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Creating Markets, Creating Opportunities

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Foreword

Dear Readers,

I am delighted to present a new report on New Zealand's food safety system. This report was developed as part of IFC's advisory activities to support and strengthen food safety systems in emerging markets and we hope this report proves useful to businesses and policymakers alike.

Food safety not only protects consumers; it helps businesses build their brands and opens up new opportunities in domestic and export markets. But introducing robust food safety systems is not always easy. We chose to profile New Zealand because it provides examples of best practices that policymakers and business leaders in other countries may find useful to adapt for their own contexts. New Zealand's food and agricultural industries are central to the country's economic stability. Approximately 80% of food grown in New Zealand is exported, something that is possible because of the well-regarded food safety system. Understanding how New Zealand created such a well-functioning and successful food safety system can help reformers elsewhere by providing concrete examples and experiences that can inform decision-making and plans for food safety programs.

I am certain that this report, "Food Safety Reforms, Learning from the Best: The New Zealand Food Safety System in Case Studies," will become a useful, practical guide for everyone who is involved in developing, maintaining or improving national food safety systems.

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Acknowledgement

The preparation of the IFC publication “Food Safety Reforms, Learning from the Best: The New Zealand Food Safety System in Case Studies” has involved the participation and efforts of a team of dedicated people and organizations.

The IFC Global Food Safety Advisory Platform has recognized the Facility for Investment Climate Advisory Services for its generous support in funding this work.

Many thanks to New Zealand G2G for its assistance in the development of this publication.

The overall project has been managed by Kateryna Onul, Policy and Regulatory Lead, IFC Food Safety Advisory, with the help of a consulting team atASUREQuality Ltd.

Special acknowledgment to Natia Mgeladze, Global Lead, IFC Food Safety Advisory, for her advocacy and encouragement of this initiative.



Introduction

IFC and global food safety

IFC — a member of the World Bank Group — is the largest global development institution focused on the private sector in emerging markets. It works in more than 100 countries, using its capital, expertise, and influence to create markets and opportunities in developing countries. In fiscal year 2020, it invested \$22 billion in private companies and financial institutions in developing countries, leveraging the power of the private sector to end extreme poverty and boost shared prosperity. For more information, visit www.ifc.org.

Developing agribusiness

IFC has made agribusiness a priority because of the potential of agribusiness for broad development impacts and an especially strong role in poverty reduction. IFC combines investment and advisory services to support the sector in addressing the growing demand and escalating food prices in an environmentally sustainable and socially inclusive manner. IFC invests across the agribusiness supply chain, from farm to retail, to boost production, increase liquidity, improve logistics and distribution, and expand the access to credit among small farmers. The IFC approach in agribusiness is comprehensive and covers the entire value chain. IFC aims to bring land into sustainable production, enhance productivity by transferring technologies and proven practices, and make the best use of water and other natural resources. As urbanization continues, IFC works to support efficient supply chains to bring safe, affordable food to cities. To help clients prefinance inventories, seeds, fertilizers, and chemicals among farmers, IFC offers working capital facilities. It is helping clients maintain competitiveness, upgrade sanitary and food safety standards, and expand market access. With both the private sector and the public sector, it pursues investments in infrastructure — including in ports, warehouses, cold storage, and telecommunication — that can facilitate trade and reduce costs. To reach small farmers and rural enterprises, particularly in low-income countries, IFC is working with trading companies and financial intermediaries, helping channel financing and advisory services effectively.

The IFC global food safety platform

For more than 15 years, the IFC global food safety platform has provided high-quality professional services to help more than 200 companies apply international food safety standards and adapt sustainable business models.¹ IFC support includes food safety assessments and staff training in the private and public sectors, as well as guidance in obtaining international certification. Improved food safety is helping IFC clients meet regional and export market requirements, attract investment, realize cost savings, and strengthen brands. The twin goals of the IFC global food safety platform are healthier balance sheets and high-quality food on plates.

Purpose of the case studies

“Food Safety Reforms, Learning from the Best: The New Zealand Food Safety System in Case Studies” is a continuation of a series of IFC knowledge management publications aimed at sharing best practice with experts involved in reforming national food safety systems.

¹ For more information on IFC food safety advisory services or questions about this publication, contact Natia Mgeladze, Program Lead, at nmgeladze@ifc.org, or consult “Global Food Safety Advisory Program,” International Finance Corporation, Washington, DC, <http://www.ifc.org/foodsafety>.

This publication is focused on New Zealand's experience with its national food safety system, which is widely acknowledged as one of the best in the world.

Food production and, especially, food exports contribute significantly to New Zealand's gross domestic product. To develop its successful food export program, New Zealand established an all-encompassing food safety system that is recognized globally. How has it accomplished this?

First, New Zealand is a member of the Codex Alimentarius Commission and regularly takes part in international food safety forums. The relevant legislation in New Zealand has been developed based on codex guidelines and overseas market access requirements.

Second, education and training programs have been launched in the country to support the legislation. These programs embody the latest scientific knowledge on food safety. Relevant information is readily available from the Ministry for Primary Industries. The distribution of information commenced well before the legislation was enacted. Indeed, the process included extensive community and industry consultations to formulate the legislation.

Scientific initiatives have also been undertaken, such as the New Zealand Food Safety Science and Research Center, at Massey University in Palmerston North. This center joins with seven science research partners to form a virtual research center network. It is funded by both the government and industry.

Third, New Zealand operates under a regulatory model framework consisting of a regulator, a verifier, and an industry operator. The New Zealand approach to food safety highlights the importance of investment and collaboration among all relevant parties, including government, food businesses, and organizations supported by industry.

Fourth, there has been widespread adoption by local food producers of international food safety programs recognized by the Global Food Safety Initiative (GFSI), such as Food Safety System Certification (FSSC) 22000, GLOBALG.A.P., and BRC Global Standards. This has provided New Zealand producers with access to large international customers.

All these features have formed a key part of New Zealand's integrated food safety system and allow consumers to be confident about the consumption of any food products, including kiwifruit, avocados, apples, honey, wine, meat, seafood, infant formula, and other dairy products.

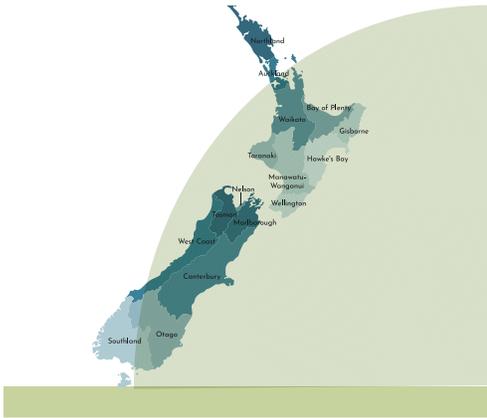
Organization of the case studies

This publication offers 13 case studies that explain the features of the New Zealand food safety system in detail. The case studies cover the structure of the system and the supporting legislation. It provides a walk-through of the relevant history of the New Zealand meat industry and the creation of a mature food safety system for the meat and horticulture sectors. It supplies an additional focus on risk assessment, enforcement, and inspections, as well as on food traceability and principles of food safety management.

The publication is associated with a self-paced learning course, "Food Safety Reforms, Learning from the Best: The New Zealand Food Safety System in Case Studies," developed by the IFC Global Food Safety Advisory and designed for experts involved in processes aimed at improving national food safety systems. The course provides a wealth of information on national food safety systems and shares links to tools that are used in New Zealand to achieve great results. The course is available at: <https://olc.worldbank.org/content/food-safety-reforms-learning-best-new-zealand-food-safety-system-case-studies>



An introduction to New Zealand and the factors that led to its food safety system



An introduction to New Zealand and the factors that led to its food safety system

INTRODUCTION

New Zealand is located in the South Pacific Ocean. It consists of 2 major islands and a smaller Southern-most island. Its temperate climate is well-suited for pasture growth and the farming of cattle, sheep, pigs and a variety of horticultural produce.

The food and agricultural industries are central to New Zealand's economic stability; in 2019, the food manufacturing industry provided \$11,135 million worth of New Zealand's gross domestic profit, while the agriculture industry provided a further \$12,660 million¹. Approximately 80% of food grown in New Zealand is exported, this is made possible by a robust and well-regarded food safety system.

The New Zealand food safety system developed as a result of refrigerated shipping and export of meat and dairy products. Initially food safety concerns were centered around the export market, with the New Zealand government inspecting export producers to ensure food safety as early as 1888. This concern and consequential inspection process gradually filtered through to products for domestic use.

Presently, New Zealand food safety operates under a regulatory model framework, covering all areas of the food industry. The model applies to produce intended for both domestic and export markets.

Prior to the adoption of this model in the 1990s, the New Zealand government operated under a 'command and control' system with a high level of government intervention in food safety. Under this system, the New Zealand government acted as "the rule maker and enforcer but also taking responsibility for ensuring product safety"², conducting manual inspections of food manufacturing premises. The onus of proof of compliance or non-compliance to food safety regulations lay with the government.

As the food industry grew, this proved to be a costly and complicated undertaking, with little or no allowance for innovation or self-regulation at an operator level. These factors coupled with an international focus on risk management systems such as HACCP, led to the adoption of the regulatory model framework for the food safety industry. In 1996 an Independent Scoping Review Team was set up to complete a strategic review of the Ministry of Agriculture and Forestry (MAF). The review team recommended the implementation of a regulatory model³.

¹ "Which Industries Contributed to New Zealand's GDP?: Stats NZ," accessed February 26, 2021, <https://www.stats.govt.nz/tools/which-industries-contributed-to-new-zealands-gdp#broad-industry>.

² NZFSA Public Information Paper, April 2008, "The Regulatory Model: An Explanation," <https://www.mpi.govt.nz/dmsdocument/22075/direct>.

³ Cherie Flynn, "The Optimal Regulatory Model," October 10, 1999 <https://www.mpi.govt.nz/dmsdocument/25931/direct>.

The model is made up of the regulator, the verifier, and the industry operator

- *The government creates food safety policies or Acts. These Acts are administered by the regulator, the Ministry for Primary Industries (MPI), formerly the Ministry of Agriculture and Forestry (MAF). There are several functions set out under the administration of the Acts including (but not limited to), the approval of risk-based management programmes, approval of verifiers, setting of standards, enforcing of the standards of the Acts.*
- *The verifier or verifiers are third-party independent organizations. These organizations perform audits and inspections to ensure operators are complying with standards of the Acts. On completion of the audit or inspection, the verifier reports back to the regulator and the auditee must close out any non-conformances. In the New Zealand meat industry, the Ministry for Primary Industries Verification Services operates as the verifier.*
- *Industry operators are obligated to implement and uphold compliance to risk-based management programmes under the relevant Act. Under the regulatory model there is an expectation that operators will incorporate all aspects of quality control and food safety risk management into their day-to-day operational activities.*

The New Zealand food industry (domestic and export) is regulated through four distinct Acts. Those are:

- *The Agricultural Compounds and Veterinary Medicines Act 1997*
- *Animal Products Act 1999*
- *Food Act 2014*
- *Wine Act 2003*

The range of markets covered by these Acts include meat, dairy, food, and beverage.

Government, the Ministry for Primary Industries, verification organizations and industry operators must work collaboratively to ensure the security of food safety across the entire food chain. This provides assurance to domestic and export customers and reduces the likelihood of foodborne illnesses.

The red meat industry provides a relevant working example of the factors leading to a progressive food safety system in a primary industry in New Zealand. The case study that follows examines how the New Zealand meat industry evolved in terms of its food safety system.





The evolution of the New Zealand meat industry in terms of its food safety system

Where we are now

The value of the red meat industry to New Zealand's economy cannot be overstated. Over 35,000 people are employed in the industry⁴ and year-on-year revenue from the export market has seen continued growth.

The industry processes around 25 million sheep and five million cattle every year. The meat industry is New Zealand's second largest goods exporter, generating \$9.4 billion in export revenue in 2019/2020. Roughly 90% of red meat produced in New Zealand is exported⁵, which equates to over 1 million tonnes of meat product.

New Zealand currently exports to 120 countries, the principal export market for New Zealand is China, followed by the United States and the United Kingdom⁶.

The meat industry is regulated by the Ministry for Primary Industries (MPI) in accordance with the Animal Products Act and various food safety related documents.

The following model applies:

- *Core legislation is enacted by New Zealand parliament. Core legislation includes Acts and Regulations*
- *Ministries that sit outside parliament implement the legislation in the form of Notices, Codes of Practice and Overseas Market Access Requirements*
- *Processors develop their operational procedures or risk management programme based on the Notices, Codes of Practice and Overseas Market Access Requirements*
- *Government verification of processor compliance with its risk management programme.*

It is government's responsibility to provide scientifically valid Notices, Codes of Practice and Overseas Market Access Requirements.

It is the processor's responsibility to manage its process.

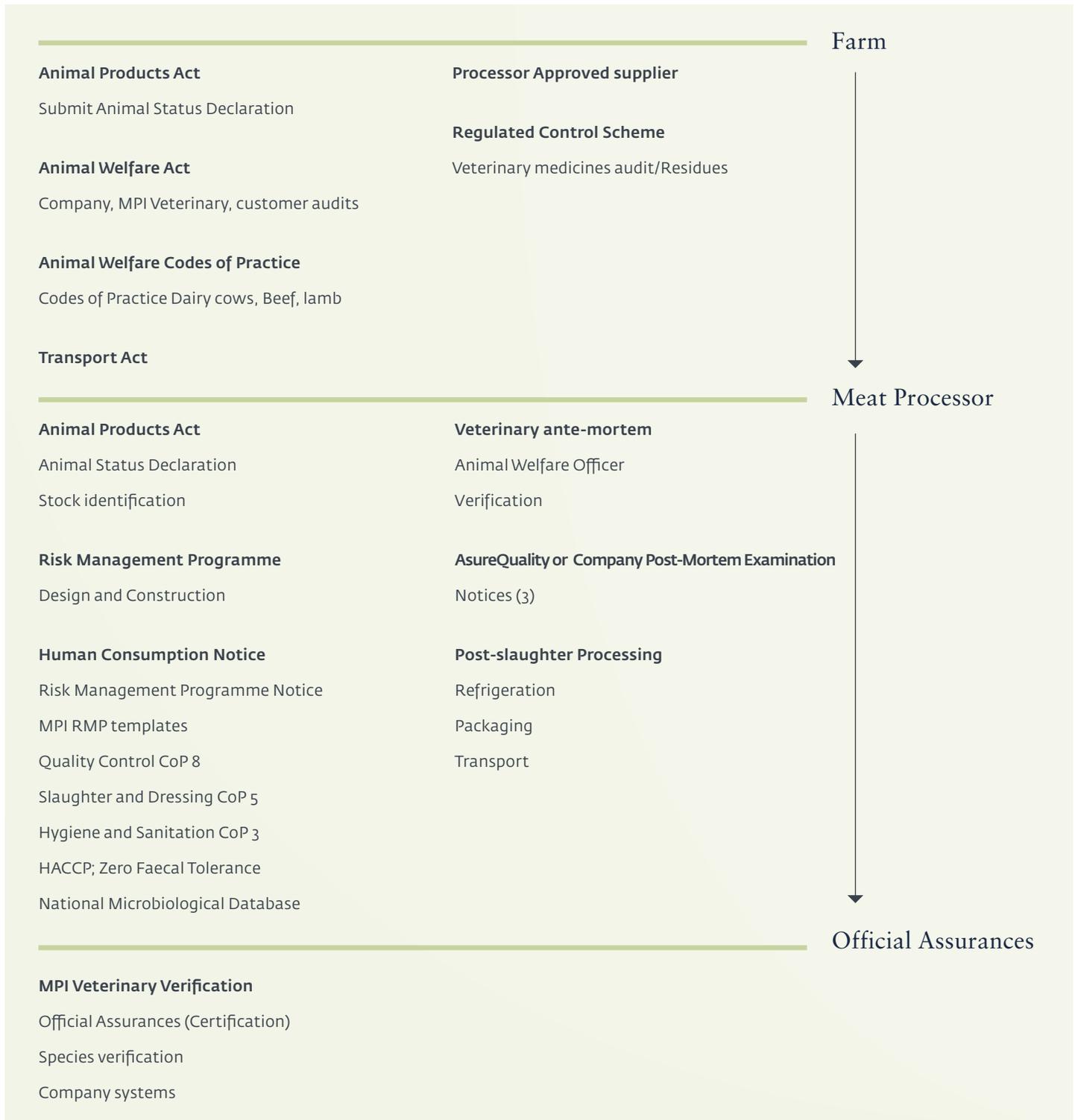
⁴ Introduction to food safety legislation, <https://www.mpi.govt.nz/legal/legal-overviews-legislation-standards/food-safety-legislation-introduction-to-food-safety-legislation/> accessed on February 26, 2020.

⁵ Meat Industry Association of New Zealand. "New Zealand's Second Largest Good Export Sector," <https://www.mia.co.nz/assets/Uploads/NZ-second-largest-goods-exporter-Overall-Factsheet-2020.pdf>, Accessed on February 26, 2020

⁶ Meat Industry Association of New Zealand. "New Zealand's Second Largest Good Export Sector," <https://www.mia.co.nz/assets/Uploads/NZ-second-largest-goods-exporter-Overall-Factsheet-2020.pdf>, Accessed on February 26, 2020

Each processor, be it the farmer, stock transporter, meat processor, meat packing and storage or final transporter to the final export facility, must comply with the requirements applicable to their role.

