming has the potential to eventually drive what can be done on farm and also impacts on labour supply. This means that more emphasis is going to need to be put onto developing open and transparent communications across the value web, from primary producers, to manufacturers, to suppliers, to the consumers, about food sources, food treatment and the sustainability of food practices.

In effect the consumer is looking for a good, proven, story, that shows respect for the natural resources and for the community. Therefore, the current lack of tools for producers and consumers to use, such as food traceability technologies and systems, poses a new constraint for a nascent conscious consumer market.

In addition, when bad stories emerge, the farmers' social licence to operate is at risk. Bad stories likely reflect not just on the single producer but on the sector as a whole. Markets are starting to show evidence of negative reaction to unsustainable farm practices.

"Little research has been conducted analysing the public's perception of the crop protection industry with respect to New Zealand. In a world of heightened societal concern regarding threats to human health, nutrition and the environment, such things as "people's perceptions" can translate into real effects in the marketplace..... *What is clear is that if New Zealand's export-orientated primary industries are to survive, they need to develop new types of crop protection strategies to supply high value export markets (Butcher et al., 2008).*"²¹

Competition between farmers in different sectors

There can be a desire to protect niche markets, as don't want everyone doing the same thing. The desire to protect niche markets limits sharing and ability to grow economies of scale.

RESEARCH & DEVELOPMENT; INNOVATION – THE TECHNOLOGY AND COMMERCIALISATION ENVIRONMENT

Siloed research and development

While there is much diverse research underway that focuses on improving outcomes and outputs from primary production and associated processing, a fundamental constraint is that research and development funding is silo-ed. This results in research outcomes not being effectively open-sourced, constraining the ability to match new findings with new opportunities. Therefore, the Canterbury primary production and processing sectors cannot use that new learning to scale and transfer new opportunities across ventures. This limits the effectiveness for the primary sector of the hub of research and development agencies that are based here.

The digital tech-transfer ecosystem

Converting research and development into new commercial opportunities is also weak in Canterbury. Although it seems that Cantabrians are great inventors, commercialising new inventions seems to be where focus is lost. The emerging, but still young (around 10 years) digital tech transfer ecosystem (invention and commercialisation, creating innovation) ecosystem in New Zealand, is evidenced by pockets of brilliance across the region in Agritech development and uptake. It is supported by, but now strongly dependent on, the broad range of R and D institutes in the region. However, a deep and stable tech transfer (innovation and commercialisation) environment and culture, with the necessary ability to access robust data and information, focussed on primary production and processing, is not yet being fully nurtured. International guidance suggests that this will take time, as it is fundamentally based on the creation of strong tech industry relationships with primary producers, which take time to form and mature.

In a publication by ChristchurchNZ: *"Research into Canterbury's innovation system shows the region has a rich set of innovation assets- skilled, creative and entrepreneurial people and strong research and tertiary institutions. Canterbury produces high numbers of patents and a high proportion of employment is knowledge and technology intensive industries, indicating high levels of innovation are occurring. But we are not getting the best value from new ideas and technologies."*²²

The demand for smart new agritech solutions is growing in New Zealand as the industry starts to understand the benefits in reducing on-farm costs and making best use of land, labour and capital. *"New Zealand is seen as one of four locations to watch for agritech solutions alongside Silicon Valley, Boston, and Amsterdam. This is based on our capabilities in agriculture, our primary export economy and our natural resources"*, says Hemi Rolleston, Callaghan Innovation's Sectors General Manager. *"We are also acknowledged for our ability to solve problems quickly and efficiently in a suitably regulated, yet agile private and public innovation ecosystem. We can capitalise on this to turn our \$1 billion of agritech exports into a market of many billions,"* Mr Rolleston says.

Technological disruption: convergence of technology and food production

There is a convergence of technology and food production which the wider primary sector has yet to fully grasp and apply. Technology and data access:

- by farmers, is creating enormous opportunities in understanding how best to use the natural resources available and how to minimise resource-use risks, such as water harvesting, through precision farming;
- by consumers, will change the consumer's access to food descriptions, reshaping the value chain to a value web⁵, putting the consumer at the heart of the food story.

It is the **value** of using technology within the primary production sector, for both market attraction and for improving farm practices, which is not yet well understood by many.

