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The Organic Sector with No More GE-Free

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I wish to thank the Kellogg Programme Investing Partners for their continued support.

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Executive Summary

This report investigates how potentially ending New Zealand's GE-Free (Genetically Engineered-free) status could affect the nation's Organic Food and Fibre sector. The organic industry currently depends on its GE-Free reputation for market access and premium pricing. Potential Policy changes allowing genetically engineered organisms raise important questions about the sector's future integrity, perception, and economic viability.

Given the growth of organic markets globally and in New Zealand, it is vital to assess both risks and opportunities of these policy changes. As the industry faces possible change, understanding these impacts will inform growers, exporters, policymakers, and consumers navigating this transition.

The methodology for this report was a literature review of already completed work in this area, which was then complemented and challenged through 10 semi-structured interviews with a mixture of professionals and experts related to the topic.

Key Findings:

Loss of GE-Free status may impact the premium currently being achieved in New Zealand organic products, threatening both current margins and future growth.

A reduction in market trust from a cotamination issue can result in less streamlined trading environments and potentially fewer customers; New Zealand establishing more organic product equivalency agreements could counteract this to a degree.

Uncertainty over coexistence and allowable GE presence increases costs and risks for organic farmers, discouraging new entrants.

Moving away from GE-Free could create market uncertainty and lead to questions about the organic sector's identity, its values and possibly result in unsatisfactory narratives in the market.

If confidence and investment decline post-GE policy change towards an already small-scale sector, it will struggle to achieve economies of scale.

Globally, the organic sector is rapidly growing, offering major opportunities for New Zealand's organic and food industries if they respond effectively.

Recommendations:

To the Stakeholder and Policy Makers - Create a clear, government-backed pathway for farmers to transition to organics, modelled on the USDA's TOPP, making the process easier and more appealing.

Integrate organic farming directly into environmental programmes like CarboNZero Toitu, build a fast-track way / reduce crossover for small Organic farms to achieve certification.

The government should fast-track the completion of the Organics Standards Bill so NZ can secure more Organic equivalency agreements to strengthen global market access. it should also, set clear GMO rules on buffer zones, liability, compensation, and labelling to give organic farmers certainty.

MPI and MfE should actively promote a trusted national food and fibre brand focused on integrity, traceability, and innovation.

To the Organic Farmer - Learn about the GE Bill, GM farming, collaborate with neighbours, and minimise contamination risks.

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I acknowledge that both Microsoft Co-Pilot and ChatGPT were used for grammar correction to help simplify my ideas when required.

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1 Introduction

The Organic farming sector is part of the New Zealand (NZ) agricultural sector with specific principles that set it apart from 'conventional farming'. It is a growing part of the sector that has been created from a culmination of values and beliefs that a sizable group with agriculture in New Zealand has prioritised and attempts to bring to life every day. These principles of health, ecology, fairness, and care are used as the guidelines that complement the relationship between people, animals, and the environment. It is a market that in 2024 brings just over $1b in into the New Zealand economy through both domestic consumption and international exports. (OANZ, 2025)

As people around the world grow more health-conscious and science advances, we continue to learn how external factors negatively affect our health and well-being. The better understanding that people get between the relationship of food and health, the more the world is seeing people turning towards healthier produce when and where it works for them. (Alsubhi et al., 2022). People are becoming increasingly focused on the environment and making sure there are processes in place that reduce/slow climate change, and farming organically is a practice that supports this. (Gundala & Singh, 2021).

Agriculture in NZ is an industry that equates to nearly 5% of its GDP and over $59 billion just in exports (Ministry for Primary Industries, 2024), meaning its success is vitally important in the country's economic success. This is part of the reason that, currently in July 2025, the Gene Technology Bill has been introduced and put forth to potenitally be passed by the current government. NZ is currently one of the most restrictive countries when it comes to GMO experiments, which is followed by the argument that the country could be falling behind in knowledge, expertise and opportunity. The opportunities vary from possible cancer-fighting techniques to new tools and technologies to help farmers achieve better yields and their climate goals. (KPMG, 2024)

This report aims to analyse the impact on NZ's Organic Farming Sector performance if the country moves away from being GE-Free by passing the Gene Technology Bill. The report sets out to understand what challenges or advantages may arise from these possible changes and then the follow-on effect they could have on the NZ organic farming sector. The findings that come from the understanding of the challenges and opportunities will provide insight for industry stakeholders on how they may work in or alongside the organic sector in NZ. It will assist policymakers in their understanding of how to ensure decision-making takes all risks and rewards into consideration in relation to the NZ organic farming sector.

2 Literature Review

2.1 Organic Farming in NZ

2.1.1 Its History

Organic farming as a purposeful effort began at the beginning of the 1900s through early pioneers like Sir Albert Howard, F.H. King, and Rudolf Steiner. They all shared the practices of crop rotation, cover crops, composting, and natural pest control as more sustainable ways to farm. (Adamchak, 2019) Sir Albert Howard spent a lot of time in India in the 1940's which is where a lot of these natural processes derived from – as of 2019, India had 2.6 million hectares of Organic Agriculture land (5th in the world at the time) (*Invest India*, 2019). These types of practices were shared widely and far through magazines and books, both the Organic

Gardening and Farming Magazine by J.I. Ordale and the publication Silent Spring by Rachel Carson are worth noting in the history of Organic Farming. Environmental awareness grew steadily, and Organic food sales increased at a similar rate in the late 20th century. (Adamchak, 2019).

In 2005, the International Federation of Organic Agriculture Movements (IFOAM) agreed on the definition of Organic Agriculture. (IFOAM, 2008). Aotearoa New Zealand subscribes to this definition and adopts it within its approach to the industry. Organic farming is built on four core principles. It starts with **health** – making sure the soil, plants, animals, and people all thrive together, because they're all connected. It also values **ecology**, working with nature's systems rather than against them. **Fairness** is key too – making sure people, animals, and the environment are treated with respect and given a fair go. And finally, it's about **care** – being responsible and thinking long-term, so we're looking after both today and tomorrow.

"Commercial organic farming developed from the early 1980s." "As demand increased, consumers wanted assurance that the produce met organic standards. The New Zealand Biological Producers and Consumers Council (BioGro) was formed in 1983 to support producers and to certify produce to BioGro standards and international regulations. (Mason, 2020)

2.1.2 Principles

In New Zealand, the Organic Sector is represented by the Non-profit organisation called Organic Aotearoa New Zealand (OANZ). OANZ was established in 2006 and its purpose is to grow the organic sector by providing leadership, advocacy and collaboration among its diverse network of organic farmers, producers, processors, exporters and consumers. The fundamentals it focuses on are transforming NZ food and farming systems to improve health, the environment and strengthen the economy.

How OANZ describes Organic farming practices through the following five areas:

- **Soil Health** – The foundation of an organic system and farming practices is the health of its soil; the healthier the soil, the more microorganisms within. A handful of organic soil could have billions. These microorganisms are a huge help to plant and animal health are play a big role in all organic farms. Key methods that promote the health of the soil are grazing management, crop rotation, composting and cover cropping. (OANZ, 2023)
  Practising carbon sequestration prevents the carbon from going into the atmosphere, this is where plants absorb the CO2 and convert it to organic matter. That plant dies, falls to the ground, and the organic matter becomes part of the soil, stabilising the CO2. (UC Davis, 2019)

- **Cover Crops –** A simple, low-input or input-free way to increase soil fertility is through cover crops and the "power of plants"; you will see cover crops across most organic production systems. A cover crop can be nearly anything, but some of the more common options are cereals, legumes or flowering herbs, all of which have the primary focus of building the health of the farm. (OANZ, 2023) Once the crop is completed, it can be crushed in place and used as mulch to enrich the soil, suppress weeds, improve soil structure and sometimes prevent erosion. (Alison, 2011)

- **Crop Rotations –** Biodiversity is the goal of most successful organic farms, and a great way to achieve it is through rotating crops. Annual crop rotations are when a farmer plans a different sequence of crops in the same location over a period. Doing this will help the soil health, and each plant pulls different nutrients out of the soil; it also prevents the buildup of crop-specific diseases. (OANZ, 2023)

- **Compost –** Composting could be described as a cornerstone of not just organic farms, but most, as it is the natural creation of soil fertility. A compost pile is the process of recycling farm waste and turning it into a humus-like substance that some call the 'black gold of soil health'. Adding mature compost to soils can introduce beneficial microorganisms that haven't naturally found their way to that paddock. It provides nutrients for plants but also enhances the soil's capability to hold water and nutrients for the future, which can be incredibly valuable in the hotter seasons. (OANZ, 2023)

- **Pest Management –** Synthetic pesticides are known to harm native species and bees, whilst also causing health problems, including hormonal disruption to cancer. Therefore, organic farmers control pests and diseases with natural methods only. They grow robust crops in healthy soils, attract beneficial insects by planting flowers, and may use safe, natural sprays. (OANZ, 2023)

- **Animal Health -** Organic animals live healthily with pasture access and without routine antibiotics. Nutritious grazing supports their well-being and natural behaviour, while thoughtful pasture management ensures both animal happiness and land recovery.

A lot more people globally are connecting the principles just mentioned, and this is having a flow-on effect, in 2009, Mason said, "Once seen as a fringe activity, organic farming has become a multi-million-dollar industry in New Zealand. Worldwide, organics is one of the fastest growing sectors of food production." (Mason, 2020). Organic farming also has significant emissions benefits outside of the soil and carbon, but also a much lower use of energy. A forty-year study from the Rodale Institute shows a reduction of up to 45% in energy use vs conventional farming and shows equivalent yields after a 5-year transition period. (Brook, 2022)

2.1.3 Economic Performance

Mason's statement in the previous section has been backed up by OANZ's release of their 4-yearly Market Report in 2025, which gives a very good insight into how the Organics sector is performing globally and in New Zealand currently. The Global Organic Market now sits at a value of $280 billion, which is tracking at 11-14% year-on-year growth. The report suggests a 2033 Forecast of $650 billion at the current trajectory. The US Market is the largest, currently valued at $72 billion and growing. In NZ, the value of the Organic sector grew from $723 million to $1.18 billion between 2020 and 2024, with the caveat of an inclusion of $190 million from domestic food service being added to the reporting (OANZ 2025). This is a growth rate of 8.1% CAGR (Compound Annual Growth Rate), which could be considered a very strong result, seeing that the sector has no government funding or assistance from other industries. NZ's growth rate is lower than the global market, which may be influenced by its ability to scale, currently being at 1% of the NZ export market. Scalability is crucial for a business or an industry to grow (Johnson, 2023). In NZ, 51% of the Organic Sector output is exported, and 49% is consumed domestically. (OANZ, 2025)

2.1.3.1 Exports

There is some very impressive growth occurring in NZ's organic sector (8.1% CAGR), but it is falling short of the growth numbers of other countries that are strategically focusing on this market and how they can position themselves. Looking at (Figure 1) it shows where NZ's export growth has occurred over the last four years, the USA and Europe hold the largest percentages of total organic exports. (Figure 1). NZ has a total of $606 million in organic exports of which, fruit and vegetables equate to 40.3%, Dairy prodcuts 35.3% and Wine makes up 12.2% (OANZ, 2025)

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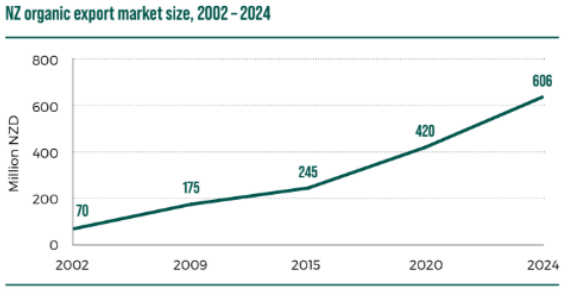


Country	2020 Export Value	Percentage of total 2020 exports	2024 Export Value	Percentage of total 2024 exports	CAGR
USA	86,776,675	20.60%	172,827,958	28.50%	18.8%
EU	73,433,270	17.50%	111,433,348	18.40%	11.0%
Australia	66,388,643	15.80%	110,564,098	18.20%	13.6%
China	81,807,040	19.50%	63,007,318	10.40%	-6.3%
Japan	31,459,360	7.50%	42,299,509	7.00%	7.7%
Korea	19,220,720	4.60%	26,938,178	4.40%	8.8%
UK	23,653,030	5.60%	20,022,073	3.30%	-4.1%
Canada	2,874,100	0.70%	16,214,914	2.70%	54.1%

B

Figure 1. Export market size for NZ (A) and international (B) organics. Taken from OANZ, 2025.