It is crucial that food safety is secured across the entire food chain. If a problem exists at a particular part of the chain, it will affect production at that stage and the end product. It will also have wider consequences for all parts of the chain. Product food safety from farm to the processor to the final customer, relies on compliance to a wide range of food safety requirements. These requirements have been developed as a result of scientific research and international requirements. The following diagram shows some of the major parts in the farm to plate journey.





LINK BETWEEN POLICY AND REGULATIONS

The New Zealand government's policy is developed in conjunction with the World Health Organisation and Codex Alimentarius agreements and standards resulting from scientific analysis of risks to food safety.

New Zealand was a founding member of Codex in 1962 and is an important and influential member of the organisation. New Zealand chairs two Codex committees, the Codex Committees on Meat Hygiene and the Codex Committee on Milk and Milk Products. The Ministry for Primary Industries operates as the lead agency for Codex in New Zealand⁷.

In 1982 Codex developed a set of agreed post-mortem judgements which were included in the code. These judgements are mostly agreed to today by the governments of all New Zealand's export markets.

The policy purpose is to provide a world-class food safety regime to ensure meat products remain fit for purpose until used by the consumer.

This policy has resulted in a highly detailed legislative structure that has sufficient flexibility for the processor to design and develop food safety systems that meet their purposes.

LEGISLATION

The New Zealand food safety programme is delivered by several layers of legislation, those are:

- **Animal Products Act 1999.** *This act is issued by Central Government and delegated to the Ministry for Primary Industries (MPI) who implement the Act. It is the principal act which prescribes operators must process in accordance with their Risk Management Programme (RMP).
The RMP is developed by each operator and is designed to identify and manage or minimize risks to human and animal health. It is subject to independent verification.*
- **Notices.** *These are legal prescriptions issues by the Ministry for Primary Industries that interpret and explain the New Zealand standards for food safety in order for companies to develop their risk management Programme.*
- **Codes of Practice.** *These are legal documents that detail the New Zealand standard for the production of meat and meat products. They are flexible, allowing companies to design their own process according to the requirement, provided their process meets the food safety criteria.*
- **Overseas Market Access Requirements (OMARs).** *These are overseas market requirements resulting from government negotiations for market access with individual countries' governments.*
- **Regulated Control Schemes (RCS).** *These are regulations issued where it is not feasible or practical for the relevant risk factors to be managed by individual animal product business operators, within individual risk management programmes (whether or not those operators would normally be required to have a risk management programme).*

⁷ Ministry for Primary Industries. "New Zealand's Strategic Objectives in Codex, 2015-2020," accessed on February 26, 2020. This publication is available on the Ministry for Primary Industries website at <http://www.mpi.govt.nz/news-and-resources/publications/>

“The government develops an RCS in the following circumstances:

- *when a risk management programme (RMP) wouldn't be feasible or practicable*
- *when it is more efficient for the government to run a national programme*
- *if it is needed to meet the market access requirements of export markets.*

Regulated Control Schemes are legislated in 2 different ways:

- *under regulation*
- *as a notice under section 60 of the Animal Products Act (APA) 1999.*

Some Regulated Control Schemes are issued as a Notice under section 60 of the APA. All of these:

- *are national in scope*
- *apply only to products intended for export*
- *manage market access requirements*
- *are issued after exporters have been notified of the requirements in an overseas market access requirement.*

Regulated Control Schemes issued in this way relate to:

- *hormonal growth promotants*
- *control of specified substances and contaminants*
- *transport of animal products for export and handling of animal products at wharves*
- *listing of cloned animals*
- *verification of farms and stock saleyards exporting animals to the European Union*
- *verification of contaminants in bee products.”⁸*

An example is the management of chemical residues in animals on the farm

Animal Products (Regulated Control Scheme—Contaminant Monitoring and Surveillance) Regulations 2004

4 Prime Purpose of scheme

The Prime purpose of this scheme is -

(a) to identify the absence or presence, extent, and distribution of chemical and biological contaminants in animal material and animal products; and

(b) to address the risks from hazards to human or animal health associated, directly or indirectly, with animal material and animal products from a risk source (whether identified under this scheme or by other means)

The regulated control scheme ensures food safety from farm to processor.

⁸ Industries, Ministry for Primary. “Regulated Control Schemes (RCS).” Ministry for Primary Industries. Ministry for Primary Industries, November 16, 2020. <https://www.mpi.govt.nz/legal/compliance-requirements/regulated-control-schemes-rcs>.



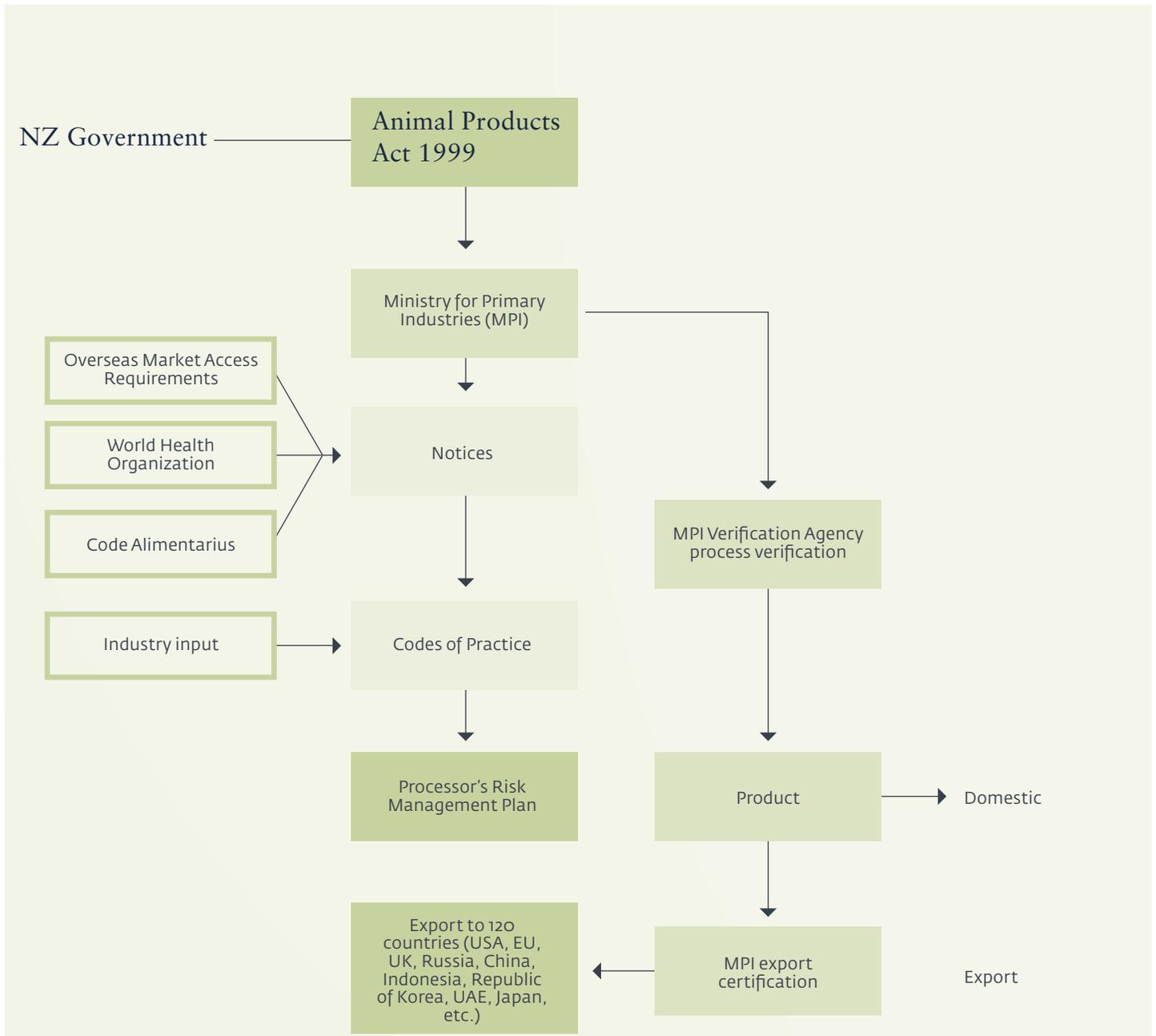
How New Zealand's domestic food safety is delivered and range of markets

The New Zealand food safety standard is delivered by:

- a. *Making government food safety requirements available to the processor. This is achieved by making available Notices, Codes of Practice, instructional and guidance manuals on the Ministry for Primary Industries website. For example, the Ministry for Primary Industries publishes the Approved Maintenance Compounds Guidance Manual. This manual lists all the chemicals that are approved for use in a food production plant. It also details the restrictions applying to each chemical, for example vermicides can only be applied when processing has ceased for the day and surfaces must be washed down prior to commencement of operations. The processor utilizes the documents to develop their risk Management Programme (RMP), Good Operating procedures (GOPs) and quality assurance systems (QA).*
- b. *The Government supplies the requirements to the processor, allowing the processor via the RMP to develop operating procedures according to its product outcomes.*
- c. *The Ministry for Primary Industries verifying the processor's compliance to its RMP.*



The following graphic shows the relationship between the government (the Ministry for Primary Industries) and processing. Meat products destined for the domestic market are produced to the same standards as those for the export market, the main difference being a domestic market plant does not require an export license.



The risk management programme is nowadays the major step in the devolvement from a regulator being fully responsible to expectation laying with the business operator.

Years of resistance to prescriptive legislation and lobbying to central government resulted in the passing of the Animal Products Act 1999. This Act prescribed for operators to design and develop a Risk Management Programme (RMP) that minimises and manages risks to human and animal safety. Each part of the RMP is:

- *Based on known science or by trial.*
- *Validated by a company elected competent person for each part of the programme.*
- *Registered by the Ministry for Primary Industries.*
- *Verified by the Ministry for Primary Industries Verification Agency.*
- *Verified by the operator.*

The requirements for designing, evaluating, and verifying the risk management program are detailed in the Animal Products (Risk Management Program Specifications) Notice 2008.

Supporting documents include but are not limited to:

- *Design and construction*
- *Specifications for Product Intended for Human Consumption Notice*
- *Industry Standard 3: Hygiene and Sanitation*
- *Industry Standard 4: Procurement of Stock*
- *Code of Practice 5: Slaughter and dressing*
- *Code of Practice 6: Presentation for Post-mortem examination*
- *Code of practice 7: Post-mortem examination*
- *Code of Practice 8: Post-mortem Dispositions*
- *Code of Practice 9: Post-slaughter processing*
- *Approved maintenance compounds chemicals*

It is the primary processor's responsibility to manage the process according to its risk management program. This management includes a comprehensive monitoring and direct supervision system owned by the processor.

All export plants must have a Ministry of Primary Industry veterinarian who:

- Verifies company compliance to its risk management program*
- Deals with animal welfare issues*
- Provides official assurances (export certification).*

Optimizing Operator Ownership (Triple O)

The Ministry for Primary Industries (MPI) verification's role was to verify compliance to the RMP and take corrective action for non-compliance. However, what evolved from this model was companies began to rely on the MPI veterinarian to check the process and in some cases formulate corrective action.

This model was contrary to the intent of the Animal Products Act legislation and so in 2017 MPI designed a system called Optimizing Operator Ownership (Triple O), where the MPI Veterinarian would identify a non-compliance and instruct the operator to design effective corrective action. The government's verification role has devolved to that of an overview, whereas each company now has full responsibility for its process compliance.

For more information on this system, see section 10.0 of this report https://www.rmpp.co.nz/site_files/13089/upload_files/Resources+ToolsFinalReport.pdf?dl=1

How we got here

The growth of the meat industry in New Zealand was entirely due to the invention of refrigeration and therefore ability to export overseas.

The New Zealand meat industry grew out of surplus meat being available as a by-product of the wool industry which was the leading export industry during the late 1880s.

By 1882 there were 1.5 million sheep in New Zealand, bred solely for wool. Because there was no method of transporting mutton to Britain, sheep not required for local consumption were destroyed.



Refrigeration

Between 1850 and 1880 the price of meat had doubled and become a scarce commodity in United Kingdom due to its booming population. Unfortunately, there was no method of transporting meat to Britain until the invention of refrigeration in the 1870s.

“Many methods of meat preservation were tried and over 200 patents for preserved meat processes were registered. Canning began 1869 in New Zealand but only the best meat was preserved. The rest of the carcass was boiled down for tallow (rendered fat) and all offal was wasted. The returns from these processes were poor and sheep were principally grown for their wool. In some districts the only practicable way of getting rid of surplus flocks was to drive them over the cliffs into the sea”.⁹

The Director of the New Zealand and Australian Land Company sent an employee from New Zealand to investigate compression refrigeration units. In 1880 the Director convinced the company to invest in refrigeration.

“Teaming up with the Albion shipping company, they approached John Bell and Sons and J.J. Coleman, who had been behind American chilled beef shipments. As a result of negotiations, Albion agreed to refit a New Zealand cargo ship, the Dunedin with a Bell-Coleman compression refrigeration machine. This worked by removing air, compressing it, then releasing it to a lower pressure refrigeration chamber—in this case the hold — where the air cooled as it expanded. Using 3 tonnes of coal a day, this steam powered machine could chill the hold to 20 °C below surrounding air temperature, freezing the cargo in the temperate climate of southern New Zealand, and then maintaining it beneath zero through the tropics.”¹⁰

In February 1882, the Dunedin sailed with 4331 mutton, 598 lamb and 22 pig carcasses, 246 kegs of butter, as well as hare, pheasant, turkey, chicken and 2,226 sheep tongues.

Having arrived in London safely, “carcasses were sold at the Smithfield market over two weeks by John Swan and Sons, who noted butchers’ concerns about the quality of meat from the experimental transport; Directly the meat was placed on the market, its superiority over the Australian [frozen] meat struck us, and in fact the entire trade.”¹¹ Just a token single carcass was condemned on arrival in Britain.

“The shipment caused The Times to comment Today we have to record such a triumph over physical difficulties, as would have been incredible, even unimaginable, a very few days ago.”¹² After meeting all costs, the venture made a £4700 profit from the voyage.

This effectively launched the industry and assured New Zealand’s early dominance in it.

“Within 5 years, 172 shipments of frozen meat were sent from New Zealand to the United Kingdom, of which only 9 had significant amounts of meat condemned.”¹³ Frozen meat and dairy exports continued to form the backbone of New Zealand’s economy until the United Kingdom’s entry into the European Economic Community in 1974, when New Zealand produce was excluded by the EEC’s trade bans.



The Dunedin loading at Port Chalmers in 1882.

⁹“THE NINETEENTH CENTURY HERITAGE: REFRIGERATION AND THE MEAT INDUSTRY” The 19th Century Heritage: the meat industry. Accessed February 25, 2021. <http://www.techhistory.co.nz/19thcentury/Meat.htm>.

¹⁰“Dunedin (Ship).” Academic Dictionaries and Encyclopedias. Accessed February 25, 2021. <https://en-academic.com/dic.nsf/enwiki/6240983>.

¹¹“Dunedin (Ship).” Wikipedia (Wikimedia Foundation, March 22, 2021), [https://en.wikipedia.org/wiki/Dunedin_\(ship\)](https://en.wikipedia.org/wiki/Dunedin_(ship)).

¹²“Dunedin (Ship).” Wikipedia (Wikimedia Foundation, March 22, 2021), [https://en.wikipedia.org/wiki/Dunedin_\(ship\)](https://en.wikipedia.org/wiki/Dunedin_(ship)).

¹³“Dunedin (Ship).” Academic Dictionaries and Encyclopedias. Accessed February 25, 2021. <https://en-academic.com/dic.nsf/enwiki/6240983>.

NEW OVERSEAS HYGIENE REQUIREMENTS

For 70 years the export industry had focused on the United Kingdom. Food safety was not a public issue in United Kingdom where thoroughly cooked meat and vegetables was the norm and the veterinary profession's interest in public health was marginal.

New Zealand becoming self-governing within the Commonwealth in 1947 became the first step in an ever-widening gulf between New Zealand and United Kingdom interests.

The introduction of the European Economic Community (EEC)

The European Economic Community (EEC), now the European Union or EU, was created in 1957. Up until then meat was produced for Britain under a bulk purchase arrangement which provided a secure comfort zone for the New Zealand meat industry. As the scale of meat exports to EEC countries other than Britain expanded rapidly, the challenge was to identify those countries' requirements and how to best satisfy them.

It took some time for the industry to understand that where it wanted to export to countries such as the United States and Europe, it would need to meet their requirements. In these instances, those countries sent veterinary staff to New Zealand to ensure that it complied. This started the hygiene reform in New Zealand.

IMPACT OF THE AMERICAN MARKET

In 1948 the first McDonalds opened in San Bernardino, California, instigating a major change in eating habits worldwide. As the hamburger craze grew, the demand for manufacturing beef expanded and soon America was seeking outside suppliers. New Zealand companies first entered the market in 1958, instigating a revolution in the New Zealand system and industry to meet United States' requirements that included:

- *Establishment of specialist boning rooms*
- *Installation of flat-bed viscera tables*
- *Chutes installed to direct offal to specialist rooms*
- *Meat packing houses and canneries had to be licensed*
- *Establish procedures for the identification of surface faecal contamination*
- *Training meat inspectors to identify faecal contamination*
- *Introduction of proper ante-mortem examination of stock*
- *Install direct veterinary supervision*
- *Improved drainage, impervious flooring, conveyer systems*
- *Removal of wood from areas where edible meat was prepared and stored, e.g freezer stores*
- *Hot and cold water supplied by taps, removing hoses from the slaughterfloor*
- *More rigorous and consistent assessment for tuberculosis*
- *Carcasses with pleurisy retained and dealt with*
- *Increase of inspection staff to man the viscera tables and carcass inspection stands resulting in doubling inspector numbers*
- *Increase in United States Department of Agriculture veterinary audits*
- *Pressure on farmers to supply clean stock to the plant.*



INNOVATION IN THE MEAT INDUSTRY

The transformation of the New Zealand meat industry from an old-fashioned to modern industry did not happen overnight. It took many years for the industry to begin to function efficiently and to assign a greater emphasis on process improvement. Today, this improvement through in-depth research practices, ensures a superior product is provided to customers. Some of the more prominent innovative practices in the New Zealand meat industry are outlined below.