⁵ Value Web Model(s) is a collection of independent firms using highly synchronized IT to coordinate value chains to produce or service collectively. It is more customer driven and works in a less linear operation than value chain. Amazon is an example making a system more effective and efficient overall as a website retailer, and internet technology has made it possible through the value web models.

Technology “solutions” are often not consumer (farmer) needs focused or the farmers cannot find the tech solution they are looking for.

However, there are some technological systems e.g. apps that are supporting better farm management practices, food attribution validation and business-to-business (B2B) communication. There will be new platforms such as blockchain technology which will shorten the value chain and provide the verifiable provenance information that consumers are seeking.

On-farm connectivity – mobile/internet

One of the challenges, is the weak connectivity for communication in some areas when there is an increased demand for capacity and connection speed, for both mobile and internet. This is limiting the ability to implement change on farm. Given the future expectations around precision agriculture, real time decision making and food traceability, gaps in the broadband rollout across the sector are problematic. Enhancing connectivity will enable farming practice innovation and also has the ability to change the value web, where producers being able to market to customers directly.

In addition, a barrier to technology use is the ability for technologies to talk to each other using common data protocols. The wide range of communication protocols reduces uptake and user’s confidence to invest. In addition, the rapid changes in technologies are creating the concern that technology investment will become redundant.

We note that data connectivity is an area already being addressed by a Mayoral Forum CREDS workstream.

Lack of on-farm extension for and low farmer up-take of technology

Another challenge is that technology uptake after the early enthusiasts is often slow, with land managers waiting until technology is fully proven or required by regulation before adoption.

Technology extension to provide working examples will help shift the perception land managers about the applicability and benefits of any recommended technology. Focusing on broadening the number of early adaptors trialling technology and hosting open day will encourage wider adoption. Pathways for simple adoption and progressive uptake are important.

ECONOMIC AND INVESTMENT ENVIRONMENTS

Markets:

Volatility and Signals

Market volatility appears to be the new norm, impacting confidence and long-term decisions. The case studies raised market signals are an issue and the importance of information to ensure that market signals are clear and that emerging opportunities can be easily identified. This is critical for the industry to be able to adapt and change, and to indicate to business’s when they may need to consider land use changes. For emerging industries, being able to read market signals will be critical to both its establishment and on-going success.

Access

Linking in with biosecurity, discussed earlier, traceability of produce will be becoming increasingly important for continued access to some markets. Land managers will need to demonstrate the providence and sustainability of their produce, and like with biosecurity, simple and robust systems for both consumers and producers are required.

Ability to operate at scale is a challenge that can also impact on the ability to access a market. This was seen in the sheep milking case study.

There is a shift from bulk commodity trade to value addition

The Agri-food Food system is changing with protein demand is expected to double by 2050. New proteins formations are being developed and meat alternatives are becoming affordable for wide spread poorer consumers, disrupting the bottom end of the commodities market

Three themes dominated the global agri-food system in 2017ⁱ:

- (1) Globally significant food companies shifting to protein-agnostic positions
- (2) Proactive investment by major players into disruptive start-ups
- (3) Health and wellness is playing a central part in shaping company strategies

Changing the framework for looking at value

The value model is changing. As mentioned, food is moving from a value chain model to a consumer-centric value web model²³, with the consumer at the heart of the web. Integrated reporting will support food traceability and food attribution, which will provide transparency but just as importantly will provide evidence of the contribution producers are making to all four Treasury LSF elements

IN KPMG Agribusiness report 2018:

*"The last year has seen growing realisation that the value chain is no longer linear; but a web of relationships, collaborators and even competitors, with the consumer sitting at the centre. The challenge to pivot operations to be truly customer-centric is one that faces every company every day"*²⁴

There are many competitive global primary production markets coming on-line and new business models are arising that support the current change happening from the standard value-chain model (with consumers at the end), such as farm to fork.

Data and Information

Access to accurate data and information – good decision making

Data is becoming more readily available but lacks structure and is not available to the degree that is necessary to fully understand the current state assessment. This stifles not only the ability to understand the present framework and therefore develop pathways to create efficiencies and innovation, but reduces the available information to farmers, support agencies, investors and researcher. This in turn diminishes confidence for future investment and increases the degree of inherent risk. Due to this unavailability, it is likely there has been

an under-utilisation of data and technology to lift productivity in the sector, which further dissuades incentives for the collaboration required to produce an accurate a useful database. Without open data access that allows for traceability of high productivity output in the agricultural sector, there is serious impediment on the ability of any decision making to actively move in the correct direction.