Canada is worth pointing out, as you can see, recently (between 2020-24), a large 54% increase in purchasing NZ organic exports, but overall, their % of total exports is still quite low compared to the other developed countries on that list. Canada does have a large organic market compared to NZ, but it is a country that has significantly invested in GMO crops, and in 2019, over 20% of its total farming land had GMO crops. In 2024, the Canadian organic sector (Domestic and Export) has grown to over $9 billion from $6.4 billion in 2020, but interestingly, within that market growth, domestic organic production by Canadian farmers and growers has not increased. This has meant that the country needed to significantly increase its organic imports as it couldn't grow enough itself, hence NZ organic imports increasing by 54%. (Canadian Organic Growers, 2025)

2.1.3.2 Land Use

New Zealand certified Organic Land grew 4.3% to 89,544 hectares, with 1,148 operators across 2,735 operations. 'Operations' are increasing, but the number of operators is decreasing. There are several larger operators now that own multiple organic operations within them, hence the number of 'Operations' growing by nearly 50% in 4 years. An assessment on this could argue that the market is demanding more types of products/brands being delivered from a similar number of operators or businesses. (Figure 2)

SECTOR GROWTH

	2007	2009	2012	2015	2017	2020	2024
Total number of certified operators	860	1,145	1,221	997	1,118	1,223	1,148
Total number of certified operations	1,206	1,416	1,765	1,500	1,672	1,870	2,735
Number of organic operations under conversion			232	104	141	217	36

Figure 2. Organic sector growth trend. Taken from OANZ, 2025

In New Zealand, the number of total certified operators has fluctuated between 860 and 1223 over the past 21 years, but only 36 current transitions to Organic Certification in the most recent 4-year period (OANZ, 2025). This is a real worry for the sector as a natural and known way to grow into increased scale through more organic producers, but it seems something is slowing these numbers down. One space that NZ may not have a large focus on comparatively to other countries is the regenerative farming sector, which a lot argue is a stepping stone between conventional farming to Organic Farming. (OANZ, 2014) An example of how the world is changing its view towards the benefits of Regenerative Agriculture is the global event held in Amsterdam, attended by thousands of industry leaders, including a lot of significant agricultural organisations from around the globe. (EU commission, 2023). The NZ agriculture industry is seeing an overwhelming decrease in total land area of 15% and number of farms, dropping 33% between 2002 and 2022. (StatsNZ, 2022) The Organic farming sector is already a small percentage of the available agricultural hectarage in New Zealand. This highlights increased pressure on small family organic farms, limited future options, and challenges for new farmers transitioning to organic production systems.

The United States Department of Agriculture (USDA) has a subsidiary arm called the 'Transition to Organic Partnership Program' (TOPP). TOPP widens the USDA engagement among industry professionals, U.S producers and the general public. Its purpose is to increase the number of people farming organically, and they are firm believers that people will do more of what is easy. The operation includes a large mentorship program, lots of public educational events to gain interest in organic transition, and organic technical assistance. They also provide training to agricultural support professionals to better support the organic farmer and grower. TOPP itself also has an intern program, which acts as a direct pathway for the next generation to connect with sustainable agriculture. A testimonial from the TOPP Impact Report shared this about getting certified – "It's like trying to cross the ocean, it's very intimidating. I wouldn't be certified if it weren't for this program" (TOPP, 2024).

2.2 GMOs in the Agriculture Industry

2.2.1 History

Genetic Modification (GM) is a space within Biotechnology that focuses on manipulating the genetic material in living organisms to change a specific trait to create a new outcome (Morse S, et al,2008). You would need to go back 10,000 years to find the earliest example of genetic modification of plants for consumption. This is when human ancestors first started testing "Selective Breeding" and "artificial selection". The terms were created when referring to

choosing specific "parent organisms" that have sought-after traits and breeding them to propagate these traits. (R.Raman, 2017)

In the 1980s, technological and scientific advancements enabled the insertion of small segments of DNA from one organism into another. In 1983, scientists created the first transgenic plant—a tobacco plant engineered for antibiotic resistance (Yang and Chen, 2016). By 1996, companies had adopted the technology to develop herbicide-tolerant soybeans (Duke S, 2005). By 2000, advancements in the process enabled biotechnology companies to incorporate nutrients and vitamins to enhance the nutritional content of foods (Duke S, 2005). In 2016, the USA led globally in GMO technology and production, with over half of the world's GMO farmland located there (Yang and Chen, 2016).

Around the world, genetic modification has been seen to be a part of the solution to the problem of not having enough food to feed the world as its population grows. In 2016, the U.N. Food and Agriculture Organisation (FAO) reported that nearly 800 million people were undernourished, specifying that 98% of these lived in developing nations. In 2012, FAO predicted that the limited amount of arable farmland that could produce food was decreasing and would further decrease from 0.242ha to 0.18ha per person by 2050. These statistics demanded change, and if bringing in more hectarage was going to be limited, then yield per hectare was an obvious focus; this is where genetically modified crops come in (C.Zhang et al, 2016).

In 2014, Klümper & Qaim completed a meta-analysis of the agronomic and economic impacts of GM crops to consolidate the evidence and provide insights on a large scale. The meta-analysis included 147 studies from farms all over the world that fully implemented GM crops, but also field trials. For a specific farm study to be used, it would have had to report impacts of GM Maize, Soybean, or cotton on crop yields, pesticide use, and/or farmer profits.

A main limitation was that several of the original studies did not include sample size or measures of variance. The results were very interesting, and one could argue that they shed some light on the potential opportunity of incorporating GM farming practices into a farming operation. Overall, across the 147 studies, the numbers showed that there was a reduced chemical pesticide use by 37%, increased crop yields by 22% and increased farmer profits by 68%. It was important to note that yield and profit gains were higher in developing countries than in developed countries; the report did not specify by how much (Klümper & Qaim, 2014). Brooke's study in 2022 supports this decrease in pesticide use and the positive impact that GM crops specifically have had on the environment. It also mentions the initial decrease in herbicide use, as well, which eventually starts to increase as weed resistance to those herbicides used increases (Brookes, 2022).
Flachs, Stone, Hallett and Kranthi based in the USA completed a study in 2025 which researchs the Jevons Paradox, which has broken down the idea that GM crops were supposed to make farming more efficient, needing less water, fertiliser or pesticides usage. But over the last 30 years, GM crops (herbicide tolerant) have led to more land being farmed (to meet global demands), but also more overall chemicals being used on a per hectare basis. An example was in India, where GM Bt cotton meant farmers could use cheaper pesticides, which resulted in farmers using more pesticides instead of fewer. This helping sustain a larger system of chemical monoculture.(Flachs et al., 2025)

2.2.2 GMO Research in NZ

In New Zealand, AgResearch is one of seven Crown Research Institutes. Its mission is to apply scientific expertise to enhance the value, productivity, and profitability of New Zealand's pastoral, agri-food, and agri-technology sector value chains. This allows them to continue supporting economic growth as well as positive environmental and social outcomes for the country. (AgResearch, 2025)

In 2025, they have three main research projects that incorporate GMOs: High Metabolisable Energy (HME) Ryegrass, High condensed (HiCT) White Clover and Gene Edited Endophytes. All of which have significant potential gains for the New Zealand Agricultural sector as they are all related to pasture, which is NZ's primary stock feed. Currently, all these projects are occurring behind closed doors in laboratories due to the current legislation in NZ, although AgResearch is also connecting with overseas countries like Australia and the US to begin field trials. (AgResearch, 2025) Some consider the progress in the project slower than it should be because of the highly restrictive nature of NZ's GMO legislation under the Hazardous Substances and New Organisms (HSNO) Act 1996 (Conner, 2023).

HME Ryegrass has properties that result in an increased level of oils in comparison to non-modified ryegrass, which has the potential to increase the available metabolisable energy to the animal, which can then potentially increase productivity. Scientists have also shown that this GE Ryegrass can reduce methane emissions from livestock (AgResearch, 2024). Figure 3 below shows ryegrass trials conducted by AgResearch under Dr Caradus.

Figure 3. HME ryegrass trials, Grasslands Campus, AgResearch. Photo taken from Burry, 2019

High-Condensed Tannin White Clover (Figure 4) is a plant that creates more tannins in its leaves, which could result in improved animal health and a methane reduction of up to 16% when consumed b livestock, it also reduces nitrogen loss in the soil and increases animal health. (AgResearch, 2025)

Figure 4. High condensed tannin white clover. Picture taken from Wallace, 2023.

Endophytes (Epichloe) are fungi that work very well with plants like perennial ryegrass, but in a symbiotic way, they act as a protector from insect pests, increasing yields and persistence. Endophytes also have potential negative impacts on livestock as they can produce compounds that are harmful to specific livestock. Genetically edited endophytes attempt to remove/prevent the dangerous compounds and promote protection from pests. (AgResearch, 2025a)

AgResearch patented endophyte AR37 in NZ, which, from its mutually beneficial relationship with ryegrass, brought in $3.6 billion into the economy over the patent's lifespan. (AgResearch, 2025a) Although this endophyte was not created through gene editing, it does present the opportunity of controlling a patent in this space of the agricultural sector for NZ.

2.3 GMO and Organics: Co-Existence

In New Zealand, if different methods of farming, including Organic, Conventional, and GM were to all succeed, they would need to mutually 'co-exist'. 'Certified organic and GM farming models are all subject to production requirements and must meet certain standards to commercialise their produce. These standards may not be reached in cases in which animal, plant, or soil material and farming supplies, such as fertilisers or pesticides used in other farming models, are unintentionally transferred by wind, water, or human transportation to neighbouring farms. In such cases, farmers or companies may experience profit losses or reputational damage if there is GM contamination in organic products (Sánchez & Campos, 2021)

'Co-existence in the context of GM and non-GM supply chains refers to the economic and market implications of growing these crops in close proximity and any resulting adventitious presence of material from one crop in another crop. The main goal of co-existence arrangements is to minimise the potential for mixing of GM and non-GM crops at all stages in the supply chain' (Caradus, 2025). A report focused on Co-existence agriculture in the USA describes its 'different primary production systems can exist concurrently or in the vicinity of each other and can be managed in such a way that they effect each other as little as possible'. (Hubbard & Hassanein, 2012).

This report looks internationally to understand how the function of Co-existence is approached and assessed. 'Coexistence, as defined in a report from the United States Department of Agriculture (USDA) Advisory Committee on Biotechnology and 21st Century Agriculture, is "the concurrent cultivation of conventional, organic, identity preserved, and genetically engineered crops consistent with underlying consumer preferences and farmer choices". In other words, it is the existence of different types of production at the same time and in the same area.' (USDA, 2015). In 2015, the USDA provided a clear message that they believed that all three methods of agriculture have an important part to play in feeding their country and the world into the future as its population grows. For context, two years after this was published, the peak population forecast was 11.2 billion by 2100 (United Nations, 2024), and now the peak is expected to come 20 years earlier and nearly 1 billion people less at 10.3 billion (United Nations, 2025).

Table 3 below showcases a few of the top 'co-existing' countries with organic and GM farms; this is purely based on global rank in total hectares in both camps. To allow a better understanding, I have added the percentages of the total agricultural land, which shows how much a country is investing in Organic, GMO or both production systems. It is worth noting that the two coexisting countries (Australia and Spain) with the highest percentage of Organic have the lowest percentage of GMOs; these industry strategies have a clear focus on organic production systems.

Table 3. Area of crops (million hectares) grown under organic standards and GMOs in selected countries in 2019. Table taken from Sánchez & Campos, 2021, Percentages in green, and data for New Zealand have been calculated by the author using data from NationMaster, 2020 and OANZ, 2024, and input into the table.

Country	Organic farming	Rank	GMO	Rank
Australia	35.69 (9.5% of total agricultural land)	1	0.6 (0.2% of total agricultural land)	13
Argentina	3.67 (2.5%)	2	24.0 (16.1%)	3
Spain	2.35 (9.0%)	3	0.1 (0.4%)	17
USA	2.33 (0.5%)	4	71.5 (17.7%)	1
India	2.30 (1.3%)	5	11.9 (5.5%)	5
China	2.22 (0.4%)	7	3.2 (0.6%)	7
Canada	1.32 (2.2%)	11	12.5 (21.2%)	4
Brazil	1.28 (0.5%)	12	52.8 (22.3%)	2
New Zealand	0.09 (0.6%)		N/A (GE Free)	

The total agricultural land percentages were retrieved from 2019 numbers, so they will vary slightly from where those numbers sit today in 2025.