Blast freezing

“A major innovation achieving significant value by increasing turnover in the freezing room was initiated in 1949. Blast freezing in which air was circulated at high velocities of 100-150 metres/minute for carcass meat past finned evaporators. Freezing times for lambs were reduced to 12-16 hours as compared to the previous 18-72 hours.”¹⁴

Introduction of the mechanized processing chain

Prior to 1932, the solo butcher system was in use, where each butcher slaughtered and dressed each carcass.



The solo butcher system. Each butcher was allocated a bucket of water which had to last most of the day, and shared a laborer who ‘cleaned up’ and placed stuff in the holes in front of the butcher.

Belfast Freezing Works, Christchurch. Webb, Steffano, 1880-1967: Collection of negatives. Ref: 1/1-003961-G. Alexander Turnbull Library, Wellington, New Zealand. <https://natlib.govt.nz/records/23157218>

¹⁴ “THE NINETEENTH CENTURY HERITAGE: REFRIGERATION AND THE MEAT INDUSTRY.” The 19th Century Heritage: the meat industry. Accessed February 21, 2021. <http://www.techhistory.co.nz/19thcentury/Meat.htm>.

“The introduction of the chain system where slaughtered animals pass along a line of butchers each carrying out different tasks did not take place until 1932. The industry had been in existence in New Zealand for fifty years prior to this.”¹⁵

The chain speed (as measured by how many carcasses would pass a certain point in a given minute) was to reflect the daily output of the solo butcher model. For example, if a team of 30 solo butchers could slaughter and dress 3000 carcasses per day, then the mechanized chain speed would be set for a daily tally of 3000 or 6.25 carcass per minute. By adding more butchers to the chain, the speed was increased to about 8.5 carcasses per minute. However, the chain speed was largely dictated by the speed with which a carcass could be hygienically produced. To this day chain speeds are agreed between meat processed and the Ministry for Primary Industries employed veterinary officer onsite.



The introduction of the mechanized chain system was part of the innovation the meat industry would experience over the next 90 years and continues today.

Green & Hahn (Firm). Butchers working on carcasses in a meat works - Photograph taken by Green and Hahn. Making New Zealand :Negatives and prints from the Making New Zealand Centennial collection. Ref: MNZ-1517. Alexander Turnbull Library, Wellington, New Zealand. <https://natlib.govt.nz/records/22679660>

¹⁵ “THE NINETEENTH CENTURY HERITAGE: REFRIGERATION AND THE MEAT INDUSTRY.” The 19th Century Heritage: the meat industry. Accessed February 21, 2021. <http://www.techhistory.co.nz/19thcentury/Meat.htm>.



Establishment of the Meat Industry Research Institute of New Zealand (MIRINZ)
To combat a reluctance on the part of plant owners to approve improvements in facilities, a scientific approach to the development of the industry was required. As a result, the Meat Industry Research Institute of New Zealand (M.I.R.I.N.Z.) was established in 1957. M.I.R.I.N.Z. was funded by the New Zealand Government and industry. It later became a standalone institute and in 1999, merged with AgResearch.

“MIRINZ is best known internationally for its research on meat tenderness and the development of industrial techniques such as electrical stimulation to prevent toughness. Mechanical dressing of carcasses has been another major focus with the result that the New Zealand sheep industry is well known for its highly mechanized integrated carcass processing systems with resulting improvements in cost effectiveness, yields of meat and high hygiene standards. MIRINZ has also made large contributions to both the local and international meat industries in a number of other areas, including new packaging systems and systems to monitor and control storage and transport.”¹⁶

¹⁶ “MIRINZ History.” MIRINZ. Accessed February 21, 2021. <http://www.mirinzi.org.nz/history.asp>.

Traceability

In 1998 a team of 9 European Union reviewers visited New Zealand cold stores, farms, and the meat processing plant. The following results were:

- *One team visited a non-EU listed cold store where they found EU-eligible product.*
- *One team visited a number of farms where they determined there was no record of veterinary medicines being administered to animals or agricultural chemicals be applied to pasture.*
- *One team determined there was no product traceback.*

As a result, the EU team delisted the entire meat industry and returned to Europe.

A specialist Ministry for Primary Industries (MPI) team flew to Brussels that day and negotiated market access by agreeing to mandate an Animal Status Declaration system applicable to all animals being sent for slaughter throughout the country. It was issued under the Animal Products act making it a legal requirement and detailed the following:

- *Owner name and address*
- *Stock type and number*
- *Identification tags*
- *Destination*
- *Name of any drugs or chemicals and their withholding periods*
- *Animal history, e.g., where born, imported, on any MPI surveillance list*
- *Feeding, e.g. ruminant protein*
- *Johnes vaccinations*
- *Tuberculosis declaration*

This Animal Status Declaration has contributed to the partnership between farmers, processors, and exporters by:

- *Giving the farmer confidence that his/her animals will be accepted by the meat processing plant.*
- *Giving the meat processor confidence that their product will be fit for purpose and not cause harm to the consumer.*
- *Giving the exporter confidence that the product meets the importing countries' requirements.*

Assurance system

Company quality control systems include but are not limited to:

- *Good Operating Systems (GOPs). An example is the opening of the carcass using a 'spear' cut. This consists of making a small nick in the skin, then inverting the knife into the cut so that the knife edge faces out, then applying a cut that opens the skin from the inside to outside, thereby preventing the transfer of skin bacteria onto the carcass.*
- *Regular process control checks*
- *Training*
- *Participating in the National Microbiological Database. This confidential programme entails company swabbing areas of concern on the carcass and submitting the swabs to a Ministry for Primary Industries-approved laboratory for analysis. The results are entered into the company's database where they are accessible to export countries' governments. The microbiological results are required and defined by the exporting country.*

REMOVAL OF AGRICULTURAL SUBSIDIES

Throughout the 1970s and early 1980s, the New Zealand agricultural industry was bolstered by the provision of government agricultural subsidies. While the subsidies were originally introduced as an aid in protecting New Zealand's economy by boosting production, by the early 1980s they were having a detrimental effect on the country's gross domestic profit. The subsidies lead to massive rates of over-production (of sheep in particular), inefficiencies in land usage and widespread over-inflated land value. This was unsustainable in the long-term.

“By 1984, agricultural output was worth less than the cost of producing and processing it and the government faced a severe fiscal crisis.”¹⁷

In 1984 the New Zealand government enacted widespread reform encouraging deregulation across the economy. For the agriculture industry this meant the removal of all agricultural subsidies.

While this had obvious repercussions for rural areas in particular, the government provided support to farmers through this period with loan restructuring and social welfare payments. The impacts of the removal of subsidies were lesser than expected. It is estimated that ‘only about five percent of farmers’ exited the farming sector between 1985 and 1989.¹⁸

Though the number of farms (sheep in particular), fell dramatically, the industry gradually recovered. “By 1995, farmland prices had recovered to 86 percent of their pre-reform levels.”¹⁹ Today, the agriculture sector is larger than when it was heavily supported; it is more profitable, efficient, and innovative. Therefore, the economic reform was successful. This success can be attributed to several factors including:

- *Farmers' ability to diversify into production of other produce*
- *Ensuring farmers were provided with ample information about the reform and its impacts*
- *“Involvement of stakeholders and farmers at early stage of the reform process and in decision-making”²⁰*

¹⁷ New Zealand Removal of Agricultural and Fisheries Subsidies,” accessed on February 26, 2021. This publication is available here: <https://www.cbd.int/financial/fiscalenviron/newzealand-subsidyfish.pdf>

¹⁸ Ministry for Primary Industries. “New Zealand Agriculture, A Policy Perspective,” November 2017. This publication is available here: <https://www.mpi.govt.nz/dmsdocument/27282/direct>

¹⁹ “New Zealand Removal of Agricultural and Fisheries Subsidies,” accessed on February 26, 2021. This publication is available here: <https://www.cbd.int/financial/fiscalenviron/newzealand-subsidyfish.pdf>

²⁰ “New Zealand Removal of Agricultural and Fisheries Subsidies,” accessed on February 26, 2021. This publication is available here: <https://www.cbd.int/financial/fiscalenviron/newzealand-subsidyfish.pdf>

BENEFIT OF A GOOD FOOD SAFETY SYSTEM

Safe food plays an integral role in New Zealand's economy. Over the last number of years, there is an increasing global trend towards greater interest in the food we eat, how it is produced and its safety and health implications among food consumers²¹. A good food safety system provides assurance to the public both domestically and internationally that New Zealand produce is safe.

New Zealand's reputation for producing safe meat has resulted in market access to over 120 countries and New Zealand has not been implicated in any meat related food poisoning outbreak anywhere in the world.

Significant impacts from food safety related illness in the world caused by unhygienic practices, include the brand damage to both the country of origin and the processor of origin. This can create public resistance to the concerned product.

It can take years for the public to overcome food safety scares.

Remedial action can be tremendously expensive. Although New Zealand meat was not the direct cause of the 1993 Escherichia coli food poisoning case in the United States related to meat contaminated with faecal matter that affected hundreds of children, the backlash has cost the New Zealand meat industry hundreds of millions of dollars in increased monitoring staff and HACCP training.

The United States Department of Agriculture mandated the New Zealand meat industry to attain zero faecal tolerance for carcasses by implementing a Hazard Critical Control Point programme in all plants licensed to export to the United States. Additional staff are now employed to inspect carcasses for faecal matter and when there's a failure, traceback to the last sample implemented which in some plants, resulted in loss of production. You will find more information on this in Module 2, case study 1.



²¹ Ministry for Primary Industries. "A Strategy for New Zealand Food Safety 2019-2024," September 2019. This publication is available here <https://www.mpi.govt.nz/dmsdocument/36705/direct>



Summary and Conclusion

In summary, the food and agricultural industries, particularly export markets play a vital role in the New Zealand economy. Food safety has progressed significantly in recent years and currently operates under a regulatory model framework. The model is made up of the regulator, The Ministry for Primary Industries, the verifier - third-party independent organizations, and industry operators. The meat industry is the exception to this, where the Ministry for Primary Industries Verification Services operate as the verifier. While the Ministry for Primary Industries has overall responsibility for food safety, all parties involved in the industries must work collaboratively to guarantee food safety.

The food industry is regulated through four distinct acts which service all market areas within the remit of food safety. Those are:

- *The Agricultural Compounds and Veterinary Medicines Act 1997*
- *Animal Products Act 1999*
- *Food Act 2014*
- *Wine Act 2003*

The New Zealand meat industry is regulated by the Ministry for Primary Industries in accordance with relevant New Zealand policy and legislation. The Government's policy is developed in conjunction with the World Health Organisation and Codex Alimentarius, resulting in a detailed legislative structure. The food safety programme is delivered through the Animal Products Act 1999, Notices and Codes of Practice.

Business operators must also adhere to Overseas Market Access Requirements (OMARs). These are negotiated by the governments of New Zealand and the relevant country. Regardless of whether meat is produced for the domestic or export market, the meat is produced to the same standard.

Production at a high standard and management of risks is supported by the use of Risk Management Programmes as detailed in the Animal Products Act 1999. Further detail on Risk Management Programmes was prescribed through a 2008 notice.

Where it is not possible for the operator to manage a risk factor, Regulated Control Schemes are issued. An example is the management of chemical residues in animals on farm.

The business operator is expected to manage their own process in accordance with the relevant legislation. To prevent an over-reliance on the verification services to formulate correction actions, the Ministry of Primary Industries created the Optimizing Operator Ownership (Triple O) system. This ensured operators had full responsibility for their own process compliance.

The meat industry in New Zealand has undergone significant change over the years in terms of food safety.

The journey from the enactment of the Slaughterhouse Act 1847 to today has been a slow development, from poor conditions in the slaughterhouse to the standard of today's modern meat processing plant.

Historically, there was no legislation dealing with the hygienic production of meat for the domestic market and the export market. The process of meat inspection and hygienic processing was slowly introduced by various Acts and regulation.

It wasn't until the formulation of the National Microbiological Database and Animals Product Act and introduction of the OMAR system, particularly the United States Department of Agriculture OMAR requiring zero faecal tolerance was enacted that the meat industry's general understanding of its business and standard of hygienic dressing dramatically improved.

Modernization of the industry was greatly aided by the establishment of the Meat Industry Research Institute of New Zealand (M.I.R.I.N.Z.) in 1957. Since its establishment, the institute has conducted significant research into practice improvement for the industry and has also assisted in the farming industry.



Though New Zealand's agricultural sector saw major reform in the 1980s, including the removal of agricultural subsidies, today New Zealand's agricultural sector is as profitable and efficient as ever. This is can in part be attributed to the early involvement of all stakeholders in the reform and decision-making processes.

In conclusion, the security of food safety across the entire food chain is vital to the food industry and consequently, to the New Zealand economy. New Zealand's global food safety brand is provided and maintained through:

- *The provision of relevant and up-to-date legislation by the New Zealand government*
- *Delegation of implementation of legislation to a central body, the Ministry for Primary Industries*
- *Operator development of Risk Management Programmes based on relevant legislation and Overseas Market Access Requirements*
- *The verification through third-party organizations that operators are compliant to Risk Management Programmes and relevant legislation.*



Guiding principles of food safety reform: Meat Inspection



Moving to a mature food safety system: Meat Inspection

Prior to the first shipments of meat products to Britain, the legislation related to the production of meat in slaughterhouses, mainly dealt with licensing. Oversight was provided by an appointed veterinarian to report on proof of ownership of cattle by examining cattle hides.

In the period following up to 1964 several other pieces of legislation were enacted, including the Slaughtering and Inspections Act 1908, the Meat Regulations 1937, the Meat Act 1939, Meat Regulations 1940. Each had ramifications for the meat industry in terms of Food Safety, most notable of those include:

- *Meat Regulations 1937 – provision of requirements for sanitization of slaughtering premises*
- *Meat Act 1939 – Prescription of requirements for hygienic construction and conditions of slaughterhouses*
- *Meat Regulations 1940 – Further regulation for requirement of meat to be inspected for eligibility for export.*



Figure 1 Frozen Mutton, Hawke's Bay, January 1947. Source: Archives New Zealand <https://www.flickr.com/photos/35759981@N08/12230222564>
Archives Reference: AAQT 6539 34/A1812 (R21010589)

Prior to 1964 meat inspection was carried out by lay persons trained to carry out meat inspection and supervised by veterinarians. This was deemed to be unacceptable by the United States and especially the EEC, as meat inspection was carried out by a veterinarian in Europe's slaughterhouses.

To ensure New Zealand met the market access requirements of the EEC and United States and because it was neither affordable nor practical for New Zealand to recruit many veterinarians, agreement was reached between the New Zealand and British governments that meat inspectors would be partly trained at a veterinary university. A qualification was developed with periodic assessments and a final oral and written examination by a panel of 4 examiners. The system and formal qualification were given legal force through the Meat Act 1964 and later the Meat Regulations 1969.

1964, No. 71

Meat

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ANALYSIS

(4) There may from time to time be appointed under the State Services Act 1962 such Inspectors and other officers as may be required for the purposes of this Act.

(5) The Minister may from time to time appoint any person, not being employed in the State services, as an Inspector in a part-time capacity for the purposes of this Act, and may also prescribe the powers and functions of any person so appointed. No person, by reason only of his appointment under this subsection, shall be deemed to be employed in the State services for the purposes of the State Services Act 1962 or in the Government service for the purposes of the Superannuation Act 1956.

Cf. 1939, No. 19, s. 4; 1953, No. 75, s. 16 (1)

4. Qualifications of Inspectors—No person shall be appointed as an Inspector under this Act unless he is registered as a veterinary surgeon under the Veterinary Surgeons Act 1956, or has passed the prescribed examination and has obtained a certificate from the prescribed authority that he is competent to perform the duties of an Inspector.