There is currently a chaotic deluge of non-standardised and non-agglomerated data, with gaps and overlaps. Information from unbiased sources is not freely available and it is hard to get one source of truth. There is no clear and imminent burning platform impacting the various agriculture production sub-sector economies, which makes it difficult to make adaptive decisions

There is range of farm system data available for farm systems, but no single source is publishing landuse data on a comparative basis. There is a need for an independent reputable presentation of farm system comparative data with information of the underling farm system inputs and risks, would assist the decision making of land managers.

The non-robust nature of data collection at present means that traceability is difficult. Traceability is an important step for land managers to use to demonstrate the providence and sustainability of their produce.

Access to and scarcity of financial capital

Access

The challenges of accessing capital for the Food and Fibre industry has been recently highlighted by the governments initiative to establish a sustainable food and fibre futures fund supported by government investment of \$40 million dollars per year.

Land managers report anecdotally (ANZ 2018) that they struggle to secure the investment needed to fund innovation, growth, intergenerational succession, productivity gains and meet compliance needs.

Traditional sources of funding have been reduced due to changing political and economic factors. Last year the new coalition Government announced stricter economic tests for foreigners when investing in farmland. Bank credit has tightened due to reduced risk appetite, banking regulatory changes and several concerns around what compliance and regulatory changes will mean for earnings and costs. It all adds up to a new landscape for access to capital in the agriculture sector that will require new innovations in funding as well as adaptable business ownership and management structures.

The need for investment right across all the businesses involved in agriculture is required to boost high growth areas, such as a range of horticultural crop or forestry expansion. It can also be used to speed up product transformation and further 'value-add' activities; improve the performance of supply chains; increase capacity in certain areas and market integration.

Public funding

There is not enough tax-generated capital available (small tax and rates base) for basic infrastructure maintenance let alone surge economic infrastructure needs (growth and tourism

areas). There is also not enough capital to respond to government policy interventions on the horizon, such as increased drinking water quality standards.

In terms of accessing government funding, it can be hard for small companies to justify the associated administration costs relative to the probability of success in competition for funding with larger organisations.

Land Matters:

Value

The value of land is not focused enough on cash flow and is too dependent on equity. The current tax regime encourages farming for capital gain rather than for annual earnings/dividends.

Access

There has been a move from an historic environment of land surplus to land deficit which results in an increasing demand (cost) for purchasing land. This is impacting the ownership structure from farm family to corporate. This is in turn impacting the way we think about farming in Canterbury: from a family/community perspective more to a commercial-only approach.

This is coupled with increased management demands of more complex systems and the new and innovative technology which suggests an increase in farm size or enterprise scale where several farms have common ownership.

OTHER OPERATIONAL CHALLENGES

Maintaining effective businesses

The case studies highlighted that many business will encounter general business effectiveness challenges, whether this was around succession planning, adapting to a large-scale business and ensuring capability/staff at scale or extracting value through appropriate pricing. These are likely to all be issues for many businesses throughout Canterbury.

Critical infrastructure: demand and capacity

Without a clear, agreed, view of future growth potential and expectations, and the related infrastructure needs, means it is difficult to plan and prioritise where critical infrastructure investment will need to be to meet demand. Without a shared view and without a shared investment plan, getting the right infrastructure in the right place at the right time will be difficult. This is exacerbated by both:

- The current state of some of the infrastructure systems, that in places present weakness (such as fibre and roading assets)
- the interconnectedness of infrastructure assets and services that are owned and managed by different agencies and institutions (e.g. power and water infrastructure).
-

Introducing farm plans and good management practices

Transition from maximising output to applying Good Management Practice (GMP) – with increased visibility and promotion GMP becomes easier for farmers to adopt and overtime

transition to GMP will become a core value. Across Canterbury GMP practices are no longer optional with audited farm plans required for most farming systems. GMP is not static, this can create farm resistance to change and increasing levels of education are necessary to stay abreast of the current practices. Shifting GMP target has the potential to remove incentives to change farm systems, for example if nutrient use efficiency savings do not allow for expanding landuse, the benefit to invest in the new management practices or technology is reduced. Innovators will continue to push improve sustainable environmental processes and identify new best practices. There is ability to influence this with impartial voices showcasing and promoting the best practises being carried out.