2.3.1 Market Access

Market Access is NZ's ability to legally sell and send its products into other countries for profit and economic gain; this is a 'granted' permission, not a right. Market access is a result of ongoing successful trade negotiations between two countries, covering topics like tariffs, quotas, quality standards and economic partnerships. (MBIE, 2016)

International trade is based on permission given by the receiving country in most cases, meaning that if a requirement is missed, then the exporting country may see a reaction from the receiving country. Equivalency Agreements make this process more streamlined, but all products are scrutinised by the standards expected of them. (MPI, 2024)

In 2013, there was a scandal that had a significant impact on New Zealand's milk exports. It started with the fact that in NZ you were allowed to use nitrification inhibitor DCD on pasture. The product was considered safe for pasture-grazed milk production, and DCD was not considered a food safety issue (NZIER, 2024), (Ministry for Primary Industries, 2013). "After low levels of DCD residues were detected in some milk products, NZ's dairy products faced a sharp market reaction in China, one exporter of infant formula said sales promptly went "to Zero" when customers found out about the presence of DCD". This incident was reported on in the Wall Street Journal, and even though it was a chemical that was accepted in New Zealand and legal to use, the export market found it unacceptable and forced NZ to stop using it (Ministry for Primary Industries, 2013). This showcases the power of market access and shows how fragile it can be if something goes wrong, with huge potential downside for the exporting country and businesses.

Relating this back to the organic farmer, if an unknown GMO contaminated some product that was planned to get exported this may create issues for that specific farmer, and more so the country's organic industry that is trying to export to that country. Contamination can lead to denial of market access, so it is something to take very seriously. (Heinemann et al, 2004).

2.4 Organic Regulatory Frameworks

2.4.1 New Zealand

New Zealand has recently enacted the Organic Products and Production Act 2023, which is a legislative framework that governs how products must be labelled when using the word 'organic' and gives authority to the government to set mandatory standards through regulations.
This covers:

- Defining the organics standard
- Requirements to become an 'approved operator'
- Register of acceptable and unacceptable inputs
- Enforcement Mechanisms (Organic Product Officers)
- Penalties for mislabelling or non-compliance

(NZ Government, 2023)

This bill currently as of August 2025, is under development, as there is still some ambiguity around how these new requirements will take full effect for all of the product classes (OANZ,

2025). One of the main purposes of it is that NZ will be able to move forward on acquiring more equivalency agreements for its organic exporting trade. A great example of this is the agreement that NZ and China already have, which allows a bottle of NZ wine to be dual certified by both BioGro (NZ Organic Certification body) and the China Organic Food Certification Center (COFCC). This means the supplier does not need to apply for a Chinese-based certification; the arrangement is a lot more streamlined, reducing costs, red tape and easier for all parties (Cai, 2025).

The organic customer base holds a high priority on knowing where their product comes from and what practices were followed in its production. That is where BioGro (Figure 5A) and AsureQuality (Figure 5B) come in as the two main certifiers of organic produce in NZ. Both are IFOAM accredited and through this have access to international markets such as the USA, EU, Australia, South East Asia, the UK and Japan. (Organics Exporters Association NZ, 2025) To understand the impact of NZ potentially moving away from being GE-Free on the Organic sector, it is important to understand the process a producer would take to become 'Certified Organic.

A

B

Figure 5. NZ organic certification logos, BioGro (A), and Asure Quality (B). Images retrieved from (BioGro, 2025 and IFOAM, 2025 respectively.

BioGro is the leading certifier in NZ and has been running for 40 years. For a primary producer, the process takes 3 years from application to certification. BioGro also certifies the non-primary producers, including processors, packhouses, storage providers, transporters, wholesalers, retailers, exporters, importers and service providers. (BioGro, 2025)

Primary Producer Certification Process:

Year 1 (Registration)

- Registration (Minimum of 36 months before certification)
- Submit a thought through the Organic Management Plan (OMP). This will include a property map, soil tests and an environmental management plan as well.
- Internal Audit (Assess current compliance and recommend corrective actions if required)
- Documentation (Animal Treatment records, Bought-in Stock Quarantine Records, Application of use of Restricted Inputs)
- No Organic claims or use of BioGro logos allowed yet.

Year 2 (Conversion – First Half of the year)

- Update the OMP and undergo another audit (make corrective changes required)
- Documentation (Animal Treatment records, Bought-in Stock Quarantine Records, Application of use of Restricted Inputs)

- Products can be labelled as "BioGro certified Conversion" but cannot use the BioGro Organic Logo/label.

Year 2 (Conversion – Second half of the year)
- Similar process to above, update OMP and another audit
- Same as above with documentation
- Still only "BioGro certified Conversion"

Year 3 (Full Certification)
- After 36 months, producers can apply for full BioGro certification.
- Certified producers can use the BioGro trademark/logo

Ongoing annual audits are completed to ensure certification stays current, and unannounced audits can also occur to ensure compliance.

The Sustainable and Environmental Management requirements state the Producer must:
- Maintain Soil, water and air quality
- Protect Biodiversity and natural areas
- Minimise waste and energy use
- Avoid contamination from prohibited materials.
- Use of GMOs is strictly prohibited
- Contamination of GMOs may affect certification status

The non-primary producers (a business that transforms raw materials into another product) need to have an OMP, Site plan, but also a chain of custody for the entire supply chain, followed by initial and ongoing audits. Other requirements of either certification only last 12 months, or the producers must sign a license agreement to comply with BioGro standards. The labels must include the BioGro logo and their specific license number, and any changes to the OMP, business ownership, or product scope must also be approved by BioGro. (BioGro, 2025)

2.4.2 Overseas

A

B

C

Figure 6 International Organic Certification logos, USDA (A), EU Organic (B), and ACOS Standard. Images retrieved from (Adamchak, 1998, EU Commission, 2018 and ACO, 2025 respectively.

Fogire 6 shows three of the largest Organic Certifiers from the United States of America (USA), Europe (EU Commission) and Australia. These certifiers all have slightly different regulation standards from each other and NZ, showing that there is not one right way. For example, USDA allows an adventitious or unintentional presence of GMOs in their organic produce as long as the process of producing the produce is GM-free. (USDA, 2019)

The USDA sent out a flyer titled 'Can GMOs be used in organic products?' to the organic and wider community to answer frequently asked questions. It stated, 'unlike many pesticides, there aren't specific tolerance levels in the USDA organic regulations for GMOs. As such, National Organic Program policy states that trace amounts of GMOs don't automatically mean the farm violates the USDA organic regulations. In these cases, the certifying agent will investigate how the inadvertent presence occurred and recommend how it can be better prevented in the future.' They included the diagram below to visualise how an organic farmer will need to adjust their farm operation to ensure they are farming to 'prevent' inadvertent presence as best as they can.

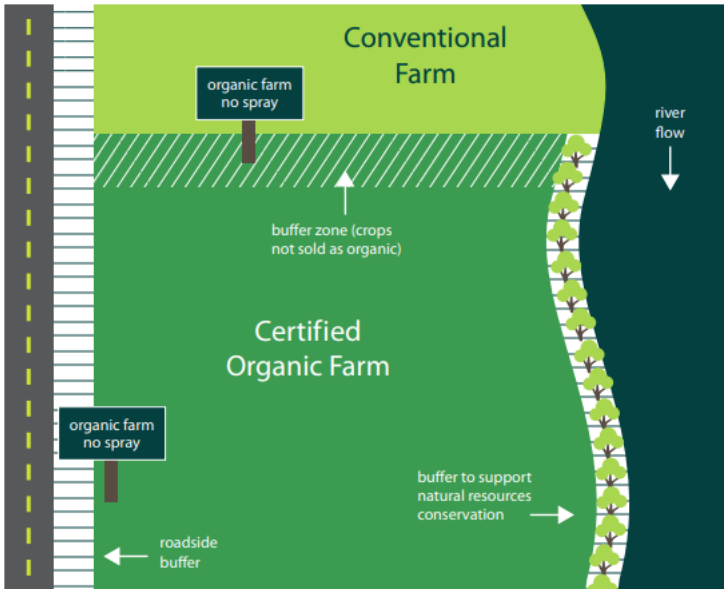


Figure 7 USDA Organic Farm Buffer Zone Recommendation Flier. Photo taken from USDA 2025a

Some main adaptations to farming systems in NZ that may be required based on the USDA framework to ensure contamination is prevented or at least minimised are:

- Buffer Zones where organic farming practices are upheld, but the produce is not sold as organic. E.g. Inwards from the farmers' boundary for 100m, the crop is harvested separately, and the product is sold as non-organic.
- Planting times where farmers will adjust their planting dates to avoid neighbouring crops flowering at the same time to prevent cross-pollination.
- Cooperative agreements signed with neighbours to avoid planting GMOs directly next to organic crops.
- Processing equipment cleanliness, extra cleaning in between use of different crop types (GMO, conventional and Organic)

(USDA, 2025a)

Caradis (2025) states that in the EU, Article 11 of Council Regulation reads that their objective is to have the lowest possible occurrence of GMOs in organic products. It explains that the current threshold of 0.9% is the ceiling, which is exclusively linked to the adventitious and technically unavoidable presence of GMOs. To be clear, the EU holds the stance that it should not be possible to label a product as organic when it has to be labelled as containing GMOs, consisting of GMOs or produce from GMOs. (Caradus, 2025; EUR-Lex 2007; Then and Stolze

2009; Chiarabolli 2011; Kleter et al. 2018; Nadal et al. 2018) But ultimately it is acceptable if it holds less that 0.9% adventitious presence.

This allowance is rejected in both NZ and Australia, with their current status of GMOs being prohibited, and if found, can result in loss of certified status (European Commission, 2013).

Most organic standards stipulate that GM technologies are prohibited and cannot be used (deliberately or negligently) in production, but do not mention an acceptable GM presence level. Recognising that zero tolerance is unrealistic, some standards warn not to put GM-free claims on a product. (Caradus, 2025).
For further contrast, Canada's Organic label does not mean it's purely organic, but instead that it could have an adventitious presence of up to 5% of GM plants or seeds. (Perry and Karky 2013) Some data worth noting is that Canada is a country that has over 20% of its agricultural land farmed with GMOs, one of the biggest percentages globally. (Sánchez & Campos, 2021) They also do not have specific laws about labelling GM Foods differently; they are labelled like any other food because the safety assessments completed have found them to be as safe as any other food. (Health Canada, 2022)

2.5 NZ Gene Bill

Currently, in 2025, the New Zealand Government is looking to change its regulatory landscape with GMOs, allowing them to be trialled and used more out on farm as opposed to only in a laboratory. The aim of publishing the 'Gene Technology Bill' is to expand the use of gene technology in New Zealand.

Ministry of Business, Innovation and Employment (MBIE) have been heavily involved in the development of this bill and explains why they have built it and, from their view, how it is going to work. MBIE also worked alongside the Environmental Protection Agency (EPA), several other agencies and purposefully built advisory groups whilst completing the bill, which currently as I write, is sitting between the first and second reading.

MBIE states:

The 'why' and the purpose of the bill:

- To enable greater use of Gene Technology throughout NZ.
- But doing so with a strong focus on protections for humans and environmental safety.

There are significant benefits from the use and development of gene technology:
- Supports the innovation in healthcare, for example, new opportunities in cancer treatments with scientists able to modify the patient's own cells.
- Helps address climate change and protect native ecosystems (e.g. Pine trees that do not spread).
- Improves agricultural productivity and resilience (e.g., pest and disease-resistant crops, fruit or vegetables).
- Potential to boost export numbers and competitiveness in global markets.
- Aligns with other countries that are already using gene tech, for example UK, EU, Japan and Australia

The How:

- Risk-proportionate regulation.
- Efficient application and decision-making processes.
- A flexible legislative framework able to accommodate future technological and policy developments without frequent amendment.
- International alignment, including with key trading partners, to facilitate trade and improve access to new technologies.
- Ways to recognise and give effect to the Crown's obligations under the Treaty of Waitangi. (NZ Parliament, 2024)

Establishment of a GMO Regulator (Similar to Australia)

- Functions
    - To locate, assess, and manage risks of GMOs
    - To be the provider of information and guidance to the public and regulated parties.
    - To advise Ministers on related technical issues
    - To consider advice on risk management plans, expedited assessments, guidance documents, and licence eligibility.
- Structure
    - Accountable to the Environmental Protection Agency (EPA)
    - To be the 'Single' decision maker with support from two committees:
        - Technical Advisory Committee and Māori Advisory Committee

One of the largest risks to the average organic farmer is GM contamination in their crop or harvest, and the potential economic repercussions. One way that the Bill plans to fund GMO contamination where fault is unknown is through a levy payment system, which would enable timely payouts where fault is uncertain, but damage is obvious. (NZ Parliament, 2024b)

2.6 Consumer and Market Perceptions

To understand the impact of change on a market, one must spend time getting to know the customer. This report is attempting to understand the potential impact on the organic farming sector in NZ, so who is the customer and consumer of that market?