Cf. 1939, No. 19, s. 5

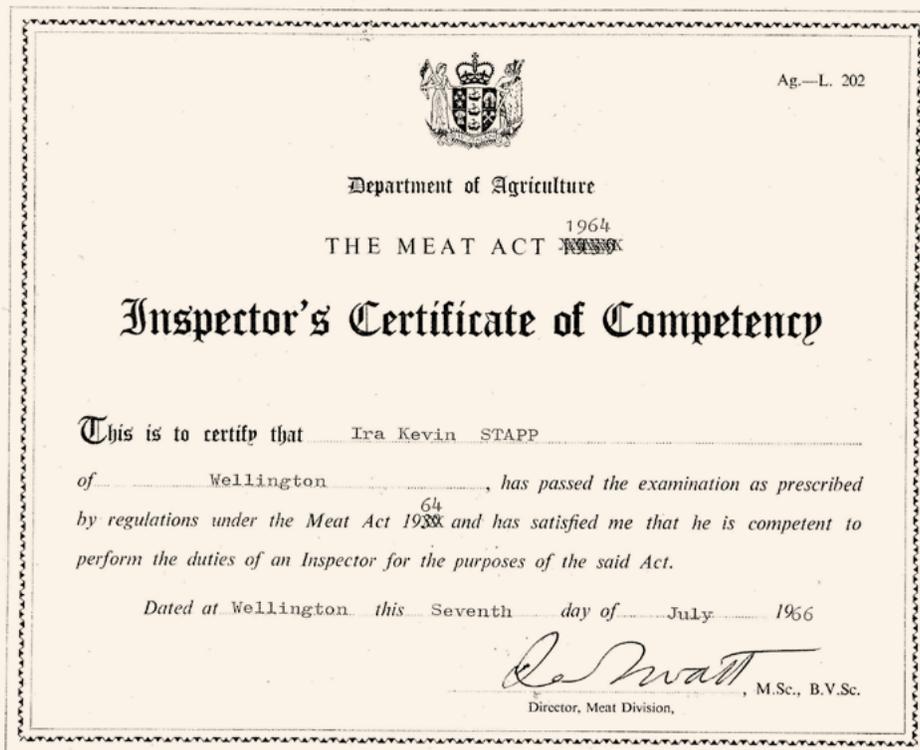
Training for the qualification was held at Lincoln College in Canterbury. The syllabus was comprehensive because meat inspectors were required to carry out ante-mortem inspection and process control checks in further processing areas such as slaughter and dressing, offal and packing rooms, chillers, and environments. In addition to the structure and function of organs and tissues and the inflammatory response and diseases, the syllabus covered microbiology and its relation to food safety.

It was later deemed necessary for meat inspectors appointed as training officers and senior meat inspectors to have a higher level of technical knowledge, so an advanced meat inspection course was implemented at Lincoln college with numbers limited to about 50 per course.

The advanced course continued until 1978 when the EU prescribed off-chain tasks to be carried out by veterinarians.

Because some trainees were finding the depth of course content and the pace of delivery difficult, pre-course training was developed back the plants. Selected meat inspectors who had already been trained at Lincoln college were officially appointed as trainers and given the task of preparing trainees for Lincoln. They did such a good job that trainees were finding the Lincoln course too easy! Because of this the Lincoln system was terminated in 1977 and all training carried out at the plant.

In 1998 meat inspection moved into a State-owned Enterprise and two State Owned Enterprises, ASURE NZ Ltd. and AgriQuality Ltd. were merged under an official Act. The act contained a Subpart that conditionally allowed examination services to be carried out by persons not employed under the State Sector Act 1998, in other words, company inspection was born. Obviously, to be accepted by New Zealand's overseas trading partners, any company inspection model was going to require government inspector control and supervision.



Subpart 4—Ongoing negotiations and obligations concerning examination services

15 Obligations concerning examination services

- (1) The Crown will continue to negotiate with New Zealand's international trading partners for the acceptance of international guidelines on meat hygiene as set out in the Codex Alimentarius's Code of Practice, "Code of Hygienic Practice for Meat" (CAC/RCP 58-2005) (the Code).
- (2) If more than 66.6% of the total value of New Zealand's post-mortem red meat exports (of both ovine and bovine origin) are made to international trading partners of New Zealand who have agreed to accept the international guidelines on meat hygiene as set out in the Code, the Executive Government of New Zealand must permit—
 - (a) competitive tendering for the provision of examination services to occur; and
 - (b) examination services to be provided by persons who are not employed under the [State Sector Act 1988](#).

The 1999 Animal Products Act described the appointment of meat inspectors working for State Owned Enterprises as official assessors. It was thought at the time that one reason for the name change was to separate government inspectors from the anticipated company meat inspection model.

A meat inspection qualification through the New Zealand Qualifications Authority was created. The qualification has undergone many updates since then, the current qualification offered is the New Zealand Certificate in Meat Processing (Animal Product Examination) (Level 4) with optional strand in Ante-Mortem.

The NZQA or New Zealand Qualifications Authority is the government department that approves qualification standards across all industries. In the case of meat inspection, the Inspection Agency (AsureQuality) develops training and assessment programmes which are recognised by the Ministry for Primary Industries (MPI) and meet the requirements of the New Zealand Certificate in Meat Processing (Animal Product Examination) (Level 4) with optional strand in Ante-Mortem.





ANIMAL PRODUCTS ACT 1999

The history of the Animal Products Act 1999 is typical of the recurring pattern. The Meat Act 1964 was outdated by 1986. Piecemeal amendments had rendered it unwieldy, confusing, and lacking cohesion. Even with further amendments it could not be made to fit present needs. It detailed prescriptive rules that proved inflexible, and unable to readily accommodate new species, products, and processes. It was a damper on innovation and competitiveness, created costs and no longer provided effective management of the known risks.

Overall, the Meat Act encouraged an assumption that the government, through the Ministry of Agriculture and Fisheries (MAF) would manage food safety risks. That resulted in a relationship with industry that was paternalistic, authoritarian, adversarial and above all, ineffective.

To rectify this ineffectiveness the Animal Products Act was introduced with 2 objectives:

- a. *“minimize and manage risks to human or animal health arising from the production and processing of animal material and products by instituting measures that ensure so far as is practicable that all traded animal products are fit for their intended purpose; and*
- b. *facilitate the entry of animal material and products into overseas markets by providing the controls and mechanisms needed to give and to safeguard official assurances for entry into those markets”¹*

These would be achieved by company developing a risk management programme.

NOTICES

Notices are legal documents issued under section 167 of the Act by the Director of the Ministry for Primary Industries. They provide a legal interpretation of the Act and give guidance for companies to develop their risk management programmes. There is a Notice for nearly all facets of meat processing, from the procurement of stock for processing to export certification. Because Notices are legal documents, they utilize the terms ‘must’ and ‘shall’.

CODES OF PRACTICE

Where required, a Code of Practice accompanies some Notices. Codes of practice are practical operational instructions and requirements and designed to assist operators to develop their risk management programme. Although they are incorporated into legislation the instructions within are written as ‘should’ and ‘may’. This step was taken after years of heavy-handed prescriptive regulations and allows for companies to develop their own process provided the core criteria are met. Some clauses in Notices do not have a code of practice. Where this occurs, the operator is required to design a system that will meet the criteria. For example, a clause in the Specifications for Product Intended for Human Consumption Notice details the competency required for ante-mortem or post-mortem inspectors but there are no instructions on how to achieve the competency.

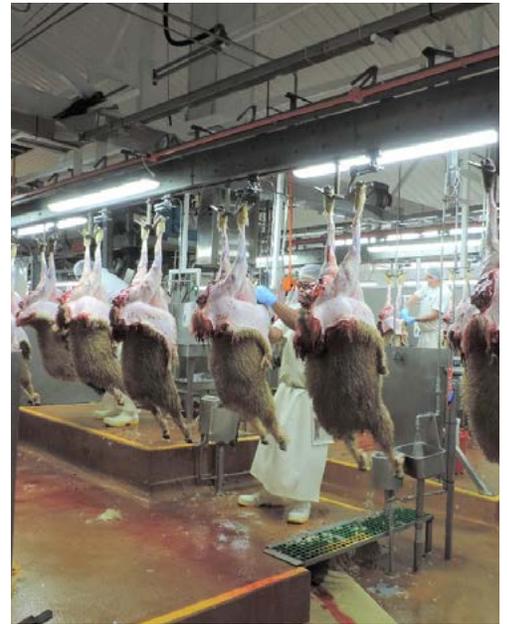
¹ P. (n.d.). New Zealand legislation. Retrieved March 11, 2021, from <https://www.legislation.govt.nz/act/public/1999/0093/22.o/DLM33509.html>

IMPACT OF THE RISK MANAGEMENT PROGRAM

The impact of the risk management program on the modern meat processing plant has been huge. Under the previous Act, the skins were torn from the carcass by manual labor, lighting was poor, and scraps littered the floor. The slaughterfloor is now free of clutter, continuously cleaned during processing, and well-lit and clean. The skin is mechanically pulled free of the carcass.

The Act also described the appointment of meat inspectors as official assessors. It was thought at the time that one reason for the name change was to separate government inspectors from the anticipated company meat inspection model.

The Animal Products Act 1999 prescribes that official assessors appointed under the Act for the purpose of meat inspection, must be employed by a State-owned Enterprise. In 2007, a new Act allowed examination services to be carried out by persons not employed under the State Sector Act 1998, in other words, company inspection was born. Obviously, to be accepted by New Zealand's overseas trading partners, any company inspection model was going to require government inspector control and supervision.



The modern lamb processing line features carcasses spaced so they do no contact each other, pelt flayed back to prevent roll-back onto the carcass, floor devoid of scraps, wash facilities within reach of each worker and robotic pulling of the pelt from the carcass.

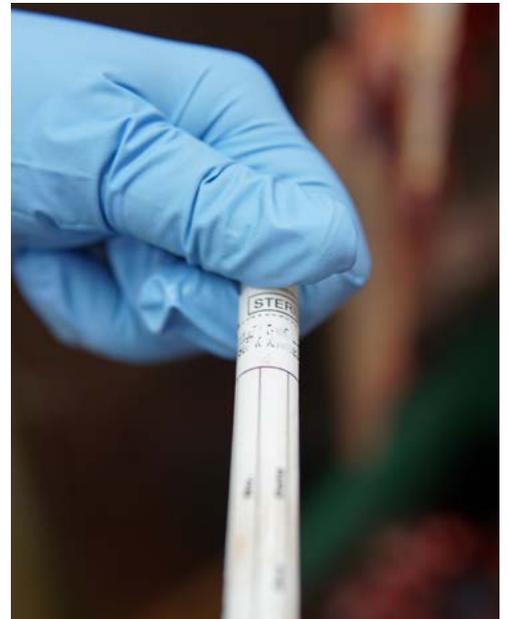
POSITIVE OUTCOME OF THE NEW ACT - NATIONAL MICROBIOLOGICAL DATABASE

The National microbiological database programme is the programme administered by the Ministry for Primary Industries (MPI) specifying the technical procedures for microbiological monitoring of the effects of the slaughter & dressing and cutting & boning processes.

It measures the effectiveness of each plant's hygienic processing systems. All meat processing plants must participate in the programme.

Each plant randomly selects and samples carcasses. The samples are sent to a Ministry for Primary Industries (MPI) approved laboratory for microbiological analysis. The results are entered into the National Microbiological database and the results made available to the company, the Ministry for Primary Industries (MPI), and overseas governments when considering exporting meat to a particular market.

Operators must analyze their microbiological data and investigate and correct the cause of any unsatisfactory microbiological test result. Products which fail the food safety criteria, including the rest of the batch, must not be exported to the European Union, and must be recalled where necessary.





POLICY CHANGES AND ITS EFFECT ON THE INDUSTRY

Over the years the New Zealand government has implemented the various Acts, Regulations, Orders, Amendments, and overseas market requirements in accordance with the prescriptions of the law. Historically this leads to considerable animosity and lobbying to central government for change.

With the introduction of the Animal Products Act 1999, companies could at last design and run their business by designing and producing their own processing systems which were based on the Acts, Regulations, Orders, Amendments, and overseas markets requirements. As a result, companies became very knowledgeable in their requirements. However, the role of the veterinarian did not change much, and the industry relied on their experience and knowledge to guide them to effective resolution for non-compliances.

OPTIMIZING OPERATOR OWNERSHIP

To counter this trend the Ministry for Primary Industries (MPI) has designed a model called Optimizing Operator Ownership (Triple 0), which hands over to the industry their total commitment to resolve their compliance issues.

For example, if the veterinarian identifies a non-compliance they will inform the company and instruct them to fix it. This removes the animosity that was being generated by the veterinarian always instructing the company. This has led to:

- a. *Improved relationships between company and the Ministry for Primary Industries (MPI) veterinarian.*
- b. *Increase in company knowledge and understanding of the regulatory requirements.*
- c. *In the past the veterinarian used to attend company meetings and list all the non-compliances and instruct company on what needed to be fixed and how. Now, the veterinarian attends the meeting to see what company is doing about its non-compliances.*

THE E. COLI FOOD POISONING INCIDENT THAT CHANGED THE MEAT INDUSTRY FOREVER

About *Escherichia coli* 0157

E. coli is a bacterium commonly found in the lower intestine of healthy humans and people. It is harmless provided it is confined to the lower part of the gastro-intestinal tract, e.g. caecum and large intestine. It is a common bacterium found in faeces. However, if it finds its way to the stomach and intestines it can overcome the body's immune system, multiply and cause serious food poisoning.

Why has it become a problem after over a century of the meat industry?

Traditionally, meat was sold in primal cuts, e.g. leg of lamb or individual cuts, e.g. chops that are cooked at high temperatures that tend to kill all surface bacteria. However, the emergence of the ground beef market for hamburger patties for the American market created a new hazard. All processed meat carries a population of bacteria on its surface. Most of these bacteria are of environmental origin and usually harmless. However, ground beef has a unique property; when beef is ground, the surface bacteria become mixed throughout the mince. If the patty is undercooked, the bacteria will thrive in its warm damp interior. In other words, they will reproduce. If the carcass contained surface faecal matter which contains *E. coli* bacteria the product is now extremely dangerous. **The food poisoning incident** In January 1993, the Washington State Department of Health investigated a major outbreak of *E. coli* related illnesses in children in Seattle. The department found the source to be *E. coli* O157: H7 from hamburgers sold at several Jack in the Box restaurants.

“Ultimately, 73 different Jack in the Box locations were linked to the *E. coli* outbreak. The bacteria led to 171 hospitalizations and 4 deaths. The investigation into the outbreak eventually identified five slaughterhouses in the United States and one in Canada as possible sources of the bacteria, but the exact source of the contaminated meat was never pinpointed.”²

The reaction from the United States Department of Agriculture (USDA) was huge. For New Zealand meat inspection, this had major ramifications. As a result of the incident, all New Zealand plants exporting to the United States of America had to implement a Hazard Analysis Critical Control Point (HACCP) system, provide HACCP training, and establish a Zero Faecal Tolerance (ZFT) for their carcasses.

Animal Products Notice: United States OMAR
Part 2: Meat and Ratite Products
Amendment 19

July 2019

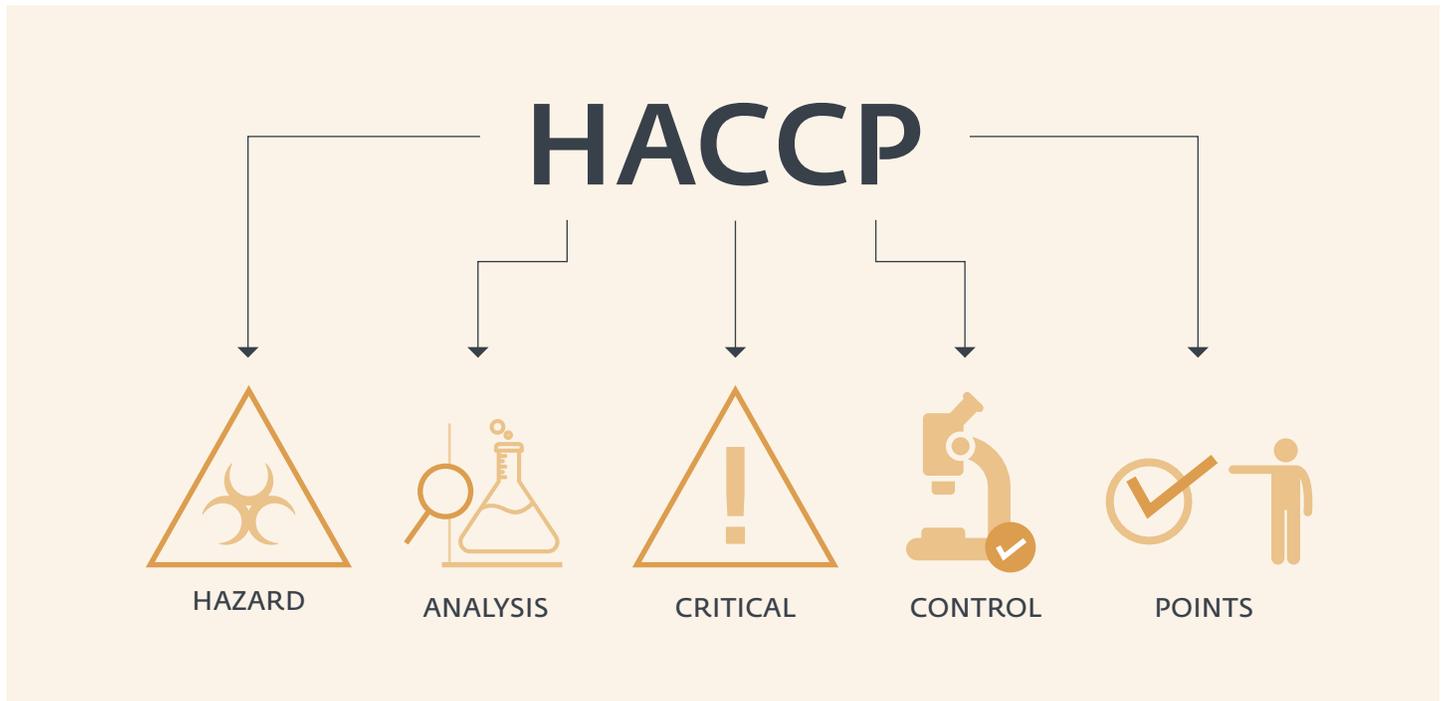
2.6.6 HACCP

The APA 1999 requires all primary processors slaughtering and dressing bovines, caprines, equines, ovines, porcines and ratites and all secondary processors processing products intended as food for humans from these, to have HACCP systems that comply with the requirements of sections 12 and 17 of the Act.