SUMMARY OF KEY CHALLENGES

Below is a summary of the above findings on the key challenges facing those operating in the primary production environment. The outcomes from the workshop and case studies that feed into these key challenges is available in Resource Material to this report.

Biophysical Environment:

- Understanding and being able to respond to and be resilient against normal seasonal cyclical water and climate variability, and weather shocks (e.g. floods)
- Understanding and being able to respond to and be resilient against future climate change.
- The availability of water, whether rainfed or irrigation supplied in the right place at the right time; and understanding the science of measurement and management.
- Understanding and managing the impact of land use systems on the environment
- Understanding and managing soil types, soil characteristics, topography/slope limitations

Planning and Regulatory Environment

- Being in a position to understand and respond to the nature of the planning compliance and regulatory environment – complex, incomplete, hard and costly to manage
- Biosecurity management
- Being able to make the most of our regional advantages, and not be unduly negatively impacted by, the one-size fits all national regulations
- Operating and investing in an environment of Government policy and investment uncertainties

Regional Governance and Leadership Environment

- Operating and investing in an environment with limited central government/regional/local government alignment on regional intentions and aspirations, and public investment transparency
- Operating and investing in an environment where the Canterbury leaders are not effectively “owning and communicating the evidenced based story together”
- The different primary production (and related processing) sub-sectors fundamentally have different leadership and operational ecosystems - competition between sectors is limited as markets are diverse,
- The value of collaboration between primary production subsectors is unclear.

Cultural and Social Environment

- Attracting enough skilled staff members is hard

- No cohesive leadership and collaboration within education between the sector, education sector and local authority – siloed services that are not well focussed
- Personal Factors constrain thinking and action such as:
 - Confidence in the markets
 - Confidence in their farming abilities
 - Attracting enough skilled staff members
 - Over complicating before doing the basics
 - Farmers not accepting of being told what they can and can't do on farm
 - Reluctant to stand out - risk of putting head up!
 - Measuring success for individual's families and businesses is not always possible in tangible terms. What matters more is what is important to individuals.
- Understanding how to respond to the Changes in the dynamics of consumerism and the growth of the conscious consumer expectations
- Understanding and being able to respond to and be resilient against public perception of farming
- Being able to make the most of competition between farmers in different sectors, while minimising the risks associated with sharing niche markets.

Research & development; Innovation – The Technology and Commercialisation Environment

- Research and development funding is silo-ed and research outcomes are not effectively open-sourced
- Addressing the time it takes to build strong and trusting relationships, in the context of the short history of digital tech transfer (only around ten years) in New Zealand (and Canterbury): the tech/commercialisation sectors and farming sector relationships are still developing.
- The true value of using technology within the primary production sector, for both market attraction and for improving farm practices, is not yet well understood by many.
- There are gaps in access to affordable high-speed telecommunications technology, be it fast (fibre) connectivity or satellite technology.
- Lack of awareness and confidence for on-farm extension for and farmer uptake of technology -enabling wider adoption. Low farmer uptake of technology until proven or required by regulation

Economic and Investment Environment

- Markets:
 - Understanding how to manage and be resilient to volatility - impacts on on-farm confidence and long-term decisions
 - Improving understanding of and access to markets
 - Understanding and being ready for the changing nature of trade focus: Shifting from bulk commodity trade to value addition
 - Understanding how to respond to the value model changing from value chain to value web.
- Data and information:
 - Understanding the economics and opportunities is hard: Lack of access to accurate information:

- - There is a chaotic deluge of non-standardised and non-agglomerated data, with gaps and overlaps
- There is no one-source of information and insights available, creating one source of truth and a basis for solid investments
- Constrained access to information and insights on the relative productivity of the land use -information from unbiased sources is not freely available
- Lack of tools and systems to support new best practice, such as traceability – needed for providence
- Access to capital
 - Creating investment and accessing capital at scale in Canterbury.
 - Investment cases are hard to develop, for various reasons including lack of robust, trusted data and robust market forecasting
 - Limited public capital available to invest in enabling infrastructure and technologies, due to the small rate and tax bases across the region
- Land matters
 - Land value- not focused enough on cash flow and too dependent on equity
 - Understanding how to make the most of our natural resources now that land is now in demand when it has historically been in excess

Other Operational Factors

- Readiness to adjust business farming models to maintain effective businesses
- Weakness in current economic infrastructure capacity and systems.
- Readiness to introduce farm plans and good management practices

Understanding the dynamics of change

Drivers for Change

Drivers of change are those factors which bring change to the individual and collectively to the sector. Drivers for change are both internal and external

There are two primary reasons for change:

- Necessity
- Confidence

The mayoral forum can directly influence the necessity for change, while support the confidence to change.