Globally, consumers choose organics because:

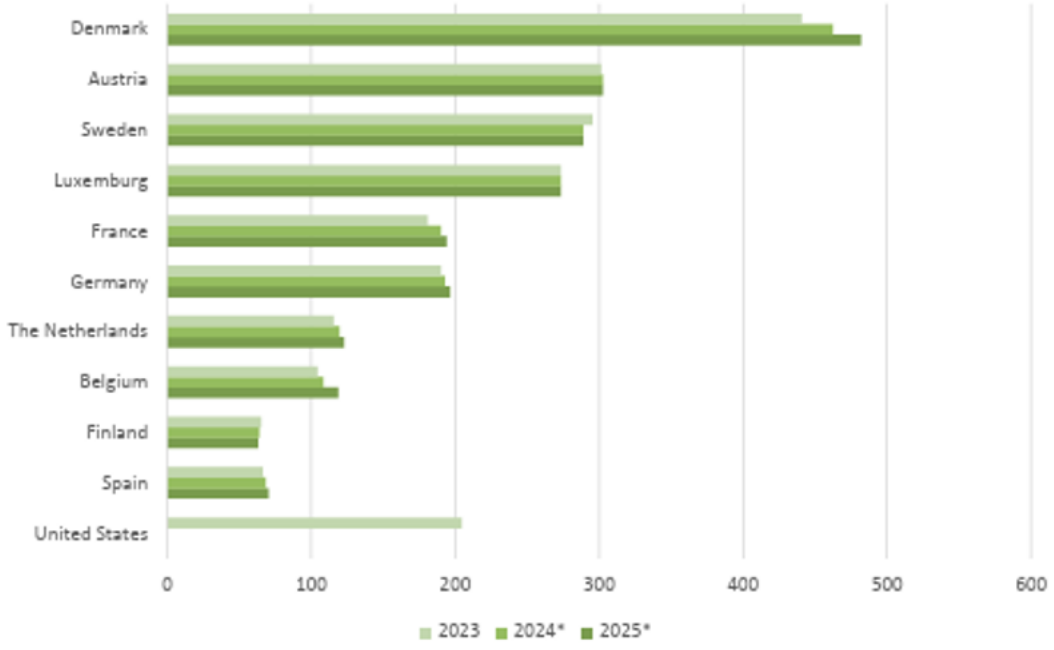
- Health and Food Safety (Avoid synthetic chemicals, GMOs, and believe Organic offers better nutrition)
- Environmental responsibility (support farming practices that protect 'soil health', waterways, biodiversity, and the climate)
- 'It's Natural', Tastes better, A better quality and I trust It (people connect organic with superior taste, premium quality and greater transparency from producers they trust) (OANZ, 2024)
- Health scares (retrospectively, after having a serious health scare, they look at what they are putting in their body and start making better choices) (Gundala & Singh, 2021)

The environmental responsibility link that organics have is being acted on and taken very seriously by multiple countries, and more significantly, the European Union (EU). In 2021, the EU

set out a hefty target under the European Green Deal (EGD) of 25% of the total agricultural land to be farmed under organic certification. The action plan and strategy were rolled out through 'Farm to Fork' to develop a sustainable food system in the EU. They have set up a subsidy support system for organic farmers, which they hope increases the rate of farmers transitioning too organic production systems. The EU was confident that the consumer market demand is there and that this would be a significant step in doing its part for the environment, with the bonus of having healthier people. (European Commission, 2020)

The EU, for example, and especially Denmark, has a government that has directly correlated Organic Farming and products to the answer needed to help fix some of the environmental issues. Denmark specifically has a fundamental understanding of who they are as a country, what their brand story is and how they want to be viewed as a people, but also as an exporting country. (Organic Denmark, 2024) The table below shows the highest organic food sales per person in the EU, showing Denmark sitting at the top by a long way.

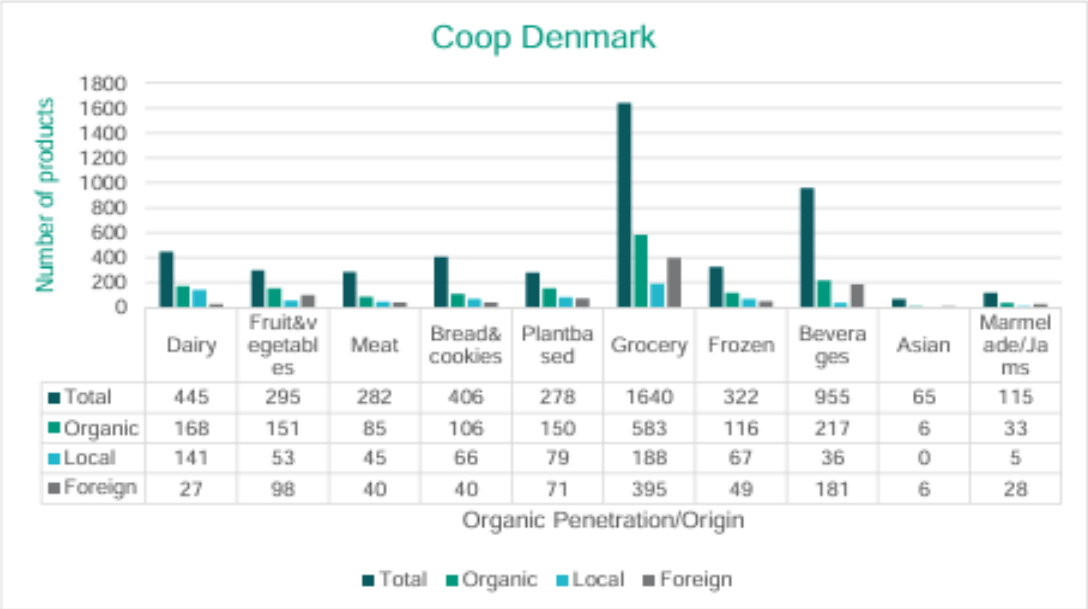
Figure 8 Highest Organic Food Sales per Person in the EU (Annual per capita, in US$) taken from Organic Denmark,2024.



Source: Organic Trade Association (OTA), U.S. Census, USDA/FAS Posts in EU, 2024* and 2025* are USDA/FAS Post estimates

To meet consumer demand, international grocery retailers are significantly increasing their presence of organic produce on their shop floors and online, with more options becoming available. A successful example of an EU grocery chain doing this well was in 2020, Coop Denmark, which saw results of 40% of their total online sales being organic (Das, 2021). Table 5 below shows 34% of Coop's product range is organic, especially within dairy. They also have a high local organic supply due to Coop having its own in-house supplier. (Bord Bia, 2022)

Table 3 Coop Denmark grocery product breakdown by category. Take from Bord Bia, 2022)



	Dairy	Fruit&vegetables	Meat	Bread&cookies	Plantbased	Grocery	Frozen	Beverages	Asian	Marmelade/Jams
Total	445	295	282	406	278	1640	322	955	65	115
Organic	168	151	85	106	150	583	116	217	6	33
Local	141	53	45	66	79	188	67	36	0	5
Foreign	27	98	40	40	71	395	49	181	6	28

The organic market is very well established in several countries throughout the EU, with countries like Denmark and Sweden setting goals of '60% organic share of all public buying of food and drink by 2030'. In other words, that means 6 out of 10 food products are organic in every kitchen. Seeing a commitment like this, there are countries like Ireland, for example, that have specific strategies on how to try to increase more exports of their organic produce into these countries (Bord Bia, 2022).

In 2024, the EU's main demographic of organic purchasers was families with young children and older couples without children, the latter of the two being the bigger buyer. A known gap is that the consumer age demographic of people between 18-29, which is not pulling its weight currently, and if not converted in a more meaningful way, the countries targeting 60% will most probably fall short (Organic Denmark, 2024).

Figure 8 below provides a breakdown of the top-performing organic export markets in the EU, with the USA added for further context. Denmark is at the top, stating that 12% of its total food and fibre sector retail trade are organic. For reference, NZ's organic market share of food and fibre exports is 1.03%.

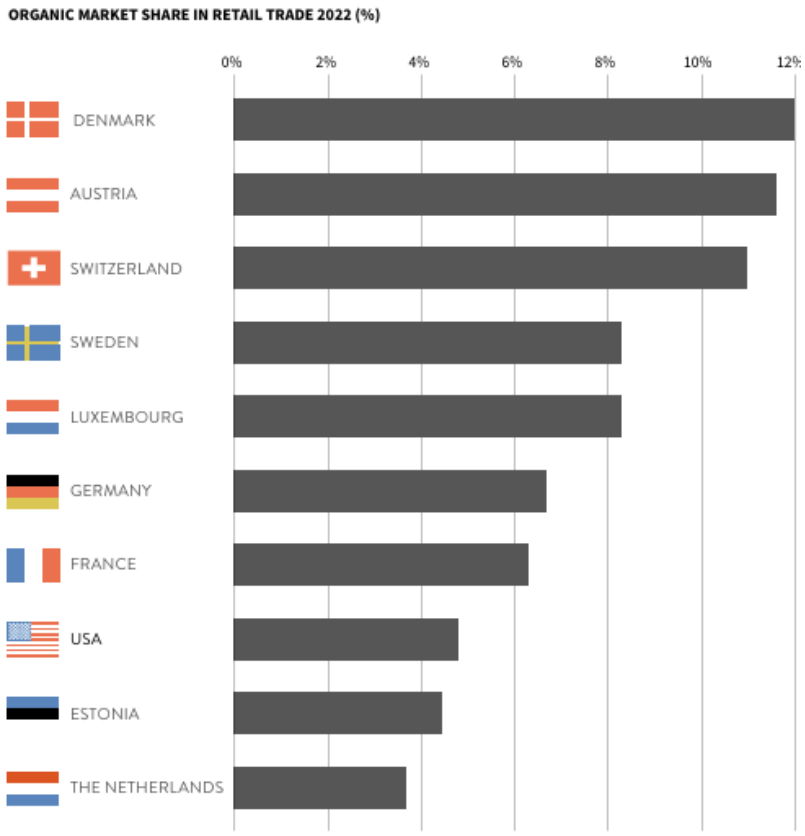


Figure 9 Organic Market Share in Retail Trade 2022 in Europe (%)
Take from Organic Denmark, 2024

Table 4 is a snapshot provided by an MPI report showcasing how purchasing drivers change slightly from country to country. This global survey was completed by the Economist Intelligence Unit (EIU), which is a research and analysis division of 'The Economist Group' based in the United Kingdom. In 2020, NZ consumers surveyed that nearly 80% had purchased organic produce in the last 12 months, but only around 20% were considered 'regular' purchases (Fortnightly). The information shared below is based on the 'regular purchasers of organic produce' only.

Table 4 The Most Important attributes when purchasing organic product by market in 2020, taken from MPI, 2020.

The most important attributes when purchasing organic product by market

Ranking	New Zealand	Australia	US	Germany	South Korea	China	Taiwan
1st	Free from residues / spray free	Good for my health	Free from residues / spray free	Free from residues / spray free	Good for my health	Good for my health	Good for my health
2nd	Good for my health	Natural	Good for my health	Animal welfare	Good for the environment	Free from residues / spray free	Free from residues / spray free
3rd	Natural	Free from residues / spray free	Natural	Natural	Free from residues / spray free	Natural	Safely produced
4th	Good for the environment	Good for the environment	Safely produced	Good for the environment	Natural	Good for the environment	Natural
5th	Animal welfare	Animal welfare	Good for the environment	Good for my health	Safely produced	Safely produced	Good for the environment

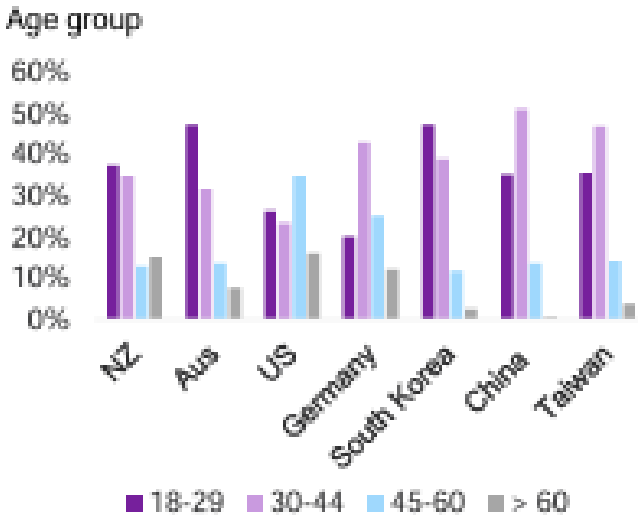
Source: EIU Consumer Survey (2020)

The table and graphs below note that over 70% of the consumers purchasing organic produce in New Zealand are below the age of 44, with the majority sitting under 29 years of age. A similar trend is seen in Australia, South Korea, China, and Taiwan. This data is from 2020 but is an important factor when talking about NZ's approach to selling organic products domestically and who is buying NZ's exports overseas. The younger buying group data is backed up by a study completed by the US Organic Trade Association, showcasing that millennials are more likely to purchase organic produce. (USDA, 2025) However, this contrasts with the data presented in the table below from 2020 and its corresponding US results, which indicate that the majority age group is 45-60, followed by the under-29 age group.