This level of scrutiny has cost the meat industry a huge amount of money by hiring staff to carry out intensified monitoring and harsh penalties for Zero Faecal Tolerance (ZFT) failure, slowing of chains when the carcass faecal incidence reaches the plant's tolerance level and overseas rejections of product for contaminated meat.

² Marler, B. (n.d.). The Marler Clark network. Retrieved March 11, 2021, from https://billmarler.com/key_case/jack-in-the-box-e-coli-outbreak

About Hazard Analysis Critical Control Point (HACCP)



HACCP is a management system whereby food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement, and handling, to manufacturing, distribution and consumption of the finished product.

Because HACCP and Zero Faecal Tolerance (ZFT) are significant market access requirements, a HACCP system is developed by the company:

1. Conducting a Hazard Analysis:

This entails examining every step in a process and identifying the risks to food safety. For example, the cuts made to open a steer hide may transfer microbes from the skin or hair onto the surface of the carcass. This can be managed by first making a small incision into the hide, inserting the point of the knife with the edge uppermost and pushing the knife along and under the skin, so that the knife is cutting from the inside out. There are usually about 50+ steps in a typical meat processing process. Company works out what controls can be put in place to minimize or remove the hazard. In this example it may be a trimming point further along the process. This is a control point but may not remove all the faecal contamination.

2. Identify the Critical Control Points (CCP)

This step asks the question; where can faecal contamination be controlled? It is not practical to remove any faecal contamination that may get onto the carcass at either the operator point or a trim station on the chain because of chain speed, so the critical control must be somewhere where the hazard can be removed.

The point in the process where the contamination levels can be controlled, minimized, or removed is the critical control point. For the above example this is post-mortem inspection. The post-mortem inspector is responsible for identifying 100% faecal contamination, retaining affected carcasses for removal of the contamination, and checking that it has been removed.

3. Establish Critical Limits

A critical limit is the level of a contaminant that can be tolerated. For example, a level of 10³ environmental per cm² carcass surface microorganisms may be tolerated by an exporting country whereas no Salmonella organisms may be tolerated. The critical limit for faecal contamination is zero.

4. Monitor CCP

Carcass monitoring to check the effectiveness of the CCP is carried out past the critical control point and can vary from checking every carcass to a selection of a percentage of the tally for the shift.

5. Establish Corrective Action

A missed faecal is a failure of the system. The usual corrective action is to work back from the last passed carcass by inspecting every carcass. Depending on the extent of the failure, it can lead to informing the inspector, retraining and sometimes strong censure by the Ministry for Primary Industries (MPI).

6. Verification

Company must verify the effectiveness of its HACCP system. This is done by checking carcasses according to their documented system and recording the results.

7. Record keeping

FURTHER EFFECT ON THE NEW ZEALAND MEAT INDUSTRY

Since E. coli 0157 was identified as the cause of the food poisoning incident in the United States, 6 Shiga-forming E. coli variants of the bacteria have been identified. The United States now require testing for all 7 forms of the bacteria.

The designation of post-mortem inspection as a critical control point has meant an intensive viewing of the carcass for faecal contamination is required. Because the United States Department of Agriculture (USDA) standard is all visible faecal contamination must be removed, a spot the size of a pin head must be identified, and the carcass retained for trimming. However, with 13 other diseases and defects required to be identified, retained, and recorded, and with chain speeds allowing only +/-7 seconds to inspect the external and internal surfaces of the carcass, faecal failures at the critical control point do occur.

HACCP and Zero Faecal Tolerance (ZFT) has placed a considerable strain on the inspection service, especially when the company verification system presents faecal trims to the inspector.

An important change has been the introduction of 'hands-off' sheep and lamb inspection which allows more time to identify faecal contamination and prevent smearing faecal contamination all over the carcass.

ADOPTION OF THE NEW ZEALAND APPROACH BY OTHER COUNTRIES

As a world leader in the production of safe meat, New Zealand was instrumental in developing a national organisation with the aim to design a set of food safety standards, codes and procedures that would be accepted and adopted by world food markets.

In 1962 the FAO and WHO jointly created Codex Alimentarius to ensure quality and safety of food and prevent unjustified barriers to trade. Its goals included a food standards programme and to coordinate the preparation and acceptance of standards published as codes.

New Zealand chairs the Codex hygiene committee. This has contributed to New Zealand's food safety system being accepted as the world leader in hygienic and safe meat processing and has been adopted by 188 countries.

In addition, New Zealand has trained meat inspectors in several countries using the New Zealand post-mortem training programme.

SULTANATE OF BRUNEI DARUSSALAM

The Sultanate of Brunei Darussalam has established several meat processing plants for the Halal slaughter of cattle and poultry. These plants are based on the New Zealand Animal Products Notice Specifications for Product intended for Human Consumption. It has also adopted and implemented New Zealand's Ante-mortem and Post-mortem training programmes.

VANUATU

Vanuatu has established a cattle export plant in Port Villa based on the New Zealand model. Its quality assurance programme is run to the same standard as the New Zealand ministry for primary industries.

It contracted AsureQuality to design its documented systems. The plant was originally built in 1972 and since that time has been upgraded each year. In its current configuration the plant can export to New Zealand, Australia, Fiji, Papua New Guinea, Japan, Kiribati, Tuvalu, Wallis & Fortuna, Samoa, Tahiti, and New Caledonia.

Vanuatu contracts New Zealand to train its meat inspectors.



A group slaughtermen and meat inspector (white overalls) at PDS Abattoir 50km out of Bandar Seri Begawan. Note the clean walls, hoses rolled up, clean litter-free floor and the workers' clean personal protective clothing.

Summary and Conclusion



The New Zealand meat industry began nearly 160 years ago. It started with nothing and slowly built up to the major industry it is today. It has overcome the continual emergence of legislation that was principally driven by negative events, the impact of zero faecal tolerance and HACCP, animal welfare requirements, health and safety in the workplace requirements, fluctuating worldwide market crashes in meat commodities, and competition from other beef-producing countries, in particular Brazil, Australia, India and Argentina. The fact that New Zealand can still sell its meat products to 147 countries is due to the Animal Products Act, the industry acceptance of the Risk Management Program model, the rigorous verification service carried out by the Ministry for Primary Industries (MPI) Verification Services, and one of the best meat inspection systems in the world. This last claim is supported by the fact that there has never been a serious food safety incident directly contributed to a meat inspection failure, nor has there ever been an incidence of corruption.

The New Zealand regulatory model works well and apart from minor changes, for example the introduction of Optimum Operator Ownership, will continue well in the future.





Guiding principles of food safety reform

Moving to a mature food safety system: Apples



Moving to a mature food safety system: Apples

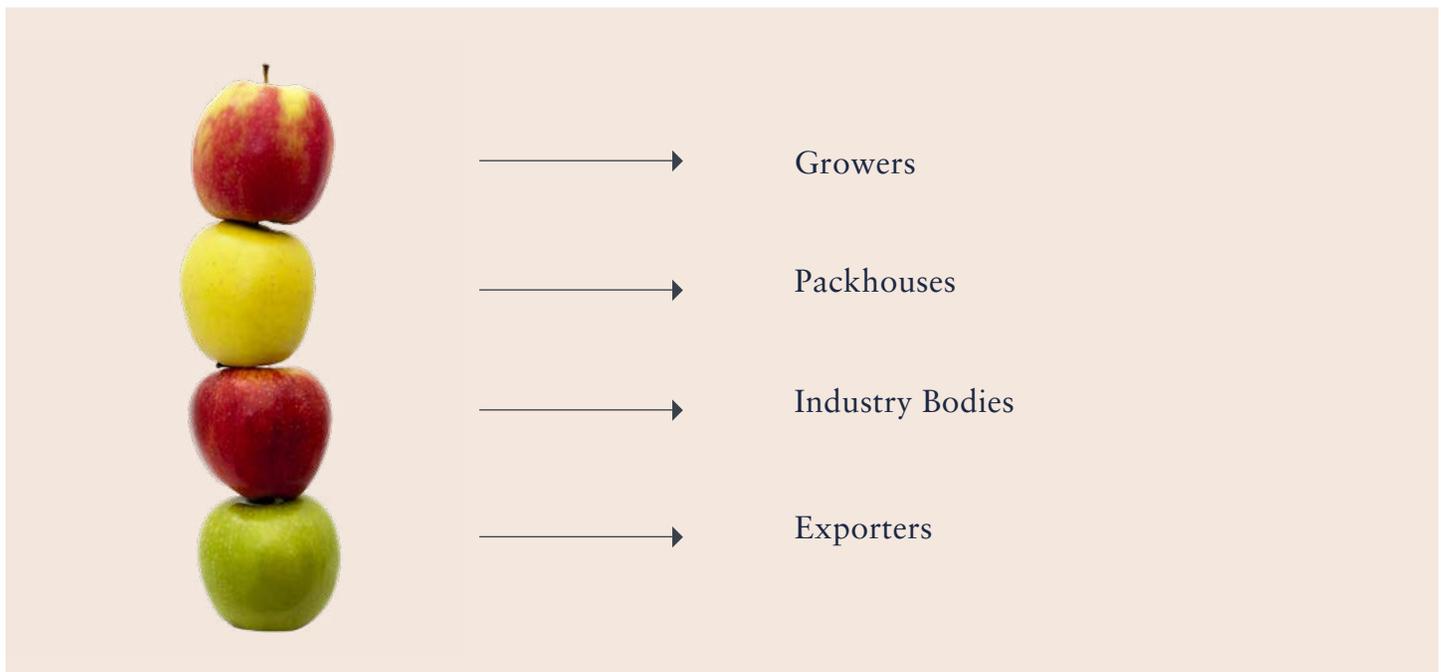
To understand why the New Zealand apple industry has chosen the pathway of food safety compliance that it has, the following question needs to be asked:

Why are customers, at all levels, demanding certification of food?

- *Increased complexity of food supply chains.*
- *Increased demand for “ready to eat” (RTE) horticultural produce with a variety of associated food trends such as raw food juicing, vegetarianism, and veganism.*
- *Well publicized contaminated food scandals/recalls, e.g: October 2019 in USA listeria monocytogenes detected in apples from North Bay Produce.*
- *Customer interest in the origin of food.*
- *Customer concern about agrichemical levels/heavy metals on and in food resulting from pesticide use, growing methods and processing.*
- *Focus on vulnerable consumers such as infants, pregnant women, the elderly and immunocompromised individuals.*

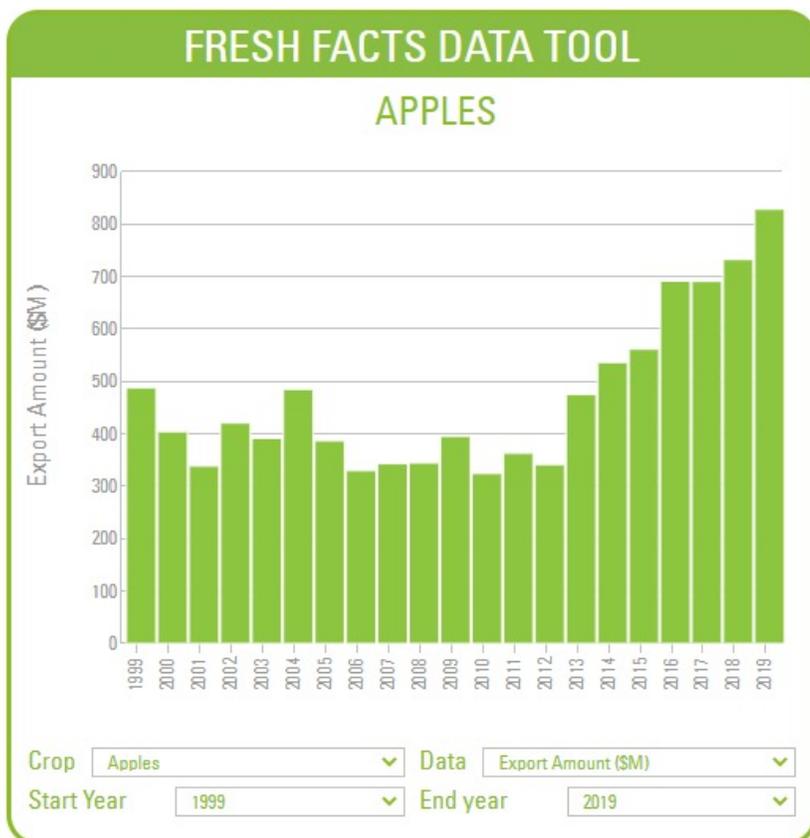
The Growing Background of Apples in New Zealand

At its simplest level, the apple industry in New Zealand is made up of the following four components:



In 2018 the New Zealand apple and pear industry covered 9,810 hectares and produced 576,000 tonnes of apples and pears. Of these, 381,000 tonnes were exported, 70,000 tonnes were sold on the domestic market as fresh fruit, and 125,000 tonnes were processed into other products. The New Zealand apple and pear industry is the most productive in the world producing 61 tonnes per hectare in 2017, 48% higher than our nearest competitor South Africa at 41.3 tonnes and 161% higher than the world average of 23.4 tonnes. The industry has been ranked as the most competitive apple industry in the world for each of the last 4 years (based on The World Apple Report published annually by Belrose Inc.¹ The NZ apple and pear industry has a current export value of \$777m FOB and is expected to reach \$1 billion by 2022.² It was reported by NZ Apples and Pears in August 2020 that the 2019/20 season was worth NZ\$870m (US\$577m).

The graph below is taken from the New Zealand Plant & Food Research Fresh Facts website <https://www.freshfacts.co.nz>³



New Zealand apple growers are producing apples for more than 100 markets around the world and they are tailored to meet their different preferences for size, color, and taste. There are dozens of varieties being grown in New Zealand, as well as many more new breeds in development. The main markets are North America, Europe, the People’s Republic of China, Japan, Taiwan, and the various regional markets of Asia have seen significant development over the past 10 to 15 years. “Wherever they’re sold, New Zealand apples are seen as a premium product thanks to the positive perception of the country.”⁴

Growers are required to register with both industry bodies [NZ Apples and Pears Incorporated](#) and [HortNZ](#) if they want to export.

¹ “World Apple Review.” Belrose, Inc. Accessed March 25, 2021. <https://www.e-belrose.com/apple-world-review/>

² NZ International, Business Forum. “SUBMISSION TO THE MINISTRY OF FOREIGN AFFAIRS AND TRADE EUROPEAN UNION-NEW ZEALAND FTA NEGOTIATIONS,” August 2018.

³ “New Zealand Horticultural Statistics.” Fresh Facts. Accessed March 25, 2021. <https://www.freshfacts.co.nz/>.

⁴ “Apples for the world A world of apples.” New Zealand Apples and Pears. Accessed March, 25, 2021. <http://pipfruitnzstories.co.nz/story/a-world-of-apples>



**New Zealand
Apples & Pears®**

WHO IS NZ APPLES AND PEARS INC?

Previously the apple and pear industry body was called Pipfruit NZ but in August 2017, it adopted a new name - New Zealand Apples and Pears Incorporated.

The chief executive of New Zealand Apples and Pears, Alan Pollard, said the new name makes the industry clear to consumers and utilizes the New Zealand brand. “In the early days Pipfruit New Zealand was primarily engaged with growers, who all knew what pipfruit is. While that is still our primary role, today we are engaging with a much broader audience from career seekers, government officials both here and overseas, and the general public. We found that there was some confusion about who we represented with some thinking we represented other fruit with pips such as mandarins, lemons, and oranges, which we don’t. We can now more easily tell our story and people will know exactly what we grow and market.”⁵



⁵ “Pipfruit NZ becomes New Zealand Apples and Pears Inc.” AgriHQ. Accessed 24 March 2021.

<https://agrihq.co.nz/topic/organisations-lobby-groups-campaigns/view/pipfruit-nz-becomes-new-zealand-apples-and-pears-inc>

AND HORTNZ?

It was originally formed by a merger in 2005 of the New Zealand Fruitgrowers Federation, the New Zealand Vegetable and Potato Growers Federation, and New Zealand Berryfruit Federation. It “advocates for and represents the interests of New Zealand’s 6,000 commercial fruit and vegetable growers.”⁶ Their vision states:

Oranga kai, oranga tangata, haere ake nei
Healthy food for all, forever



Integrated Fruit Production (IFP) program

Apple growers must also follow the Integrated Fruit Production (IFP) program. This is the New Zealand system for producing fruit with low residues, low biosecurity risk and low environmental impact. IFP was introduced in the 1990s. By 2001, 100% of export fruit was being produced under this programme. “New Zealand IFP guidelines were developed from IOBC (International Organisation for Biological Control) principles and matched carefully to local production conditions. The rapid rate of implementing the guidelines was largely attributable to the industry’s strong reliance on export markets and the legislated single seller status operating at the time.”⁷

IFP has become the industry standard and is now adopted by buyers in key world markets, who demand that all suppliers produce fruit to the standards obtainable under the IFP programme. The goal of IFP is to produce high quality apples and pears, prioritizing human health and the environment through sustainable production techniques. A manual is available for growers from NZ Apples and Pears.