Necessity to Change

Necessity to change causes are primarily an external event or regulation that causes the shift in status quo.

Examples of the necessity to change are;

Regulation; the requirement to meet a rule in a regional or district plan, act of parliament etc, regulation could also be via permitted activity standards, non-regulatory farm environment plans and industry codes of practice and conduct

Climate; change may be forced due to the climatic event or shift in climate, drought, flood, earthquakes. Increase frequency of flooding, snowfall or drought may cause a traditional farming system to fail more often forcing the land managers to review and change. The introduction of irrigation to property in response to drought conditions may cause a shift in land use to meet the investment costs

Market Demand; changing consumer demands mean that some traditional products no longer have a viable market, while others emerge, examples include use of palm kernel in dairy, flax harvesting for fibre use, the growing demand for hemp or A2 milk.

Business ownership; the key example here at the family farm level is succession planning. Future generations introduce new farm systems and

Financial viability; funders or business owners requiring the business to return a cash profit.

Access to resources; a change in the supply of capital, labour, water or nutrients loss rates (environment's assimilative capacity) will affect the land's productive output relative to its potential. The change will cause a corresponding response from the land manager.

Confidence to Change

Confidence to change resides with the land manager, there are a large number of factors that affect positively and negatively the confidence to change. When change is not required of a land manager by necessity, they have to want to change before change can occur.

The primary factors influencing confidence are personal to the land manager or business owner. AgFirst (2017) lists a number of personal factors such as age, education and experience, family circumstances, attitude to risk, access to capital, access to information, and attitude to change.

Of the factors that create the necessity for change only components of regulation are in the control of the councils that the Mayoral forum represent. Regulation of resource use relating

to land, nutrients and water is well established across Canterbury and broad acceptance that allocation limits are necessary for water and nutrient losses. Changes to these two base resources to create scarcity, will directly change the landuse mix within the region, with the resource generally moving to the highest value landuse. Creating certainty of resource allocation is important for investment confidence and landuse change.

Local Sentiments (Anecdotal)

There appear to be some underlying Canterbury dynamics in play that are likely to be impacting the ability of people to accept an adjust to change:

- (a) Many people feel that Canterbury's long-standing way of life is being challenged by current social and economic trends, when many don't seek change
- (b) It seems that people living in Canterbury are no longer sure what it means to be a Cantabrian - what they stand for and what they are proud about
- (c) Christchurch City people are not generally aware of the rural story- creating a divergence of future planning between the city and the hinterland

It seems that the world-wide trend of urban drift is at play in this region too: social, cultural and economic choices which provide people with a strong sense of place and certainty are more limited in rural areas (urban/rural divide)

Focusing on the underlying problems

We have attempted to distil from the findings above, from the workshop discussions, research, meetings and case studies, the fundamental underlying problems to a thriving, value-add, primary production and agri-tech sectors that may be able to be tackled in some way by the Mayoral forum. Our assessment is that they include:

- The limitations caused by the regional impact of the “One size fits all” national regulation and planning frameworks;
- The lack of clarity caused by the complex and incomplete planning environment;
- The limited public funding available for new opportunities caused by the small rate and tax base within the districts of Canterbury;
- Difficulty in scaling opportunities and accessing capital;
- The limited central government/regional government /local government alignment on regional intentions and aspirations;
- The lack of clarity (evidence-based) around the Canterbury opportunity, as Canterbury leaders are not effectively “owning and communicating” it;
- The difficulty in seeing collaborative opportunities when different primary production (and related processing) sub-sectors fundamentally have different leadership and operational ecosystems;
- The difficulty in accessing trusted information and insights as there is a chaotic deluge of non-standardised and non-agglomerated data, with gaps and overlaps
- The difficulty in accessing research and development outcomes, as funding is siloed and research outcomes are not made available as open source information;
- The weak connections and relationships between the tech and innovation sector and the primary production and processing sector due mainly to the nascent nature of the tech transfer ecosystem;
- The confusion caused by the plethora of generic business development support tools and opportunities which is not well focussed for primary producers as a client group;
- There is no aligned medium to long term messaging from the sector about labour and training needs; and
- The weak connections and relationships between the primary production and wider education sectors causing lack of alignment and lack of collaborations and partnerships

These underlying problems are causing many issues affecting rural businesses and rural communities. We tend to put much of our effort into managing the issues rather than solving the underlying problems, wasting effort and resources. We have distilled the above underlying problems further into eight key problem statements which created the base for the Road Map.