Table 5 Demographic profile of a regular organic purchaser in surveyed markets in 2020, take from MPI, 2020

	NZ	AUS	US	GER	SK	CN	TW
Age group	18-29	18-29	45-60	30-44	18-29	30-44	30-44
Gender	No significant difference	No significant difference	Female	Female	No significant difference	Male	Male
Job	Professional	Professional	Professional	Professional	Professional	Professional	Professional
Income	Middle income	Middle income	Middle income	Middle income	Middle income	Middle income	Middle income

Figure 8 Age Group Demographic profile of a regular organic purchaser in surveyed markets in 2020, take from MPI, 2020



The chart below breaks down the main barriers to buying organic food/drink by market.

The main factor by a country mile is that it is currently 'too expensive', respondents indicated that lower price and better education may change their opinion to buy organic food/drink. Lack of trust in the organic claim was also a significant influencer in the purchasing decisions of the people surveyed.

Main barriers to buying organic food/drink by market (% respondents)

	New Zealand	Australia	US	Germany	South Korea	China	Taiwan
Do not know where to buy them	6%	8%	2%	5%	17%	14%	9%
Not conveniently available	11%	10%	11%	1%	18%	8%	14%
Not familiar with the brands	24%	20%	21%	14%	18%	20%	27%
Not a wide variety of products	11%	9%	9%	6%	7%	14%	17%
Do not trust the organic claim	21%	31%	25%	21%	21%	8%	21%
Do not like the appearance	4%	7%	4%	3%	7%	8%	1%
Too expensive	77%	80%	76%	78%	47%	53%	52%
Lack of information about organic products	15%	17%	19%	10%	22%	29%	22%

Highest barrier
Lowest barrier

Figure 9 Main barriers to buying organic food/drink by market in 2020 taken fomr MPI 2020

2.7 NZ's GE-Free and Organic Premiums

New Zealand currently prohibits GMO cultivation outside of laboratories or specific greenhouses. This policy could be seen as supporting the country's organic sector, making it easier to promote itself internationally as '100% Pure'. (Kaefer, 2016) NZ's Clean Green brand was delivered largely on the back of NZ's stance against nuclear energy and genetically modified organisms in the 1980s. (Insch, A, 2016) The NZ Government has previously indicated that taking a cautious stance on genome editing is suitable, as New Zealand, as a provider of premium food products, must safeguard market perceptions of purity and safety (The New Zealand Government, 2016). New Zealand has held strong on this '100% Pure' marketing since it was launched in 1999 and has been praised for it as well. New Zealand Ministry of Tourism and the Ministry of the Environment understood what was important to them as a collective and marketed itself in line with its values and beliefs. The results of this campaign over the past 20 years suggest its consumers are connected to this authenticity. (Kaefer, 2016) Simon Sinek says that any great leader or organisation starts with 'why' they do what they do, making their actions and how they communicate authentic, seamless and easily understood. (Sinek, 2011)

An Initiative that New Zealand currently has running is Toitū Envirocare CarboNZero certification, which is a certification process that recognises operations that run at a carbon-zero footprint, supporting the climate. This is an initiative that drives competitor advantage by auditing and recognising environmentally positive behaviours. (Toitū Envirocare, 2025)

A main reason NZ has tread so cautiously when it comes to gene editing is that the majority of New Zealand's exports are sent to countries where the cultivation and production of genetically modified organisms (GMOs) and genetically engineered organisms (GEOs) are permitted and unregulated, while less than 8% of all produce exports go to the European Union and the United Kingdom. (Spök A et al. 2022). It is reported that consumers purchasing premium New Zealand fresh food value the "100% Pure" brand identity (Kaefer, 2016). This marketing position has stayed the same despite some studies indicating that most value chain stakeholders believed no cross-over effect would happen and that increasing GM/GE crops in NZ would not affect the export of non-GM products. (Knight et al., 2005b)

2.7.1 Economic Impact

Currently in New Zealand, the Gene Technology Bill is set to be published in late 2025. What will be the economic impact on the organic sector? The Bill itself has been said to not consider the economic impact on the industry. (Hancock, 2025)

In an effort to answer the economic impact question, NZIER, on behalf of Organics Aotearoa New Zealand, has completed a report which attempts to quantify the market value of NZ's 'Clean and Green / 100% Pure and GE-Free' Brand.

The value of the brand was quantified through researching keywords and phrases like 'clean green image', '100% pure', 'organic', 'Non-GM', 'GM-free', 'New Zealand', 'brand', 'reputation' and 'value'. The report then proceeds to investigate the correlation between the New Zealand brand and the 'premium' value it currently adds to the Food & Fibre exporting market.

A few findings of the report were: it creates a 24% premium for its GE-Free export products and a 39% premium for the organic produce being exported. These prices were based on basic world prices in those respective areas. (NZIER, 2024)

Table 6 below displays the different percentage premiums that different products receive in different markets because of the clean and green New Zealand brand discussed above. The organic premium ranges from 5 per cent to 116 per cent, averaging at 39% as mentioned.

Table 6 Organic product premiums achieved across multiple produce types, taken from OANZ, 2024

WTP (%)	Attribute	Product	Market / Consumer Segment	Source
23%	Organic	Ground beef	California, US	Tait et al. (2018a)
10%	Organic	Top sirloin	California, US	Tait et al. (2018a)
11%	Organic	Ribeye steak	California, US	Tait et al. (2018a)
25%	Made with organic grapes (incl no GMOs)	Sauvignon blanc	California, US	Tait et al. (2018c)
31%	100% organic (incl no GMOs)	Sauvignon blanc	California, US	Tait et al. (2018c)
55%	Certified organic (incl GE-free)	Kiwifruit	Shanghai, PRC	Tait et al. (2018b)
51%	Organic	Yogurt	Shanghai, PRC	Tait et al. (2018d)
88%	Organic production	Apples	'Conscious Consumers', California, US	AERU (2023) and Tait et al. (2022a)
17%	Organic production	Apples	'Broad Considerations', California, US	AERU (2023) and Tait et al. (2022a)
104%	Organic production	Apples	'Strong Preferences', California, US	AERU (2023) and Tait et al. (2022a)
14%	Organic production	Beef tenderloin	'Animal Attentive', Beijing, PRC	AERU (2023) and Tait et al. (2022b)
33%	Organic production	Beef tenderloin	'Cultural Consumer', Beijing, PRC	AERU (2023) and Tait et al. (2022b)
116%	Organic production	Beef tenderloin	'Organic Oriented', Beijing, PRC	AERU (2023) and Tait et al. (2022b)
78%	Organic production	Beef mince	'Cultural Consumer', UAE	AERU (2023) and Tait et al. (2022c)
11%	Organic production	Beef mince	'Carbon Concerned', UAE	AERU (2023) and Tait et al. (2022c)
7%	Organic	Kiwifruit	'Healthy Me, Healthy Environment', Japan	AERU (2023) and Tait et al. (2022d)
13%	Organic	Kiwifruit	'Broad Considerations - Taste Driven', Japan	AERU (2023) and Tait et al. (2022d)
25%	Organic	Kiwifruit	'Safety Focused', Japan	AERU (2023) and Tait et al. (2022d)
15%	Organic farming system	Lamb leg	'Environmentally Engaged', UK	AERU (2023) and Tait et al. (2022e)
5%	Organic farming system	Lamb leg	'Cultural Consumers', UK	AERU (2023) and Tait et al. (2022e)
20%	Organic production	UHT milk	'Broad Considerations', Beijing, PRC	AERU (2023) and Tait et al. (2022f)
103%	Organic production	UHT milk	'Pasture Preferred', Beijing, PRC	AERU (2023) and Tait et al. (2022f)

24%	Organic production	UHT milk	'Broad Considerations', Shanghai, PRC	AERU (2023) and Tait et al. (2022f)
33%	Organic production	UHT milk	'Pasture Preferred', Shanghai, PRC	AERU (2023) and Tait et al. (2022f)
81%	Organic production	UHT milk	'Strong Preferences', Shanghai, PRC	AERU (2023) and Tait et al. (2022f)
8%	100% Organic Production	Sauvignon blanc	'Organic Origin', California, US	AERU (2023) and Tait et al. (2022g)
39%	**Average**	**Organics**		

New Zealand Organics is growing approximately 8% per year, which is slower than the global industry at 11-14% per year. The current market interest in organics may also be interpreted as an indicator of a potentially thriving future, as organic producers continue to perform strongly in international markets. NZ has been leveraging its clean and green image for over 20 years, and NZIER believe there is a premium derived from this brand.

The recent NZIER report also delved into the premium linked to just GM-Free produce (Not specifically organic) that NZ exports and linked a 59% premium in prices to the "New Zealand Clean and Green Brand". Based on the NZ Exports for the sector sitting at $54.6 billion in 2024 (Ministry for Primary Industries, 2024), hypothetically, if this premium were lost, it could cost the country $20.3 billion in export earnings each year. (NZIER, 2024)

The report also found that there was a premium linked to NZ being free from GE products that equates to 24% ($10.6 billion), although it was unclear whether this crossed over with the above premium or not. (NZIER, 2024)

Lastly, the report also looked at the organic opportunity if NZ was able to scale up its exports in this space at a premium of 39% could hypothetically equate to an improvement of $21 billion to the Food and Fibre Sector. Not to say that this is feasible on sector sector-wide scale, as switching over everything to organic would also affect how the country produces things and the costs to do it. (NZIER, 2024)

As a generalisation, a lot of NZ Food and Fibre exports are seen as premium or, in other words, sit in a better/best space on their exporters' retail shelves. (Mohammed, 2018). Goldberg and Knetter (1999) researched the framework called residual demand elasticity, which shows that a product that changes its market position can increase or decrease its substitutability or the chance of being directly compared to a different product in the market (Goldberg & Knetter, 1999). In other words, if NZ's premium organic product loses some perceived value, the product's value may drop in a consumer's eyes, changing its market position to now sit next to a competitor product in value and therefore price. Over time, driving the selling price down of these previously perceived premium products. The cost of producing this will not change, potentially even increase, as the importance of marketing becomes greater. (NZTE, 2024)

Countries around the world are seeing a steady increase in demand for products that are proven to be sustainable, made ethically, and have transparent supply chains. When we look at the Asia-Pacific region, where NZ is located, these demands are predominantly from younger buyers and women. A study done by Goedertier et al. (2024) suggests that in places or scenarios where people are more sceptical, it's important to show proof of quality and positive results. (Goedertier et al., 2024) Using this logic, aslong as New Zealand organics keep up strict checks and avoid GMOs, they should continue to earn higher prices. The organic industry in NZ can keep its edge, even if rules about genetic engineering change, by sticking

to strong certification, clear tracking, and showing real environmental and social benefits – as this is what the significant percentages of the younger generation (under 29) are basing their buying decisions around.

A contrasting view linked to the clean and green image. There is a concern that investing in organic systems and labelling products as organic, by association, highlights that other products are not organic (Jones & Mowatt, 2016). This re-emphasises the importance of how NZ communicates its brand image now and into the future; a clear message is crucial as the industry is at the mercy of a huge international market. NZ ranks 44th in exports per capita globally, speaking to a lot of competition out there that all want a bigger piece of the pie if given the opportunity (OEC, 2022).

NZ is potentially going through some significant changes to the GE landscape, which NZIER say could damage the current clean and green brand. What will happen to NZ's organic sector's growth trajectory and its ability to maximise the current opportunity being seen in the global organic market? This is the focus of this report going forward.

3 Methodology

This report is broken up into two parts: A literature review and semi-structured interviews with key agriculture industry stakeholders. The interview candidates were selected by their connection to either the Organic Sector in New Zealand, the Genomics sector in NZ, or a connection to the upcoming changes with New Zealand's GE Bill.