Apple exports from New Zealand have seen a big shift from west to east in recent years. In 2019 around 57% of total NZ apple exports went to Asia, while in 2004 only 13% went there. The NZ Apple industry has some exclusive varieties which are very popular and can command premium prices. In 2017 Germany was still the biggest market for NZ apples, followed by the United States then the United Kingdom, but Taiwan is now the fourth biggest market having seen huge growth in recent years.

Each component of the apple industry is subject to statutory regulations such as Importing Countries Phytosanitary Requirements (ICPRs), Offshore Assurance Programmes (OAPs), Overseas Market Access Requirements (OMARs) and the Food Act 2014. The application and enforcement of these regulations is primarily overseen by the Ministry for Primary Industries (MPI).

As well as these statutory regulations, the industry has adopted non-regulatory food safety management schemes (FSMS), specifically BRC (now known as BRCGS, Brand Reputation Compliance Global Standards) which is applicable to packhouses and GLOBALG.A.P. for growers. These schemes are audited by third party certifying bodies, for example AsureQuality. A key element of validating compliance is the use of accredited certifying bodies (CBs). In New Zealand, the Joint Accreditation System of Australia & New Zealand (JAS-ANZ) is the accreditation body authorized by the government to provide an accreditation service to the certification bodies. For most non-regulatory FSMS, certification bodies must be approved by the scheme owner. This is applicable for BRCGS and GLOBALG.A.P. Both organizations have a process for this approval. For example, certification bodies that want to become GLOBALG.A.P. approved must be: “accredited for ISO/IEC 17065 for the relevant scope and sub-scope. A GLOBALG.A.P. recognized accreditation body must also be a member of the International Accreditation Forum (IAF) and signatory of the part of the Multilateral Agreement (MLA) on Product Certification. This means that the accreditation body (AB) has been subject to a peer evaluation in the product certification field and has received a positive recommendation in its report. GLOBALG.A.P. signs license and certification agreements (LCA) with certification bodies that have passed successfully the GLOBALG.A.P. internal approval process. The agreements and the accreditation ensure a standardized high level of quality and integrity.”⁸

Certification bodies are organizationally independent from producers and customers and can therefore provide assurance of consistent implementation of the food safety standards.

⁶ Horticulture New Zealand — Ahumāra Kai Aotearoa. “About Us.” Horticulture New Zealand - Ahumāra Kai Aotearoa, November 26, 2020. <https://www.hortnz.co.nz/about-us/>.

⁷ Wiltshire, Jonathan W. “INTEGRATED FRUIT PRODUCTION IN THE NEW ZEALAND PIPFRUIT INDUSTRY.” Accessed 24 March 2021.

⁸ GLOBALG.A.P. “Become a GLOBALG.A.P. Certification Body (CB).” Accessed March 18, 2021. https://www.globalgap.org/uk_en/what-we-do/the-gg-system/certification/Become-an-approved-CB.



WHY DID THE APPLE INDUSTRY IN NEW ZEALAND CHOOSE BRCGS AND GLOBALG.A.P.?



“GLOBALG.A.P. started in 1997 as EUREPGAP, an initiative by retailers belonging to the Euro-Retailer Produce Working Group. British retailers working together with supermarkets in Europe became aware of consumers’ growing concerns regarding product safety, environmental impact and the health, safety, and welfare of workers.

The EUREPGAP standards helped producers comply with Europe-wide accepted criteria for food safety, sustainable production methods, worker welfare, responsible use of water and plant propagation materials. Harmonized certification also meant savings for producers, as they no longer needed to undergo several audits against different criteria every year.

Over the next ten years the process spread throughout the continent and beyond. Driven by the impacts of globalization, a growing number of producers and retailers around the globe joined in which gave the European organization global significance.

To reflect both its global reach and its goal of becoming the leading international G.A.P. standard, EUREPGAP changed its name to GLOBALG.A.P. in 2007. GLOBALG.A.P. today is the world’s leading farm assurance program, translating consumer requirements into Good Agricultural Practice in a rapidly growing list of countries – currently more than 135.”⁹

It was therefore the obvious choice for the apple industry who wished to export around the world. The New Zealand Apple industry adopted the G.A.P. program in 2007 and is often described as an “early adopter”. The adoption of the G.A.P. program represented a shift in emphasis to food safety from just phytosanitary.

Individual growers undertake an annual GLOBALG.A.P. audit and any identified non-compliances must be closed out within a designated timeframe before a certificate is issued. GLOBALG.A.P. maintains a database where valid certificates can be viewed. The apple packhouse receives a copy of the valid certificate for each grower and electronically enters the grower in their database with certificate details. These details are reconfirmed prior to harvest and again when the grower’s apples arrive at the packhouse. Quality Controllers further confirm GLOBALG.A.P. status prior to the apples commencing the packing process – water bath, grading, packing, inspection, and cool storing.

⁹ GLOBALG.A.P. History. Accessed March 24, 2021. https://www.globalgap.org/uk_en/who-we-are/about-us/history/.

Each apple grower's annual GLOBALG.A.P. audit covers the entire growing process including:

- *land selection*
- *purchase of trees and planting*
- *fertilizing*
- *pollination*
- *pruning*
- *integrated pest management*
- *agrichemical application*
- *water use – sources, uses and safety*
- *staff training*
- *disposal of waste*
- *environmental considerations*
- *pollution*
- *energy use*
- *calibration of equipment*
- *harvesting*
- *transport*
- *health and safety*
- *hygiene*
- *traceability*
- *packing of product i.e. is the packing facility BRC accredited?*



In the grower's audit there is considerable emphasis on checking records. Spray diaries must include location of spray applications including address and field reference, name of applicator, identification of equipment used, weather conditions, date and time of application, name of product applied including volume and active ingredients, withholding periods and justification for application. Growers are asked whether the agrichemicals being used are on-label or off-label. Residue tests are required. The apple industry has a mandated programme to ensure the residue tests are completed and the results forwarded to the grower's packer of choice.

Similar details are required for fertilizer applications plus the levels of elements they contain such as nitrogen, phosphorus, and potassium. Storage conditions of agrichemicals and fertilizers are also audited to confirm that they pose no risk to the harvested apples.

Hygienic practices are paramount and are assessed by way of reviewing staff training records, observing staff at work and their practices, signage e.g "wash hands", and availability of toilets and handwashing equipment such as potable water, soap, and paper towels. Staff are interviewed to ascertain their level of understanding of the hygiene practices at the orchard. Induction of employees will include the instruction to alert a supervisor should anyone become aware of any potential contamination to the apples. This contamination could result from fluids or material getting into the picking bags or bins of fruit, for example blood or machine oil. Induction also covers illness and communicable diseases which workers may be suffering from. The instructions are clear, any unwell staff must not attend work and must get a medical clearance to return – the Covid 19 pandemic has of course brought this rule into sharp focus.

HOW TO WASH YOUR HANDS?



1 Wet hands with clean, running water



2 Apply enough hand wash/soap to cover your hands.



3 Rub hands palm to palm



4 Lather between fingers



5 Scrub between your fingers



6 Rub the backs of fingers on the opposing palms



7 Clean thumbs



8 Wash fingernails and fingertips



9 Rub each wrist with opposite hand



10 Rinse hands and wrists under clean, running water



11 Dry with a single use towel



12 Your hands are clean

When the Global Food Safety Initiative (GFSI) was established, the BRCGS Global Standard for Food Safety was the first standard to meet it. The BRCGS standard has therefore come to be readily accepted by many of the world's biggest retailers, such as Tesco and Walmart. It has been developed to ensure that safe food is being produced at all stages of the process. It makes good economic sense for both producers and those selling their products.

BRCGS certification indicates that a site will have as a minimum:

- *A comprehensive focus on the safety, legality and quality of food being produced*
- *Evidence of food safety culture*
- *HACCP based processes*
- *Evidence of senior management commitment*
- *A documented food safety and quality management system*
- *Site standards emphasizing hygiene and pest control*
- *Well maintained equipment to carry out the tasks required*
- *Product control including full traceability of product and packaging*
- *Trained personnel*
- *Records of cleaning and sanitization*
- *No open non-conformities*

Like GLOBALG.A.P., BRCGS was an appropriate choice for apple packhouses in terms of achieving market accessibility and evidencing the safe packing of their product.

During the apple packhouse BRCGS audit, an auditor from an accredited certifying body (CB), will thoroughly assess the packing operation, looking at records, documentation, and processes across the core areas of operations. Audits typically are carried out over three days with auditors interviewing staff across all areas of the operation. An extensive site walk is completed where buildings and equipment are visually inspected.

Underpinning both the GLOBALG.A.P. and BRCGS programs is extensive use of risk assessments, particularly regarding hygiene. Risk assessments require the growers and packhouses to identify food safety hazards and categorize them under headings such as: microbiological, chemical, physical, and radiological. Having identified the hazards, the probability/likelihood of occurrence is determined along with the level of harm it is likely to cause. For growers the emphasis on food safety hazards will focus on water supply, staff, harvesting equipment and agrichemicals. For packhouses, the emphasis will also be on staff and water but will include the premises – toilets, handwashing, canteens, equipment, packaging, and storage.

In the late **1980's to mid-1990's**, apple exports from New Zealand were only required to meet phytosanitary requirements, from the **mid-late 1990's** residue results and grade standards were added. **Circa 2000**, the additions were: GAP, food safety, labelling, traceability, and customer programmes. **Today**, there are all these attributes as well as: ethical trade, trade security, food fraud, food defense, social practice, and sustainability.

Effectively, the apple industry compliance programs chosen throughout New Zealand seamlessly ensure that at each step, food safety compliance is being maintained. Packhouses will not accept apples from growers who have not achieved GLOBALG.A.P. certification and exporters are not able to supply offshore customers if the apples have not been packed in a BRCGS accredited facility. There is a multitude of checks undertaken throughout the process from growing to harvesting to packing to cool storing to exporting to confirm compliance. Alongside these food safety programs are the phytosanitary regulations – ICPRs, OMARS and OAPs.

There is one other key component in New Zealand’s food safety program – the Food Act 2014. The Act utilizes a sliding scale where food businesses with greater food safety risks are required to operate in a different manner to those with less food safety risks. For example, the packhouse packing whole fresh apples will not be treated the same way as a company producing apple juice.

The main tenet of the Act is that food production processes must be effective in terms of food safety. The Act came into force in March 2016 and included other important elements:

- *food recall management*
- *penalties and enforcement*
- *changes for food importers*

All these compliance requirements ensure that New Zealand is supplying safe food to both domestic and export markets. Reputation is paramount.







Legislative reform

Creating a legislative framework: Horticulture



The New Zealand Food Act 2014

This Act has been in force since March 2016 and it helps make sure that food sold throughout New Zealand is safe and suitable, whereby 'safe and suitable food' is defined as follows:

- *'safe food' won't make people sick*
- *'suitable food' meets compositional, labelling and identification requirements and is in the right condition for its intended use.*

HOW DID THIS ACT COME ABOUT?

In 2003 NZFSA (New Zealand Food Safety Association) began a broad-ranging review of the domestic food regulatory regime and by 2006 began work on rewriting the Food Act to reflect a number of changes to improve the regime. In 2007, NZFSA published Policy and Related Implementation Position Paper: Domestic Food Review (NZFSA Public Policy Paper No. 01/07). In 2009, NZFSA reviewed the policy in light of the Government's regulatory reform programme to address, amongst other things, the regulatory burden faced by businesses.

The paper noted that not only were there a range of regulations governing the production and sale of food but there were also a number of issues emerging:

- *a significant increase in the numbers of people contracting foodborne illnesses*
- *three different food regimes/regulators (Food Act 1981, Food Hygiene Regulation 1974 and voluntary Food Safety programs) operating simultaneously, with resulting poor lines of accountability and unnecessary confusion, inconsistency, complexity and cost*
- *unnecessary complexity in both the structure of responsibilities and legislative framework of controls*
- *lack of practicality of some controls and inconsistency in their application*
- *lack of common understanding of good hygienic practice and other key concepts*
- *the absence of sufficient risk assessments in the food sector¹*

¹ New Zealand Food Safety Authority. "REGULATORY IMPACT STATEMENT 2009 – A REFORMED FOOD REGULATORY REGIME" [PDF] accessed on March 20, 2021. This publication is available here <https://www.treasury.govt.nz/sites/default/files/2009-10/ris-nzfsa-rfrr-oct09.pdf>

The Food Act 2014 also introduced other changes, including the way food recalls are managed - the chief executive of the Ministry for Primary Industries (MPI) has the power to direct a food recall if needed. Previously a recall under the Food Act 1981 could only be directed by the Minister for Food Safety.

MPI

The chief executive of MPI has a number of other powers including the ability to



publish statements about the food

give directions to a person to complete and supply a declaration if there is a change of ownership/location

give directions to impose movement or related controls in relation to food that may not comply with the Act to control the risk to human life or public health

give directions to recall unsafe, contaminated, mislabelled/ mishandled identified food

give directions to a person to dispose of imported food

give directions to manage food

require production of information for the purpose of determining safety and suitability of food



The new Act also strengthened the Government’s enforcement powers by introducing new offences. Food safety officers now have the power to issue infringement notices, a new enforcement option that is an intermediate measure between warnings and court action. There are also greater powers given to the officers to inspect and search food businesses and premises where food is prepared. Penalties for breaching the Act have significantly increased. The maximum penalties are now \$100,000 for individuals and \$500,000 for companies.

Furthermore, the Act also introduced a “good Samaritan” clause to protect businesses who donate their food in good faith. A donor is protected from civil and criminal liability that results from the consumption of food donated if it was safe and suitable when it left the possession or control of the donor and (if necessary) the donor provided information on how to keep the food safe and suitable.

A central feature of the Act is a sliding scale where businesses that are higher risk, from a food safety point of view, will operate under more stringent food safety requirements and checks than lower-risk food businesses. This means that a grower of kiwifruit or avocados will not be treated in the same way as the manufacturer of infant formula. The Act promotes food safety by focusing on the processes of food production.

There are two key food safety measures:

- **Food Control Plans (FCPs):** *Written plans for managing food safety on a day-to-day basis. These are used by higher-risk businesses.*
- **National Programmes:** *A set of food safety rules for medium and low-risk businesses. If a business is under a national programme, they don’t need a written plan (or develop written procedures), but must register, meet food safety standards, keep records and get checked.*

All growers and packhouses are required to register under the Food Act 2014. In some instances where the grower belongs to a grower group such as Zespri, this registration process is facilitated for them.

After consultation with the horticulture industry, certifying bodies and other interested parties, the New Zealand Government decided to issue Food Control templates for growers who were either NZGAP or GlobalG.A.P. certified and packhouses which were BRCGS certified.

- [*Food Notice: Approved Food Control Plan Template \(New Zealand Good Agricultural Practice \(NZGAP\)\) \[PDF, 462 KB\]*](#)
- [*Food Notice: Approved Food Control Plan Template \(British Retail Consortium BRC for Horticultural Operators\) \[PDF, 462 KB\]*](#)
- [*Food Notice: Approved Food Control Plan Template \(GLOBALGAP\) \[PDF, 464 KB\]*](#)

The implementation of these templates allows a grower or packhouse to meet the Food Act 2014 requirements without an additional audit. Recognition of these existing programs was seen as an important and practical step in achieving compliance in the horticultural industry.



Around the time of the implementation of the Food Act 2014, produce wholesalers in New Zealand communicated to all their suppliers effectively requiring them to become compliant to a recognised food safety program, primarily NZGAP or GlobalG.A.P. Until this time, many smaller growers had not bothered to become certified as it was not mandatory and often they did not understand the rationale behind the programs. It was also seen as an additional cost with little real benefit. The wholesalers emphasised to these growers that the market for uncertified produce was rapidly shrinking and the returns were significantly less. The supermarkets were a key driver in this movement with their customers requiring surety around produce, both in terms of origin and food safety. The raw food, vegetarian, vegan and juicing trends further highlighted the value of safe food.

In 2018, following the introduction of the Food Act, The Food Safety Assurance and Advisory Council (FSAAC) and New Zealand Food Safety (part of the Ministry for Primary Industries) released research that had been carried out into the food safety culture in New Zealand food businesses. The FSAAC was established in 2014 to provide the Ministry for Primary Industries (MPI) with high-level independent strategic advice and risk analysis on the performance of New Zealand's food safety system.

The council commissioned this research which aimed to:

- a. Understand how the level of food safety culture can be improved in New Zealand*
- b. Get data to support the food safety culture debate*
- c. Be able to track food safety culture over time.*



In total 900 businesses participated in the research. Interviews were undertaken with food safety managers and staff. 402 of the businesses were involved directly in the horticulture/dairy/meat/seafood sectors. Their involvement was either growing/producing or packing/processing. “Chair of the FSAAC, Michael Ahie explains, “We wanted to get a better understanding of how New Zealand food businesses are implementing and maintaining a strong food safety culture in the workplace. Food safety must be treated as a way of doing business and not just something that is discussed at a weekly meeting. This initial research provides a baseline that will be valuable for tracking improvements over time”.

New Zealand Food Safety’s director of food regulation, Paul Dansted said having a strong food safety culture is very important. “It’s important for the health of our consumers and the strength of our economy that New Zealand food continues to be safe and suitable and we protect our good reputation. Most food business owners, managers, and staff have an inherent sense of pride in what they are doing and are motivated to build and maintain a good reputation for their business.

“But there is still work to do to ensure consistency across all types and sizes of food businesses, and right across the supply chain, whether it’s growing, harvesting, importing, processing, transporting, storing, exporting, or selling. Part of having a world-leading food safety system is that we must always look at continuous improvement. This research helps to identify areas where we excel and areas where we can do better.