After the regional validation workshop the 8 key problem statements were defined as:

- i. Lack of alignment and application of sustainable landuse systems across the four wellbeing pillars;
- ii. Different primary production subsectors operate in fundamentally different business environments;
- iii. Lack of open access data, Ngāi Tahu mātauranga and insights to inform decision making;
- iv. Lack of collaboration between education and business;

- v. Lack of insight and signals about domestic and international consumers and appropriate business models;
- vi. Variable adoption and sharing of innovation limits sustainable productivity and value addition;
- vii. Scarcity of Accessible Resources – Natural, Human, Financial, and Physical Capital; and
- viii. The nature of the planning, compliance, and regulatory environment in NZ

Mayoral Forum Influence: Proposed strategic approach

Moving from problems to the opportunities

Thinking about what the Mayoral Forum could do to address the underlying problems/challenges that have been distilled, it has been possible to see strategically what the Forum needs to do. It seems that the Mayoral Forum should plan to:

- i. Clearly articulating and telling the story of their targeted and collective aspirations for the future of the sector and the region;
- ii. Improve access to existing data by leading the creation of data aggregation and sharing processes;
- iii. Create a trusted regional investment proposition to support investment from people, businesses and financial institutions;
- iv. Drive each of their own districts' Long-Term Plans in a way that underpins pride in who we are in Canterbury, where we live and what we do;
- v. Use the planning and investment tools that they have available to them to support primary producers and processors to make the best use of their natural resources;
- vi. Enable and support the implementation of initiatives that help to put innovation and sustainability at the heart of food and fibre production and processing, with a focus on adding value for businesses and for people; and
- vii. Work with education and career planners to develop capacity from preschool to the end of effective working careers towards creating a flexible, agile, technology savvy rural community

Within the above context provided, we have looked for the ways that the Mayoral Forum could directly influence the necessity for change and to indirectly influence the confidence to change. The Mayoral Forums response has been narrowed into four strategic areas of action

- (1) COLLABORATIVE LEADERSHIP: Work out and express what we aspire to as a region, incorporating the concept of kaitiakitanga (guardianship)
- (2) OPEN INFORMATION: Improve availability of verifiable, agglomerated data
- (3) INTEGRATED LAND USE: Create the right mechanisms to leverage regional data and information to form insights and advice, strengthening the sustainable integrated land use policy dialogue.
- (4) TALENT AND CAPABILITY BUILDING: Leverage the focus of our regional tertiary and business capabilities on primary production and rural, supporting investments in talent and capability building.

We have taken the view that there are three functions for the Mayoral Forum:

- what the Forum should lead (have or take control to make things happen);
- what the Forum can enable (work with other leaders to assist them in their work); and
- what the Forum can support (share resources and tools (for example, people, systems, platforms, data, and physical assets) that will help others to lead).

We have designed the road-map in the main report accordingly,

References

- ¹⁷ Ian Proudfoot, presenting on the KPMG Agribusiness Agenda, 2018.
- ¹⁸ KPMG Agribusiness Agenda, 2018: p 6
- ¹⁹ KPMG Agribusiness Agenda June 2018, Ministerial Foreword
- ²⁰ Darryl Stretton, "Public Perception of Crop Protection and How This Could Be Improved", Kellogg Rural Leadership Programme, p 9
- ²¹ "Public Perception of Crop Protection and How This Could Be Improved" Darryl Stretton, Kellogg Rural Leadership Programme
- ²² Innovation in Canterbury: Realising our Potential, Christchurch
- ²³ KPMG Agribusiness Agenda June 2018, p 7
- ²⁴ KPMG Agribusiness Agenda June 2018, p 9

RESOURCE COMPENDIUM

1. Workshop Outcomes
2. Individual Workshop Reports
3. Case Studies
4. Canterbury Agriculture – Current Environment
5. Canterbury Agriculture Stakeholders
6. Relevant Policies, Legislation and Regulations
7. The Overarching Analytical Framework and associated concepts, including extracting value from land-based outputs – high value manufacturing