The literature review was a large part of this research project, starting with nationally published papers by scientists directly working in the GMO space to assess the potential economc impact of the GE changes in NZ. Due to the future being unsure and NZ potentially moving into an environment that hasn't been seen before, there was a significant number of international papers used as reference points, which provided insights into what things 'could' look like. Due to the nature of the project and the timeliness of legislation potentially changing, I needed to compare this to other countries' legislation.

The interviewees all agreed to the interview through the Kellogg Rural Leaders consent form; examples of this form are that they stay anonymous and don't have to answer any questions that they do not wish to, a copy of the interview questions is provided in the appendix. The use of Microsoft Teams was used to complete about 60% of these interviews as it has a recording function with can then later be transcribed and analysed. This means that interviewees were reachable from all around New Zealand. The interviews were carried out with four farmers (a mixture of organic and conventional), an organic grocer/on seller, and three scientists who have a good understanding of genetically modified organisms. One person in the international market access for NZ produce (Organic and conventional), and also two organic sector representatives. Once completed the analysis of the interviews to identify key themes was through the use of thematic analysis.

The purpose of getting a mixture of experts within the Organic Farming value/supply chain and also within what could be the GMO value/supply chain has resulted in some moments of very clear disagreement and in others surprising alignment. Going through this interview process has shown how important and topical the new GE Bill in NZ is and how driven people are to make NZ agriculture more successful. It has also shown the contrast of opinion, which is driven by the size of variability and the number of impacting factors related to this topic.

4 Analysis

Analysing the results from the 10 semi-structured interviews was like sitting on a seesaw and constantly jumping from seat to seat with the contrasting opinions, perspectives, and understandings. It is broken down into the five key themes that came through, which were:

- Opinion on the GE changes (Pros and Cons)
- Coexistence
    - The costs and who pays for it
    - Certification and label challenges
- Overseas Demand and Market Access
    - NZ GE-Free Status as a strategic brand
- Organic Sector Scale Limitations

4.1 Opinion on the GE Changes?

Most interviewees who have a connection to the Organic Sector were 'against' the country opening to GMOs being tested and farmed out in the environment. The main reasons were Co-existence risks, NZ Clean & Green brand impact, Cost vs reward imbalance and the importance of mandatory GE labelling.

The GE bill was direcly brought up in the interview questions which I think resulted in the bill submissions numbers becoming a strong theme. Bill Submissions are where an organisisation or members of the public have the opportunity to support or stand against proposed legislation changes. This action is completed through a bill being submitted to the government within the time frame allowed, this submission should have an opinion and recommendations included. Interview comments were made about how there were 15,000 submissions and 'only about 3% of people in support', followed up by:

'This sends a pretty big message'

That message is that there are a lot of people who are connected to the organic sector in some way and are really concerned about what the future looks like if NZ continues to move away from being GE Free.

The interviewees linked to the genomic modicifation community all had themed opinions that the current 'onerous process' was far too restrictive for the sector to create any meaningful discoveries or change. There were a lot of comparisons to how Australia and other countries do it, and the opportunities it has opened for the overall Food and Fibre sectors. Examples of traits to reduce methane emissions, nitrogen leaching and improved pasture persistence – A lot of environmental improvement opportunities were discussed.

Economic and environmental incentives are what drive a country to incorporate GMO farming into the agricultural industry. Most of the Global GM investment has flowed into the big crops (soy, maize and cotton) around the world; these are not big opportunities for New Zealand – this perspective was shared throughout most of the interviewees. There was also a consensus that the opportunity for NZ was in the pasture grazing systems the country uses. NZ has the most to gain from research and development in these systems, so therefore probably needs to be the one to lead the race. The fact that these systems have a base ingredient of grass species raised a large concern for accidental spreading from GM ryegrass, and once that starts, it would be very hard to come back from. Rye Grass often has an outcrossing trait which can be facillitated through pollin drift, if this occured it could result in contamination for a non GM crop.

An example mentioned was GM *Epichloë Endophytes; t*hey explained that these endophytes have a huge potential to help ryegrass persistence and "do not" produce sexual spores and are not found in pollen. The only way it can be found in a different location is by seed or plant movement.

Positive environmental impacts were a main driver to get this bill published; about half of the interviewees saw that as a real benefit to the country, not just the agriculture industry. The possibility of new processes or products that result in positive environmental change, one example which was slightly off topic was the change of an insect trait in wasps. The goal is to get these GM wasps to reproduce with the invasive wasp pest species and reduce the requirement for current insecticide use, but still remove the pest from the NZ ecosystem.

Overall, the people linked to the organic sector didn't see much or any value being added to their sector through the possible changes to the GE Bill, making it hard for them to get close to agreeing that 'some risk' was acceptable. It is important to note that the interviewees who had direct links to organics did understand that there was a possible opportunity through specific crop productivity and even introducing plant traits that results in a positive cllimate change impact. The majority constently used the caveat of 'at what cost' to other arms of the industry like Non GM and Organic.

4.2 Co-Existence

4.2.1 The Cost and Who Pays for it

In multiple interviews, the interviewee discussed the physical costs that could result from the potential publication of the NZ GE Bill.

Throughout the interviews, several scientists (all with a good understanding of GMO's) discussed who they thought should pay for the increased costs that come with the extra testing needed on farms, at the packing warehouses, at the border, or in the new buffer zones. Firstly, all of which agreed that a 0% threshold of contamination was impossible, and that was backed up by countries overseas and their position in this space.

There was agreement that the benefits were to be gained from either the GMO farmer, the community, or the country through environmental wins. A question put to them was, who should pay for these increases in costs, of which the answers were split nearly right down the middle. A marginal majority believed that if a farmer was taking the step to move to start having GMO crops on their farm then to do that, they should pay for the impact that may have on businesses already operating. On the other side of the coin, organics are being sold as a premium and in business to achieve a premium price for your product you have to do something different which normally costs more.

One scientist said:

> *' If organics is getting a premium, then it can't have someone else pay for its privilege of having that premium'*

A different scientist asked a question that, based on the above, are we saying that the

> *'With the cost of certifying organic as such that is it impossible to do it?'*

The above comment was backed up by thoughts from the Organic Grocer/café owner explained that yes, their business was doing well, looking at the past few years, but when it

came to looking specifically at thier organic produce range. They were worried that the increase in separation and certification costs to the farmer would flow through to the product and potentially price organics out of reach for many more consumers. As we know, it's hard to have a business if you don't have customers buying your product.

The Organic farmer/sector expert spoke in detail about how it will depend on how/if the GE Bill is released and will depend where some costs land. If buffer zones are required, then the cost of adjustment and yield impact will most likely be absorbed by the farmer. They mentioned there is an opportunity for any extra costings around tests that appeared to be covered by the government alongside the country's equivalency agreements with its exporting nations.

> *"Certification costs could rise, consumer trust might weaken, and organic products could become even more expensive – potentially shrinking the market."*

Another organic farmer explained it was not necessarily the introduction of changes like buffer zones, but more importantly, how he would be looked after if a contamination were to occur, and therefore, his certification and income were at risk.

Multiple interviewees from both sides of the industry explained that these changes should benefit the environment and not promote more chemicals to be sprayed on the land, or in other words, the environment should not pay for this. Examples were mentioned, like 'Round Up Ready Canola' and products like this should not be the goal of the bill.

There was a clear theme should be to mandate the focus towards human health and environmental improvement; the expectation is that rules and guard rails for these results should be in the bill. In other words for a medium-high risk GE/GM trial it must have a focus of either improving human or the environments health not specifically financial gain.

> *"We could put, you know, less insecticides, less fertiliser, get as good crops out of it, and then everyone wins."*

> *"You shouldn't be increasing those things like herbicides and insecticides; the change should mean these things are reduced"*

A theme was created when discussing an agriculture related gene modification: the majority agreed that an approval process should always assess whether a plant gene modification has the goal of either reducing herbicide, pesticide or fungicide application rates or at a maximum keeping the same. But cannot suggest increased use directly or indirectly which would need time and effort to analyse how this may occur.

4.2.2 Contamination Challenges

To begin with, the results to the question of 'whether coexistence between organic and GM is possible or not' were nearly evenly split between Yes, No and maybe which provided a variety of perspectives.

The interviewees who sat in a solid NO were mainly because their understanding of other countries that are attempting co-existence has had to allow an 'adventitious presence' allowance into their organic supply chain system.

There is an integrity cost here as farmers I spoke to firmly believe:

'If we have even a 0.01% of GMO's in our grass that's being grazed, to us that product should no longer be considered organic.'

This expresses the choice of the organic way of life; it's not just a business – it's a foundation of values and beliefs with a result of organic food or fibre. They also want to be able to provide a healthy and trustworthy choice for people that also value this.

The majority of interviewees were concerned about how realistic coexistence is in NZ and theyworried about what the expectations were going to be on the organic producer. Secondly, were these rules and guidelines going to be realistic, costly and most importantly - work properly? One example when talking about realistic policing/auditing of these changes and can these processes be upheld with confidence.

'Policing capabilities and that the system may rely too much on self-regulation, which can create interesting dynamics between neighbouring farmers'

The ones indirectly affected (Not organic farmers themselves), were mainly concerned about the cost to implement things like buffer zones or change operational processes to reduce contamination risk. Depending on their role, they felt there was either more cost coming their way therefore the consumers way or trade negotiations may get more complicated due to more checks required.

What happens when something does go wrong and there is contamination of an organic crop with GM material was an area that nearly every interview went to, even though there was not a question specifically targeting this. The organic farmers all mentioned words like 'fair' when it came to the process at allocating fault to a contamination event. It would not be fair for an organic or non GM farmer to spends excessive amounts of money to prove innosence especially if not all proticols were being followed by all parties. Once again expressing the need for a robust system with very clear expectations from its initiation or all parties that can be effected by one of these events.

5 Overseas Demand and Market Access

5.1 Global Demand and Consumer Trends

A common theme in most interviews was the idea that agriculture is a business, particularly in discussions about exports and international markets. A Market Access Manager stressed the importance of the country's decision regarding this issue:

'How is NZ going to compete?'

In other words, if the plan is to move away from being GE Free, what was going to be NZ's 'point of difference' in the market, and what was the new story that was going to be told? With New Zealand being such a small country and a small percentage of the global food and fibre sector, they explained that the most important thing is that it is the best or near the best at something, otherwise it could get forgotten. One farmer mentioned something that they saw as a risk, but also an opportunity:

'The lack of NZ national vision, if we don't have Clean Green / GE Free, who are we?'

Several interviewees discussed the increasing awareness of personal health, noting the significant growth of the organic and health products sector, particularly in international markets. One interview specifically said:

'It's the fastest growing multi-food sector in the world, period, and it's gaining momentum and not just from organic communities but from people with a connection to health sustainability'

Multiple people raised the idea of a world becoming increasingly aware of what humans should and should not be putting into their bodies. Speaking to an organic grocer who has worked in the big grocery chains, they have seen the change in buying behaviour and the demographics widening when it comes to purchasing healthy food. Despite the price premium, there is a growing demand for cleaner, more traceable food.

5.1.1 New Zealand's GE Free status as a strategic brand

When asked about what other factors should be considered, the majority of interviewees mentioned NZ's brand or story in some form. They are concerned that these changes may impact NZ as a country, and as an organic sector needs a plan to counteract any potential negative impact. It was clear that the interviewees linked to the science side of the conversation did not raise these concerns.

An international produce exporter of both conventional and organic products believes that there is a clear link to the buying decisions of other countries, as it helps secure the trust of international consumers. Meaning that if people in their position lose that bargining chip or competitive advantage NZ may sit itself more closely alongside other competing countries and lower its value make it harder to make 'good' deals.

One Exporter explained:

"GE-Free is part of NZ's wonderful, beautiful image, and if we lose that, our market access and reputation could be affected"

Many of the interviewees had the opinion that it would be harder to sell organic produce overseas if NZ lost the GMO-Free status, as they believed it had a direct link to the NZ organic produce value proposition overseas.

When discussing the NZ organic sector's market access, NZ is working through the new organic standards. They also said 'coming up with these new organic standards (Organic Product and Production Act 2023).

'It's going to create a lot of new opportunities that we haven't had before with certain markets in terms of recognition and equivalency agreements. But will the removal of GE Free status counteract all of this?'

There was however, a range of perspectives. A scientist used the example of premium-priced lamb (not specifically organic) and the fact that after Australia moved away from being GE Free, it didn't seem to impact any premium the country had. They mentioned that the price premium gap that NZ had has gradually become smaller.

'If you look and the price premium between NZ and Australia, it's actually been eroded over the past 20 years, so if Australia had lost its image, or our clean green image / GE free image was strong. You would think we would see it go the other way.'