“Nine hundred food business and 193 employees spanning all areas of the food supply chain from manufacturers to retailers were surveyed. Overall, the results show that New Zealand food businesses have a strong commitment to food safety.

“Where food businesses are doing well is keeping customer safety top of mind and having formalised food safety policies and procedures, with 95% saying they had policies and rules in place to identify and deal with food safety risks. There’s also good leadership driving food safety culture with 75% of employees surveyed saying that their managers visibly show support for food safety and walk the talk.

“On the other hand, the research indicates there’s room for improvement. Businesses need to have specific food safety goals and key performance indicators in place, and reward employees for taking part in the day-to-day improvement of their food safety practices. Businesses also need to develop a more inclusive and shared sense of responsibility for food safety across the whole organisation. Only 3% of food businesses surveyed report data on their food safety performance back to their employees.

“This research helps us to build a better picture of how food businesses view and develop food safety cultures both internally and across their supply chain. New Zealand Food Safety has been providing more effective food safety tools for businesses. We have received very positive feedback on our new food safety templates, resources and guidance, and the way we have worked in partnership to develop them”².

The key findings were:

- Large businesses tend to have a formalised approach to food safety. In particular, medium to large retailers/wholesalers and manufacturers are more likely to say they have food safety goals, and that they regularly report food safety performance data to a Leadership Team or an auditor.
- Larger businesses interviewed identified a number of audit regimes and customer requirements which drive their food safety practices. Whereas smaller businesses said they relied on more informal approaches to managing food safety – such as internal training and talking to their staff as they work alongside them.
- The most commonly mentioned influences on food safety commitment described in the survey were: Brand reputation, satisfied customers, protecting market share and minimising risk. Both types of business, large and small are motivated by the need ‘to stay in business’ – which includes delivering a reputable product, protecting their brand, and satisfying customers.

² Industries, Ministry for Primary. “Food Safety Culture in Good Shape but More to Do,” September 12, 2020. <https://www.mpi.govt.nz/news/media-releases/food-safety-culture-in-good-shape-but-more-to-do/>

The Role of Codex for New Zealand

The Codex Alimentarius Commission (Codex or CAC) has established international standards and related texts for consumer health protection and international trade. It also provides an important forum for discussing contemporary and emerging food safety issues.

New Zealand's prosperity and wellbeing depend on sustained growth and access to international markets for our food and agricultural products. The work of the Codex Alimentarius Commission is critical to promoting international harmonisation and reducing technical barriers to trade. Codex food safety standards are recognised as international benchmarks under the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement). Implementation of the SPS Agreement and promotion of international harmonisation based on Codex and other relevant international standards are essential to advancing the objectives of New Zealand's free trade arrangements.

“New Zealand enjoys a high level of recognition and profile in Codex through our leadership and commitment to international food standards that are based on sound science and risk assessment, and that meet the needs of health protection and trade.”³

Key aspects of Codex for New Zealand are:

- *the establishment of food standards for individual commodities such as milk, meat, fruit, and vegetables*
- *the setting of maximum limits for pesticide residues*
- *the setting of standards/guidelines for food hygiene and food labelling*
- *development of import/export inspection and certification systems*
- *increased co-ordination of governmental and non-governmental organisations in food safety matters*



³ Ministry for Primary, Industries. “New Zealand’s Strategic Objectives in Codex 2015–2020,” accessed on March 20, 2021. This publication is available [here https://www.mpi.govt.nz/dmsdocument/9596/direct](https://www.mpi.govt.nz/dmsdocument/9596/direct)



Overseas Market Access Requirements

This continues to be a moving target which New Zealand exporters of horticultural produce must strive to meet. For example, with the outbreak of the Covid 19 pandemic, the Ministry for Primary Industries (MPI) has issued a series of documents with Chinese requirements, the latest issued on 26 February 2021 - F15/21: China Covid-19 import measures Animal, plant, and food products.

It includes the following mandatory declaration which must be completed for all offshore shipments:

“In order to prevent the contamination of food with the virus and to avoid compromising food safety in the current COVID-19 epidemic situation, (grower/packhouse name) commits to: Willing to comply with Chinese laws, regulations and standards and the “COVID-19 and food safety: guidance for food businesses” published by the Food and Agriculture Organization of the United Nations and the World Health Organization to ensure that food imported into China is not contaminated with the COVID-19 virus and to ensure the safety of food imported into China. In the event that a new case/suspected case of COVID-19 is detected in a food enterprise, or if there is a risk of contamination of food products exported to China, we are willing to take all necessary measures to eliminate food safety risks and protect consumer health.”⁴

And a requirement that: Clause 1.3 (5) The COVID protection measures include nucleic acid testing of food and outer packaging before product leaves the factory, with export only after the test is negative; coverage of possible contamination pathways such as ventilation systems, across production and transportation, and environmental disinfection; daily health checks of personnel, personal protection of employees during production processes, encouraging employees to be vaccinated, and regular nucleic acid testing.

The Ministry for Primary Industries (MPI) is the body charged with ensuring that companies in New Zealand follow these offshore government’s requirements and they can of course be subject to change at very short notice. It is therefore essential that growers, packhouses and exporters have mechanisms in place to enact procedures and documentation to meet the regulations as they come into force. It could be argued that because they already have well developed and mature systems and processes in place to meet existing food safety standards (vis-à-vis their GlobalG.A.P. or BRCGS certification), further adaption to meet new requirements is not such a momentous task. HACCP principles, traceability at all stages, standard operating procedures and well-defined staff responsibilities all assist with rapid adaption. Growers and packhouses understand the importance of maintaining and keeping these systems up-to-date and being agile to meet ever changing market requirements, especially offshore.

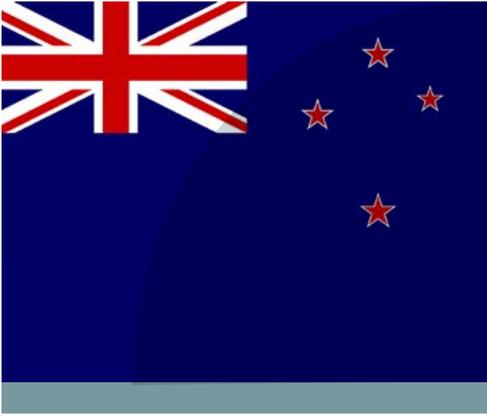
⁴ Ministry for Primary, Industries. “F15/21: China Covid-19 Import Measures Animal, Plant, and Food Products,” Accessed on March 15, 2021. This publication is available here <https://www.mpi.govt.nz/dmsdocument/42922-F1521-China-Covid-19-import-measures>

To achieve this agility, it could be argued that staff training is the most important element of all. Staff are required to not only carry out a number of tasks, but they are also being asked to respond to any changes/events in the processes they oversee which may impact on food safety. They must therefore have an understanding of what food safety means and how their actions impact on this. The motto “Food safety is everyone’s responsibility” underpins the successful production of food suitable for human consumption and is a message that successful food producers in New Zealand have adopted.





Legislative reform Creating a legislative framework: Dairy Processing



Overview: Dairy Processing

New Zealand is situated in an ideal location with a good level of isolation as an island group to allow for excellent farming climates and the ability to limit pests that can impact on primary industries. This system allows for high quality primary products to be exported to all corners of the world.

To protect this valuable industry, it is regulated by the government under the department of MPI (Ministry for Primary Industry). MPI manages Biosecurity for the country and regulates primary industries including dairy. New Zealand has 100 plus years of history of government regulation to support the quality of the primary industries and negotiation of trade with overseas markets. The Dairy and Meat industries followed similar legislative modes since the first export of primary products in the late 1800s (see Module 1, case study 1).

“New Zealand is the world’s top dairy exporter, accounting for a third of the world’s dairy trade. Dairy alone now accounts for 35% of New Zealand’s total commodity export value. A well-regulated dairy industry supports competition in the local market and ensures New Zealand farmers see the benefits from exporting their goods.”¹

The New Zealand Dairy industry is aligned to the Animal Products Act 1999 (APA 1999). Beneath the APA 1999 there are regulations, notices and guidance defining the requirements of the Act. Dairy farms and manufactures then develop their own Risk Management Programs (RMPs) to align with the legislation using the regulations, notices, and guidance, ensuring compliance to the APA 1999.

The RMP includes a written Hazard Analysis Critical Control Point (HACCP) plan – as per Codex Alimentarius 1969 – Revision 2020. The HACCP is not a standalone Program and is therefore supported by Pre-Requisite Programs defining how support systems are managed e.g. pathogen management, pest management, training, cleaning, and hygiene practices, etc.

Dairy legislation evolved in a similar manner to the meat industry system (see Module 1, case study 1):

“In a broad sense the history of New Zealand is essentially the history of agricultural development, as a country which has always been so dependent upon its primary industries must evolve policies which encourage their expansion. Moreover, the rate at which the economy as a whole can grow is tied to the capacity of agriculture to expand. Today pastoral products account for about 90 per cent of New Zealand’s export income, a proportion as high as at any time in the past.”²

¹ Industries, Ministry for Primary. “Introduction to Primary Production Legislation.” Ministry for Primary Industries. Ministry for Primary Industries, November 16, 2020. <https://www.mpi.govt.nz/legal/legal-overviews-legislation-standards/primary-production-legislation/introduction-to-primary-production-legislation/>.

² McLintock, Alexander Hare, M.A. Patrick Russell Stephens, and New Zealand Ministry for Culture and Heritage Te Manatu Taonga. “HISTORICAL EVOLUTION.” Te Ara Encyclopedia of New Zealand – Te Ara Encyclopedia of New Zealand. Ministry for Culture and Heritage Te Manatu Taonga, April 23, 2009. <https://teara.govt.nz/en/1966/farming>.

How NZ legislation looked and how it evolved

The industry grew from modest beginnings and developed through increased expansion to export markets and the development of dairy co-operatives. With the development of Reefer Shipping (Refrigerated Shipping systems) the United Kingdom increased sourcing primary products from further afield. This increase in demand was likely supported by the United Kingdom's growth in the middle-income population as the industrial revolution had established United Kingdom as a leading commercial nation. "In parallel with New Zealand's identity as 'a healthy country', the colony's reputation as a disease-free agricultural paradise was economically and culturally significant."³

The dairy industry began with local farms supplying milk to central locations to manufacture dairy products. The manufacturing of these products was completed by independent business owners; termed Proprietary Processors. The dairy Proprietary Processors were not trusted by the farmers, likely due to the lack of visibility of the pricing and payment for their milk and general distrust for business owners. The Proprietary Processor were in fact professionals with detailed knowledge of the export needs for the United Kingdom. However, the level of distrust from the farmers resulted in this model not working. The development of cooperatives was a collection of local farmers who had limited understanding of the export market and requirements.



Scene outside the Greytown-Wairarapa Co-op Dairy Co. Factory in Greytown. Smith, Sydney Charles, 1888-1972: Photographs of New Zealand. Ref: 1/2-048475-G. Alexander Turnbull Library, Wellington, New Zealand. /records/23075675

³ Ford, Katrina. "The Very Life-Blood of the Country' GERMS, DAIRYING AND PUBLIC HEALTH IN NEW ZEALAND, C.1890-1910." *New Zealand Journal of History* 47, no. 2 (2013). Page 157. <http://www.nzjh.auckland.ac.nz/>.

With the development of demand for dairy products in the United Kingdom; the New Zealand Government established a unified system to look to manage consistency of product and quality. “The Dairy Industry Act 1892 established an unprecedented degree of government involvement in the industry. All cheese and butter for export to the UK had to be branded so its factory origin could be traced. The dairy instructors became inspectors and were given the task of tracing sources of unhygienic butter and cheese.”⁴

At that time Bacteriology was becoming an understood science and the United Kingdom was significantly concerned about tuberculosis from milk containing Tubercle bacilli – “Bacteriology helped to construct many of the concerns of agricultural science as significant to public health by highlighting the channels through which the microbes of disease moved from the farm to the wider public.”⁵

“Attitudes to bovine tuberculosis amongst agricultural officials in New Zealand were transformed in the 1890s. Prior to this, very little was known about the prevalence of tuberculosis amongst cattle in the colony.”⁶ It was a perception that tuberculosis was low risk in open air farming instead of the closed system farms in Europe (housing of animals in barns in close quarters). This increased the perception of quality dairy products from New Zealand for a short period of time until it was further investigated and found that the prevalence was still high in New Zealand cattle also.

The hygiene conditions of the farm dairies were of significant concern due to the limited understanding by farmer supplying milk to the factories. “A series of Dairy Industry Acts in 1892, 1894, 1898 and 1908 gradually extended the powers of the state to inspect farms and factories, in order to ensure the safety and quality of the milk supply”.⁷

Other manufacturing concerns were identified although mostly considered as being related to the quality of milk supplied by farms, however manufacturing issues can often extend to the production environment; “Dairy officials blamed the problem of ‘fishy’ butter, which dominated concerns about the quality of New Zealand butter in the early years of the industry, on bacteria introduced into milk by careless farmers. However, research later showed that the fishy taint was not caused by a micro-organism, but rather was due to a chemical process that resulted from high acidity in the cream combining with oxidation from overworking of the butter.”⁸

“The 1898 Dairy Industry Act largely completed state regulation of the industry. Under it the Government could provide cheap finance to set up dairy factories.”⁹ Dairy factories were established by cooperative groups. Although the Cooperative model had difficulties in knowing and understanding the export market models, this model resulted in the establishment of Fonterra in 2001 as a world-renowned dairy company.

The dairy industry needed to be set up to ensure consistency and quality of materials to allow for export and local market confidence. Therefore, the establishment of the government systems to unify good practices was initiated.

⁴ Nightingale, Tony. “White Collars and Gumboots. A History of the Ministry of Agriculture and Fisheries, 1892-1992”. New Zealand Ministry of Agriculture and Fisheries, 1973. Quoted in Baldwin, Tony. “Dairy Industry – History” <http://www.tonybaldwin.co.nz/publications/dairy%20publications/2016/Industry%20history.pdf>: August 2016, page 16.

⁵ Ford, Katrina. “‘The Very Life-Blood of the Country’ GERMS, DAIRYING AND PUBLIC HEALTH IN NEW ZEALAND, C.1890-1910.” New Zealand Journal of History 47, no. 2 (2013). Page 175. http://www.nzjh.auckland.ac.nz/docs/2013/NZJH_47_2_03.pdf.

⁶ Ibid., 160.

⁷ Ibid., 170.

⁸ Ibid., 167.

⁹ Nightingale, Tony. “White Collars and Gumboots. A History of the Ministry of Agriculture and Fisheries, 1892-1992”. New Zealand Ministry of Agriculture and Fisheries, 1973. Quoted in Baldwin, Tony. “Dairy Industry – History” <http://www.tonybaldwin.co.nz/publications/dairy%20publications/2016/Industry%20history.pdf>: August 2016, page 16.

“Early government measures included:

- *Direct financial assistance*
- *Regulations on processing and standards*
- *Legislation to help set up cooperatives*
- *On-farm advice on how to operate a dairy farm and factory*
- *Legislation to help set up cooperatives*
- *Powers to enable the industry to designate milk collection zones to eliminate competition between processors at the farm gate.*
- *Strong restrictions on the supply of non-dairy alternatives like margarine”*¹⁰



In 1923 the Dairy Farmers sought legislation that gave them further support and confidence within the industry. The Dairy-produce Export Control Act was passed in 1923 (after a vote of dairy farmers approved it) and the Dairy-produce Board of Control was established.

This was the beginning of the dairy board model which was a central forum of knowledge, information, scientific methodology and negotiation of markets to unify New Zealand’s approach to managing this primary product for domestic and export markets. The Dairy Board was in control of all dairy product exports from 1923 until 2001.