Similarly, another respondent referred to Canada's experience, suggesting that genetic modification did not significantly harm market perception: This interviewee suggested a close connection directly linked to the same debate in Canada when that government was working through a similar GMO bill process, commented:

The "Clean & Green" image is invoked in virtually every country considering GM agriculture. New Zealand does, indeed, enjoy a positive image overseas, but GM neither diminishes that wholesome image, nor results in any significant trade loss"

An organic viticulturalist had an interesting point of view on the GE Free/ NZ Clean and Green branding. Surprisingly, it had more of a positive spin on moving towards having GE in the country. Firstly, they explained that their perception is that:

'NZ is doing so well because it's green. So Organics doesn't get the wrap it deserves or potentially the help. Whereas overseas, it's cranking along, it's one of the fastest growing industries, but in NZ we're shrinking.'

Here, the interviewee was talking about the potential recognition NZ organic certification will get on the international market if the standards and processes are performing as expected and there aren't any mistakes. I found this an interesting idea. Has there been an overseas perception that in some roundabout way NZ's Clean and Green image has lumped non organic really close to organic? Meaning when international consumers are buying NZ food and fibre products, they think it has followed similar processes to an organic standard and therefore the benefits and inturn drives a market premium? Is being GE-Free perceived the same or similar as organic internationally?

The tension between progressive regulation and brand integrity was evident, the two distinct schools of thought were:

- Brand Protecters, people who see GE-Free as central to NZs value proposition and believe removing it would undermine export trust and identity.
- Innovation Realists, people who argue with credible regulation, scientific rigour and transparency believe NZ can modernise without to much consideration for reputation.

5.2 Organic Sector scale limitations

The grocer that was interviewed explained that NZ is small and full of even smaller organic producers who often aren't more than a few hectares. They explained that currently, the country doesn't have the scale required to access more international markets, and without the likes of Ceres Organics and Chantal Organics, the industry would be struggling even more. These businesses both buy local growers' produce and brand it but also bring in overseas organic produce that is not grown here to sell to the NZ consumer.

This scale obstacle was reiterated by other Organic sector experts, and one of the biggest struggles the industry has is making itself more resilent, some would argue, less resilient to macro implications.

'We need to be filling up more containers'

To increase scale, you need more organic transition; you need more people wanting to go down the organic journey and way of life. On top of choosing the organic practices for a better environment, it needs to be a sustainable business, and the upfront costs also need to make business sense.

Human behaviour was also discussed, and people often will act when something is easy. This topic is linked to how easy it was to transition your farm from non-organic to organic. An industry expert explained that, based on their experience in the sector for multiple decades, they have seen scores of farmers who were much 'closer' to being certifiable than they thought they were. A main obstacle is that the sector does not have a really clear pathway

from conventional to regenerative to organic farming, they explained that there is a real opportunity here.

Different countries have different priorities at any one time; the priorities are normally based on the nation's needs, whether it be economic growth, citizen well-being, or sustainable goals. An industry expert talked about the countries that really succeed in organics are the ones organised and have it directly linked to their sustainability targets.

> *'Europe have subsidies to support efforts in achieving its goal of achieving 25% land in organic use.*

This comparison highlights a key challenge for New Zealand — the absence of an integrated national policy linking organics to environmental, economic, and well-being goals. Without clear government direction or incentives, growth in NZ's organic production relies heavily on individual conviction and private-sector initiative, rather than coordinated national strategy.

6 Findings and Discussion

6.1 New Zealand's Place in the Market

6.1.1 Context and Positioning

New Zealand is a small country in terms of physical size, population, and overall exports within the global food and fibre sector. It exports nearly $60 billion in food and fibre every year, which for the country itself adds nearly 5% towards New Zealand's annual GDP. Feeding one country's own population has always been a priority for governments and subsequently the related sectors like the food and fibre sector. Looking to the future, countries are considering the peak population and calculating where that food is going to come from. GM cropping was initially introduced to increase scale and yields in areas to produce more output on the same amount of agricultural land. Since 2017, the global peak population forecast has decreased from being 11.2 billion in the year 2100 to now being only 10.3 billion, 20 years earlier at 2080. (United Nations, 2024). This drives the question: Is intense GM high-yield cropping as important now as it was? Now that the peak population forecast of the world has dropped by nearly 10%. Where in the market does NZ want to play and does that position have a sustained opportunity for its unique offering going into the future.

6.1.2 Premium Export Focus and Organic Share

As a generalisation, a lot of NZ Food and Fibre exports are seen as premium or at least sit in the Better/Best space on our exporters' retail shelves. (Mohammed, 2018) It has been a strategic focus of the industry to position our exports increasingly in the premium market as opposed to the lower quality, higher quantity market. Examples of these are: dairy, red meat, kiwifruit, apples, vegetables and wine. (Soliman & Greenhalgh, 2020)

So, if we look at the $60 billion of exports and the majority being generalised as premium products as that is where NZ's strategy sits as a country. Diving slightly further into these export numbers, premium certified organic products equate to $606 million (just over 1%) of this annually, some could argue a very small piece of the pie. What are we risking if we lose or move away from the high quality premium pricd export offering?

6.1.3 Global Growth and International Comparisons

The growth and opportunity of the Certified Organic market globally are impressive. NZ's $606 million in 2024 has increased 44.3% since 2020, which is significant compared to most other sectors but surprisingly slower than the global rate of 11-14% per annum. Organics is currently the fastest-growing multi-food sector in the world, even though you could argue it's still only a small piece of the puzzle in New Zealand, especially with only holding 0.6% of agricultural land in organic production versus a country like very organic-focused Australia, who sit at 9.5%.

The Global Organic market is currently worth US$250-280 billion and forecasted to be worth US$650 billion by 2033. The growth is being driven by consumer demand for safe, healthy and environmentally responsible food. An industry that is forecasted to double in less than 10 years is an opportunity that should be front of mind for any business and, in turn, potential GDP growth for a country.

In Europe, they are providing subsidies to their organic farming operations for two main reasons

- Organic farming is a vehicle that supports their 'why' and helps them reduce the negative impacts of agriculture on the land, is in line with their target of making 25% of the agricultural land Organic by 2030.
- Also, it is an industry that is growing incredibly fast, so being at the forefront of this will create more opportunities and returns.
  (European Commission, 2020)

In Canada, they are in a situation where they need more organic farmers but have struggled to transition nearly any over the past four years, with domestic production not increasing in that period.

As a country they are:

- Heavily invested in GMOs, 22% of the agricultural land.
- Not focused on domestic organic production as much, the overall organic market has grown to the fifth biggest in the world now through the demands of the consumer wanting healthy, nutritious and sustainably sourced food. Because they don't have the farmers, nor the infrastructure, they have to import a significant portion.
- The growth in the sector has grown from $6.4 to $9 billion total market over 2020 to 2024, but there has been no increase in domestic production, resulting in a heavy reliance on other countries and importing organic products.
- Different labelling requirements; Organic labels allow up to 5% threshold of adventitious presence of GMO, and there is no need for GMO food to be labelled differently from Non-GMO food.
  (Canadian Organic Growers, 2025)

6.1.4 Scale and Access Challenges

The scale of a business impacts a lot of things, for example, its buying power, with most of the costs associated with running that business. (Johnson, 2023). Where the NZ Organic Sector struggles is its size in both organic hectarage and turnover, which impacts not just costs but also market access.

- Freight is a significant piece of all exports, especially when you are an island nation quite far away from most of the market you're trying to export to. If the organic sector cannot efficiently fill containers, then it will not be maximising the potential profit available, which impacts the Organic Suppler (farmer or grower).

- Only having X quantity available to sell may also mean that a potential customer does not even consider purchasing from you because they are looking for a larger quantity, but also sometimes the convenience of one supplier.

Ideas provided through both the literature review and the interviews on how this problem could be tackled were to increase the transition rate of people into Organic farming operations by making it look like a more attractive and less 'risky' business opportunity.

One tactic of making an organic farming business a less risky investment is to provide more tools to help that business. We have discussed that consumer behaviour is changing towards environmentally focused businesses and products, so enabling an organic product to be recognised for this easily could support its market success. NZs Toitu Envirocare / CarboNZero certification shares that a business is carboNZero, which is a fantastic selling point domestically and internationally. Organic farmers, by nature do a lot of very low-carbon practices, is there an option for this certification be set up in a way that's easier for an organic farmer to achieve?

6.2 New Zealand's Big Brand Plan

6.2.1 The Power of Clean Green / GE Free Brand

There are several different opinions out there related to the value of the New Zealand inc / Clean and Green / GE Free branding. It is fair to say that New Zealand has marketed itself incredibly well over the past 20+ years by positioning itself in this space and not just for the Food and Fibre Industry, but Tourism as well. (NZIER, 2024)

There is a fair argument to the fact that the perception of NZ's Food & Fibre trade quality may be impacted by such a significant change in approach to Genetically modified Organisms and how they are researched and contained. Throughout this project, there has been both research and opinion shared for and against this argument.

6.2.2 Brand Risk, Price Premiums and Competition

This report looks at the current organic premiums being achieved in places, for example, the organic apples getting an 88% premium in California. That premium is explained through the NZIER report, having a direct link to NZ's current brand and therefore potentially getting negatively impacted as and if that brand changes. This may result in those apples holding less perceived value by California and push them to look at a competitor such as an Italian Organic apple, for example (Biosuditrol, 2025). Now, in California's eye, there are two comparable apple options. A natural supplier response to this is to lower their selling price to ensure they can still move the quantity required. These negotiations will flow down the value chain and, in the end, will impact the organic farmer either by a reduced price or not buying the product at all.

Earlier, the report discussed how the NZ organic sector is already considered quite small globally and with that comes some vulnerability. The more competition the NZ organic exporting industry receives, the more effort it needs to put in to separate itself to ensure its products have easy access into and demand from the market. Simon Sinek in his book 'Starts with Why' speaks to the importance of a leader/organisation understanding 'Why' they do what they do, and if this is understood, people and customers will follow because they relate on a deeper level (Sinek, 2011). A farmer who was interviewed explained that they felt unsure where NZ's 'North Star' sits regarding what NZ's identity as a country is, where it is heading and most importantly, how.

6.2.3 *Redefining NZ's Identity and Communicating Certainty*

NZ's Clean Green brand was delivered largely on the back of NZ's stance against nuclear energy and genetically modified organisms in the 1980s (Insch, A, 2016). So if NZ moving away from being GE-Free is going to bring some confusion to the export market with regards to the perception of NZ's Brand, you could say it is very important that NZ communicates this carefully with those customers.

So whether NZ moving away from being GE-Free impacts views on NZ's exporting brand or not, it is sensible to go through the motion and mitigate potential impacts on the Organic Sector. It is important to understand the potential symptoms, the potential effect of any action (cause) before doing it, so that an organisation is best situated to mitigate any potential negative effects.

The possible symptom that could arise is that NZ's exporting countries lose trust in the quality of the Food & Fibre products that are currently linked to the Clean & Green branding that the country holds. The product may then lose some perceived premium value, lowering it down the value chain, so in the exporter's eyes, it now sits next to a competitor's product, one that it was not directly compared to before (Goldberg & Knetter, 1999). If there are more similar/comparable products on the market, it makes it harder to individualise them and get the consumer to choose a specific one and not just choose the most cost-effective option.

The opposite of confusion is certainty, meaning that NZ will need to communicate its brand and instil clarity and certainty about who it is as a country in the Food & Fibre sense and 'why' it does what it does. It will need to do this alongside the results of the GE bill and in whichever form that gets published. This is not an easy task, as on one side the country is becoming less clean and green (based on its initial stance), and on the other side, it is trying to tell its story that holds the environment at the forefront of its values and beliefs.

The question of 'timing' was raised during the interview process, meaning, during a time when an industry is growing faster than most (Organic), NZ is making changes that may interfere with its chances to grow in line with the global trajectory.

6.3 Coexistence, Contamination and Risk Management

6.3.1 *Coexistence Realities and International Context*

It is evident through the allowance of adventitious presence (technically unavoidable) GMO thresholds in countries further along this journey than NZ that it is near impossible for GMO and Non-GMO farming to coexist with a 0% rate. An Organic Farmer interviewee responded to this idea, 'Well, it's not Organic then,' raising the question of how many other incumbent organic producers feel a similar way. You could argue a lot, as 97% of submissions to the GE Bill were opposed. This raises concerns about how the group will respond, hoping it doesn't deter suppliers from staying in farming, as the sector needs them all.

Several countries' legislation states you cannot label something organic when it contains GMO's unless it is below the threshold of 0.9% in the case of the EU. Canada is different again; it holds a threshold of up to 5% of GM material permitted under an organic label, which is interesting, as most other countries hold a dramatically different stance (Caradus, J. R. 2025). When looking at the Top 10 Organic and GMO coexisting countries, Canada has the second-highest percentage of total agricultural land use being used as GMO crops (21.2%) (Sánchez & Campos, 2021). They also do not have specific laws about labelling GM foods differently;

they are labelled like any other food because the safety assessments completed have found them to be as safe as any other food (Health Canada, 2022).

6.3.2 *On-Farm impacts and Risk to Certification*

The technically unavoidable contamination is difficult to prevent and to reduce the chance of it occurring, farming practices will need to be changed, for example:

- Buffer zones established, meaning that a portion of the farm is no longer sold at the organic premium and therefore a decrease in revenue.
- Planting/harvesting times can sometimes mean a farmer is not able to plant at their preferred time or when the conditions are at their best.
- Cooperation agreements require cooperative people, of whom you can hope your neighbour is and that they follow what they sign.
- Machinery cleanliness is paramount, meaning extra cleaning, for example, you will need to clean it after you harvest the buffer zone and before you use it on an organic crop.
  (USDA, 2025a)

During several interviews, it was evident that none of the farmers or businesses impacted by the increase in costs mentioned above were excited about them. But there seemed to be more concern targeted at the change in risk element of their business due to the link between contamination and decertification. There were multiple comments about how crucial it is that a clear process for exactly what happens with contamination and how protected the organic farmer is in all possible scenarios. They spoke about how imperative it was that the process was 'robust and fair' and that nothing was left to interpretation. Including a clear re-imbursement structure and recertification plan that gives a farm the best possible chance to regain its consumers' trust, continue producing and being profitable.

6.3.3 *Policy Solutions and Future Opportunities*

Within the international market, trust is very important, and the risk assessment is changing with the chance of GMO contamination and products getting stopped at the border, with huge potential market access issues. We saw what happened with a chemical that NZ considered 100% safe, but China viewed it differently, and it brought the trade to an immediate halt and forced a change in production behaviour. The country's reputation will most likely be hurt and potentially irreparable.

A person looking to move their operation or invest in organic farming would want to know exactly the risks and the rewards, and if these are ambiguous or unclear, then this could really impact their decision to transition and apply for certification. To be a part of this growth trajectory that the organic industry is on, NZ needs more scale, more organic farms and farmers.

This report has discussed the scale of NZ, the brand and its value, as well as the opportunity of the global organic sector as it is forecasted to hit $650billon by 2033. One way that the Organic sector and the NZ government are trying to support the export opportunity is through establishing more international equivalency agreements by publishing the organic standards bill. An equivalency agreement reduces duplicate environmental regulations/checks required for an organic product at the border. It allows countries to trade certified organic products with confidence and trust that their standards align. The more of these the NZ organic sectors has, the more access it has to different markets and the less impact a less valuable clean and green brand will have.

7 Conclusion

New Zealand's position in the world of organics is full of potential, but it's not without headaches. Even though it is small and doesn't have the largest organic export numbers, it has managed to earn a premium for these exports. That's largely due to its clean and green reputation and a history of being trustworthy when it comes to quality and standards. As organics get more popular around the world and in New Zealand itself, there's a real chance for the sector to grow, especially as more consumers look for food that's healthy and gives back to the environment.

But there are a few big things holding it back. To begin, it currently doesn't have the scale: its farms are small, there isn't a large amount of land in organics, and to freight products from an island country so far away is never simple or cheap. It means New Zealand struggles to compete when it comes to volume and can't always meet big international orders easily. On top of that, the risks and hurdles for farmers switching to organic are daunting. A lot of conventional farmers are closer to certification than they think, but confusion and a lack of clear information slow everything down. Other places, like the EU, have done a great job, but with direct government support have supplied subsidies and given farmers a clear path to make the switch—maybe there are some lessons for New Zealand.

How New Zealand is seen overseas is also important. Being known as clean and green, and GE-Free, has helped it stand out and charge more for what it sells. Any changes to this, like new rules around GMOs, need to be handled with care and explained carefully, or it risks losing the trust it has built with it's trading partners. With global competition heating up, making sure its identity is strong, clear, and honest will be key if it wants to keep getting those premium prices in organics.

Rules and regulations are also a crucial piece to this puzzle, especially when it comes to certification, the risk of contamination, and aligning standards with NZ's organic exporting nations. Organic farmers in New Zealand really worry about things like GMO contamination and what happens if there's an issue; no one wants their certification at risk because of something out of their control. What's needed are transparent, straightforward rules that cover how risks are managed, how farmers get reimbursed if something goes wrong, and how they can get recertified. That sort of clarity gives everyone more confidence to get involved and invest in organics. Aside from an environmentally beneficial way of life, people seeing Organics as a smart business opportunity as well will move the dial.

So, it is at a turning point. The global organic market is set to nearly triple in the coming years, and if New Zealand wants a bigger slice of that pie, it needs to tackle its scale issues, help more farmers make the switch, protect its brand, and keep its rules strong and fair. If it gets behind this with the right investment, government backing and a future-looking food and fibre sector, then New Zealand can boost its share of the organic market and continue to be seen as a world leader in sustainable, top-quality food and fibre.

8 Recommendations

New Zealand is at a crossroads in the organic world, with on one hand we are seeing amazing opportunities and incredible growth, and on the other, the country is going the significant changes with the GE Bill going to readings. Both the organic sector and government bodies must work together, firstly to ensure a minimal impact of legislation changes, but also to empower NZ organic farmers and growers to succeed domestically and internationally.

8.1 To Stakeholders

1. Develop a Clear Transition to Organics Program:

Establish a well-communicated, government-supported (MPI) pathway for conventional and regenerative farmers to transition into organic production. This should include clear information, technical and operational support structures, public events and practical guidance to make the process less daunting and more attractive for farmers considering organic certification. This program should be based on the successful United States Department of Agriculture - 'Transition to Organic Partnership Program' (TOPP).

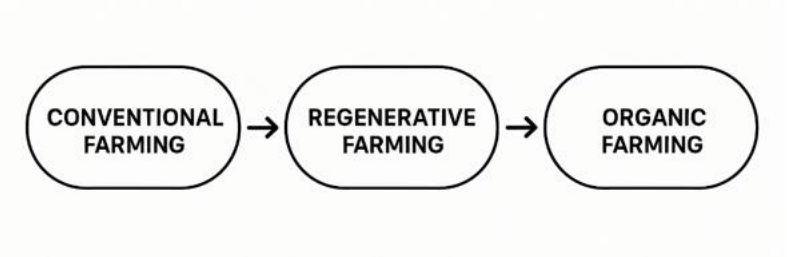


Figure 11 Organic Farming Transition flow chart

2. Enhance Government Support :

The Government needs to directly include organic farming in the CarboNZero Toitu certification, or at the bare minimum, create a fast-track option. Toitu certifiers Asure Quality are already Organic certifiers themselves, a great opportunity for them to streamline and combine the auditing process where possible. This will allow more Organic farmers to achieve the CarboNZero Toitu certification more easily and strengthen their offering to the market.

3. Protect the Organic Sector from Risk through the GE Bill changes:

The NZ government should set up straightforward, independent rules to deal with GMO contamination when it occurs. This includes making sure farmers know how they'll be reimbursed and how recertification works if required. By doing this, organic farmers will have more confidence and protection, which will help the organic sector stay strong and attract more people.

- Independent regulator
- Enforced Spatial and Agronomic Separation (Buffer Zones, Flowering times and pollen/seed containment plans)
- GMO contamination liability regime, a simple independent claims pathway to GMO operators or their insurers to prevent a dragged-out process and irreparable damages.
- GMO Operators to pay a levy-funded compensation fund to support scenarios where fault is uncertain, but damage is obvious.
- GE or GMO product labelling to be clear in NZ market to ensure the consumer has an informed choice. This will drive the conversation of "where is my food coming from?" and remind them that there are different production methods.

4. Control the Narrative on New Zealand's Brand Identity:

There is significant concern about the potentially negative impact of NZ not having its GE Free status soon. Sometimes, the best defence is offence. If New Zealand's GE-Free status changes, MPI, the Ministry of Environment (MfE) and large private business exporting stakeholders need to proactively manage and communicate the country's 'refreshed' food and fibre brand to overseas markets. Ensure trading partners understand the continued commitment to high standards and environmental stewardship to maintain trust and premium pricing for organics. A Marketing campaign similar to the 'NZ 100% Pure', or more recently Beef and Lamb 'Taste Pure Nature' that incorporates NZ Organic.

To build and market a campaign like this that really works overseas, especially with the younger generations, it must be authentic and credible. It needs to be backed up with evidence of environmental performance, sustainable practices and ethics. Another crucial aspect is that as much of the country as possible needs to be 'singing the same song' and sharing the same message.

The actual rollout of a marketing campaign this size would need to be supported by a well-known professional marketing firm that is accustomed to the world stage. I did have an idea to talk about how in 'We live in Nature, We protect Nature, and we innovate with nature'. Clearly highlight New Zealand's integrity and emphasise on traceability and origin to build trust in premium food markets like Organics.

5. Expand International Equivalency Agreements:

To reduce the reliance on brand or reputation it is necessary to have a contract in place. The NZ government needs to really push to get the Organic Standard bill completed and in a form that allows it to acquire as many equivalency greements as possible. The only way it does this, is if its efficiencies in organic production and packing are balanced with the expected standards of it's potential exporting customers.

This will reduce trade barriers and, like extra quality or traceability checks at exporting borders, it will allow our organic products to be more trustworthy, be traded faster and with less oversight, resulting in more trading being done. It will be up to our Export trade experts to go out and set these up sooner rather than later. If there is too much of a gap between the world hearing NZ is no longer GE FREE and a new contract being locked in, there may be opportunities lost.

8.2 To The Organic Farmer and Grower

Become an expert on GMOs and the legislation.

The average organic grower, having a decent understanding of GMOs, equips them with the knowledge to navigate evolving regulations and market requirements. With a deeper expertise in GMOs, organic farmers can better engage with independent claims pathways to address potential contamination issues, ensuring timely access to compensation and reducing

legal uncertainty. It also may best prepare them to prevent these issues from occurring in the first place, which is the best case for everyone.

Be a leader in your organic community and seek out information, share it to better prepare your fellow farmers, too.

Ultimately, by becoming experts on GMOs, organic farmers can proactively mitigate risks, adapt to industry changes, and strengthen both their own operations and New Zealand's brand identity in global markets. The world will know that NZ is no longer GE Free. The next best thing is having integrity in everything sector does and preferably not having contamination issues arise, as this can hurt its reputation.

Know your local area

For an organic farmer, being familiar with their local area involves being aware of the presence and locations of any GMOs grown nearby. This serves several purposes:

- Enables the organic farmer to reach out to the GMO farmer, build a relationship and get an understanding of what their plans are with GMO crops. Once the crop type is understood, further study would identify all of the possible ways contamination could arise, e.g, Planting time (pollen), harvesting machinery route or where best the buffer zones should be located.
- It will also create an opportunity for the organic farmer to work cooperatively with the GMO farmer, as contamination is only a headache for them as well. The farmers would figure out how they could best work together to prevent impacting each other's neighbouring farms.

9 Limitations

Limitations of the research project included:

- Quantity of Interviews: Only 10 semi-structured interviews, even though they had a variety of roles, connections to the topic and perceptions of the GE changes, the same size could have been bigger to provide more insight.
- Interviewee Location: Only people in NZ were interviewed when a significant amount of the literature was based on overseas findings. There is an argument that having overseas interviewees could add valuable insight.
- Data Gathering Method: Surveys were not used but could have resulted in a large reach of insights.

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10 Appendix - Interview Questions

1. What's your role in the agri-food sector, and what is your current understanding of Genetically Modified Organisms in relation to farming in New Zealand?

2. What is your understanding of the global Organic market, and where does NZ sit?

3. What's your view of the proposed gene technology changes?

4. What impacts—positive and negative—do you see these changes having on farming in NZ?

4. Can organic and GMO farming coexist in NZ? Why or why not?

5. What Changes in this bill will impact your business and how?

6. From your perspective, what do you see as the most important factors for making sure that all farming systems we use in New Zealand—whether they're organic, GMO, or conventional — continue to be trusted and successful both here at home and in our export markets?

7. If you were an organic farmer right now that exported 50% of your produce overseas, what would you be most worried about with this bill getting published.

8. How do you think the organic industry could use GMO's?

9. Is there anything else you think should be considered in this discussion?