“In 2001, the Dairy Board was merged with the two largest New Zealand dairy cooperatives (which represented 96% of the industry) to a company initially called GlobalCo, but shortly afterwards renamed Fonterra. The merger required approval from the Commerce Commission, which it declined, so a special Act of Parliament, the Dairy Industry Restructuring Act 2001 was passed allowing the merger to occur.”¹¹

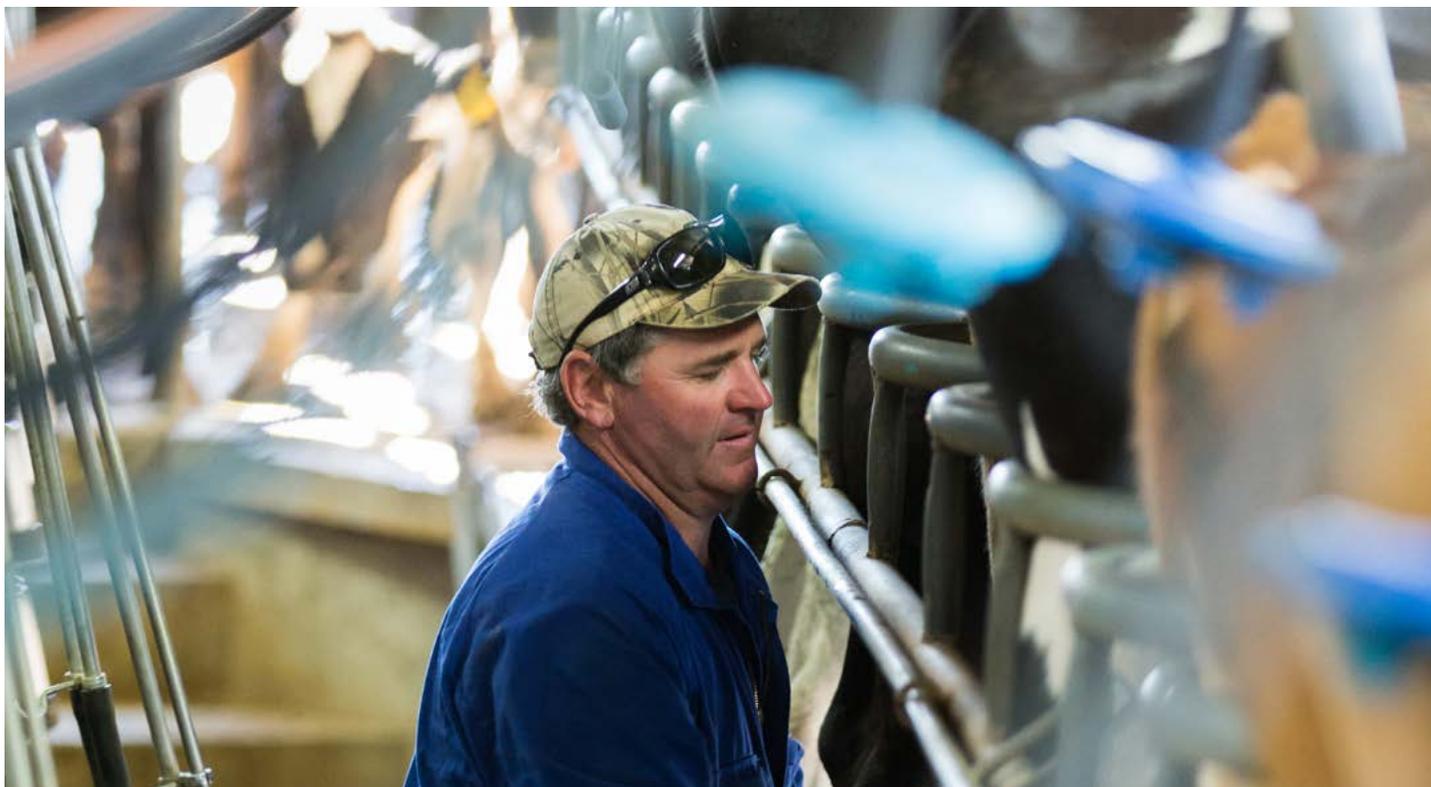
¹⁰ Nightingale, Tony. “White Collars and Gumboots. A History of the Ministry of Agriculture and Fisheries, 1892-1992”. New Zealand Ministry of Agriculture and Fisheries, 1973. Quoted in Baldwin, Tony. “Dairy Industry – History” <http://www.tonybaldwin.co.nz/publications/dairy%20publications/2016/Industry%20history.pdf>: August 2016, page 15.

¹¹ “New Zealand Dairy Board.” Wikipedia. Wikimedia Foundation, August 26, 2019. https://en.wikipedia.org/wiki/New_Zealand_Dairy_Board.

As Clive Lind explains:

- *“The thinking behind the [1923] legislation was reasonably straightforward. It was an attempt to give producers some combined strength when the market became difficult. The system was not designed to try to control the market – which would undoubtedly fail given milk’s widespread availability – but to enable the Board to manage the flow of products to minimize the effects of the worst declines”.*
- *“The Board’s powerful negotiating position resulted in huge shipping cost reductions, but market prices were still not where farmers thought they should be. This aggravated the tension between proprietary companies – with their close links to importers – and the cooperatives whose representatives, deep down, knew they were not able to market as effectively as they would like”.*
- *The rationale later evolved into the idea that a single dairy exporter from New Zealand could get higher prices for its products than competing exporters. This became an article of faith that determined the shape of the industry for most of last century and led to the formation of Fonterra.”¹²*

The Regulatory system is managed by the government who supports the dairy industry and seeks regular feedback from the industry through multiple forums. These forums are industry meetings in person and more recently via remote meetings and are by invite only. Although publicly available upon request they are not accessible without invitation. Although the government is the regulator, they also recognize their role as the Ministry for Primary Industries and therefore work to support the industry while complying to world recognized standards. As a regulated system there are costs to the industry, however this is balanced with the work the government does to maintain open markets for trade.



¹² Lind, Clive. ““Till the Cows Come Home – Inside the battle that built Fonterra”, Overland Publishing Ltd, Wellington, NZ, 2014.” Quoted in Baldwin, Tony. “Dairy Industry – History” <http://www.tonybaldwin.co.nz/publications/dairy%20publications/2016/Industry%20history.pdf>: August 2016, page 32.

How regulations impact on RMPs and industry practices



The regulatory and food safety system is continually changing and improving which is managed through the central government body in New Zealand – MPI (Ministry for Primary Industries). MPI is responsible for many sectors relating to the Primary Products including dairy. MPI is the controller of legislation and management of the systems and changes. The operators (farms, transport, stores, and manufacturing etc.) are responsible for maintaining the system within compliance to the legislation.

This system is monitored by Third Party Verification of manufacturers by approved Recognized Agencies who are approved to verify operators’ systems to confirm compliance and/or improvement to comply with the APA 1999.

The system works on a continuous improvement model therefore there is the possibility of changes and improvements to the systems. It is the operator’s responsibility to maintain and manage the RMP in compliance to current legislation. MPI have a road map to support the document hierarchy and to assist in location of the correct level of legislation. Below is a snippet of the document and a hyperlink to the document:

[\(Manuals and guidelines for dairy product manufacturers | MPI | NZ Government\)](#)

Figure 1: an image of the dairy roadmap and hyperlink below to the document. This document gives the legislative hierarchy and hyperlinks to the relevant regulations, notices, and guidelines within the Animal Products Act 1999.

The New Zealand food safety Program is delivered by several layers of legislation as outlined in Module 1, Case Study 1.

| DAIRY ROADMAP: | | DAIRY LEGISLATION | OTHER INFO: |
|--|--|--|---|
| | | General guidance A guide to the Animal Products Act 1999 and the Food Act 2014 . Glossary of Terms for Dairy | FORMS REGISTER & LISTS |
| Food Act 2014 | Animal Products Act 1999 | Agricultural Compounds and Veterinary Medicines Act 1997 | |
| REGULATIONS | REGULATIONS | REGULATIONS | |
| PART 2 RISK BASED MEASURES PART 3 FOOD IMPORTED FOR PURPOSE OF SALE PART 5 MISCELLANEOUS PROVISIONS This part provides for the setting of standards for food manufactured for sale in NZ or imported and sold in NZ. Requirements issued under Part 2A and guidance covers the following information; <ul style="list-style-type: none"> • Australia NZ Food Standards Code • Imported foods • Foods of High Regulatory Interest • Supplemented foods • Residue limits for food | Part 2 – Risk Management Programmes (RMPs) An RMP is a programme designed to identify, control, manage, eliminate or minimise hazards and other risks during processing of animal material and products. Requirements issued under Part 2 and guidance cover the following information; <ul style="list-style-type: none"> • General requirements for RMPs • Waivers to provide evaluation report • RMP manual • Codes of practice (COP) and RMP templates | The ACVM Act covers agricultural compounds used in the management of plants and animals. It includes veterinary medicines, pet food, stock feeds, fertilisers, pesticides, and vertebrate toxic agents. It manages their risks to trade, animal welfare, public health and agricultural security. The ACVM Act prohibits an agricultural compound being imported, manufactured, sold or used in NZ unless authorised. The two main authorisation mechanisms are registration of a "trade name product" with conditions imposed to manage risk to acceptable level, and exemption of a product from registration by regulations for those products having low risks. For Further Information: Refer Here | |
| | Part 3 – Regulated Control Schemes (RCSs) RCSs are special regulatory regimes to provide for cases where it is inappropriate or impractical to manage risk factors under an RMP or where special provision is required for the purposes of overseas market access requirements. There are RCS covering the following areas; <ul style="list-style-type: none"> • Transport of Animal Products Requiring an Official Assurance • Export of dairy quota products • Dairy industry national residue monitoring programme • Raw milk for consumers (for raw milk products, e.g. raw milk cheese, refer to Specification for raw milk products in Part 4) | | |
| | Part 4 – Animal Product Standards and Specifications This part provides for the setting of standards that must be met by any animal product intended for trade or processed for reward before it may be considered fit for intended purpose. This part also allows for the setting of specifications that may be necessary to ensure such standards are met. Requirements issued under Part 4 and guidance covers the following information; <ul style="list-style-type: none"> • Dairy Processing • Disposal of non conforming dairy material or dairy product • Specification for raw milk products • Laboratory testing | | |



How the World Trade Organization and overseas markets impact on our regulator and how that impacts on legislation

The legislative structure within New Zealand is based on international standards to ensure consistency and alignment to importing country expectations. This alignment is based on three international standards with the remit to support international trade.

Those are:

- *Codex Alimentarius Commission for food safety*
- *World Organisation for Animal Health (OIE) for animals and animal health*
- *International Plant Protection Convention (IPPC) for plants and plant health.*

New Zealand has aligned the legislative structure with the international standards. The international standards are recognized by the WTO (World Trade Organization) as part of the Sanitary and Phytosanitary Measures (SPS Agreement).

This structure gives New Zealand an internationally recognized model to scientifically support the management of the primary industries and ensure the most modern and relevant systems and controls are used to maintain the quality of export and trade internationally.

New Zealand finds significant value in having the basis of the international standards and therefore is a strong advocate for the system. This is not only to support international trade but also due to the standards being aligned to best (scientifically proven) practices which are also used for domestic supply.

WHY RISK MANAGEMENT PROGRAMS ARE ACCEPTED BY FOREIGN COUNTRIES

New Zealand has developed a strong reputation for the quality of its primary products which is further endorsed by the strength of the regulatory system established within New Zealand. MPI as the Government body is the only body that communicates with other foreign governments. The New Zealand Regulatory system is presented to overseas governments to demonstrate how the legislation is managed within New Zealand. This system is presented and agreed with Overseas Markets who may also have some additional requirements. The additional requirements are called OMARs (Overseas Market Access Requirements). The OMARs are available within the MPI system and are used by operators to confirm compliance to the particular market. Any dairy operator planning to export must be registered with MPI as a Dairy Exporter and is required to comply to the RMP and any relevant OMARs for the markets they plan to export to. This system, within the dairy model, is verified by the Third Party Recognized Agency and is also monitored by Overseas Markets who may complete a verification of this system by completing a verification of MPI, the recognized agencies and operators.

Years of resistance to prescriptive legislation and lobbying to central government resulted in the passing of the Animal Products Act 1999. This Act prescribed for operators to design and develop a Risk Management Program (RMP) that minimises and manages risks to human and animal safety. Each part of the RMP is:

- *Based on known science or by trial.*
- *Validated by a company elected competent person for each part of the Program.*
- *Registered by the Ministry for Primary Industries.*
- *Verified by the Approved Third-Party Verification Agency (Recognized Agencies).*
- *Verified by the operator.*

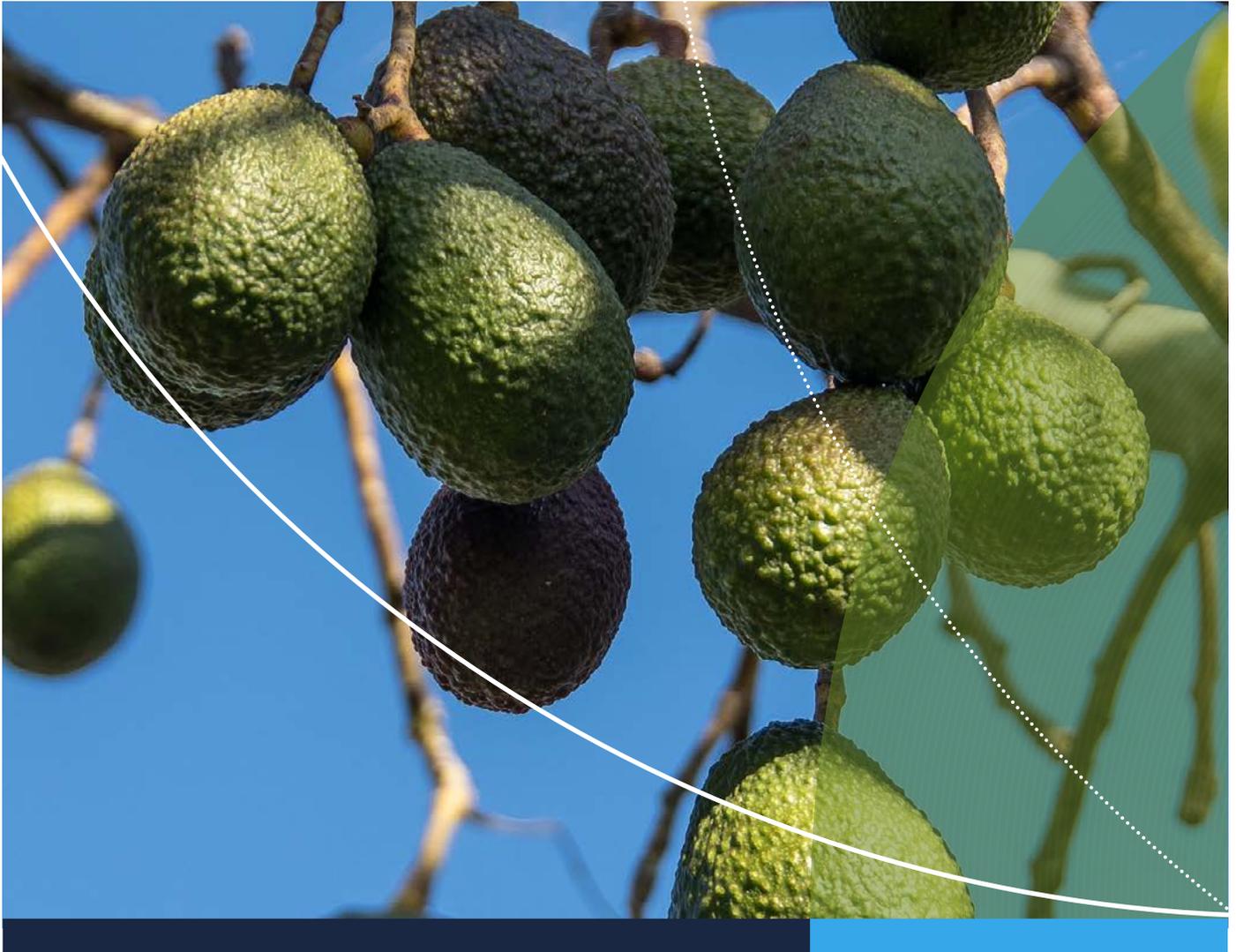


Summary and Conclusion

The New Zealand Dairy Industry has developed a reputation for premium products and quality that gives New Zealand access to trade markets that few other countries have. Major markets are European Union, the People's Republic of China, the United States of America, South America, the Middle East to name a few. New Zealand exports from Afghanistan to Zimbabwe and all in between (alphabetically). These systems have continually improved for over a century with collaboration between industry and government to represent the country as a supreme quality primary producer. New Zealand systems are well recognized and there are some key importing country listings that can be managed by MPI based on the confidence with the systems New Zealand has. Other countries can be required to be audited by the country however the years of developing a quality brand as part of New Zealand Inc. has help to increase trade opportunities around the world.

Industry and the government continue to look at ways to maintain continuous improvement within the industry models supported by the regulatory and food safety systems in the ever-changing world of trade and export system.





Institutional Structure

**A look at how the New Zealand food safety structure has evolved over time:
New Zealand Avocado**



Ministry for Primary Industries' role in food safety

The New Zealand food safety system extends from “farm to fork”. It covers all food and beverages for human consumption, as well as pet foods, animal feed, and agricultural compounds and veterinary medicines (ACVMs).

New Zealand’s Ministry for Primary Industries (MPI) aims to ensure that the health and safety risks from food are negligible and that consumer health and wellbeing are protected.

They do this by:

- *developing, regulating, and implementing food standards*
- *providing official assurances for wine, animal, and plant food products for exporters to governments in overseas markets*
- *tightly controlling the products that can be used in agriculture*
- *responding to food safety incidents and suspected breaches of legislation*
- *supporting access to export markets*

Four Acts regulate the safety of food that’s produced in New Zealand for domestic and export markets:

- *Agricultural Compounds and Veterinary Medicines Act 1997 – NZ Legislation*
- *Animal Products Act 1999 – NZ Legislation*
- *Food Act 2014 – NZ Legislation*
- *Wine Act 2003 – NZ Legislation*

The Ministry for Primary Industries (MPI) provides official assurances [to overseas governments] for agricultural, horticultural, forestry and food exports (as outlined in module 1, case study 1). “MPI’s regulatory model is based on a partnership approach between government and industry. Under this model, MPI manages the delivery of official assurances through authorizing independent verification agencies (IVAs) and in some circumstances approving organizations to undertake services on its behalf”.¹

By reducing the extent of direct government intervention that is the utilization of the IVAs, and placing the responsibility for systems and process control on the industry, individual businesses can maintain flexibility and economic control. The government (MPI) can focus its resources on verification through surveillance audits (carried out at pre-determined intervals by the IVAs). IVAs and industry both have a responsibility to the government in terms of meeting food safety requirements and reporting to MPI when any food safety incident arises.

¹ And the footnote to go with it is: Ministry for, Primary Industries. “MPI Certification Standard: Assurance System Framework,” March 30, 2015.

The MPI regulatory model for plant exports operates through authorized independent verification agencies and Ministry Approved Organizations (MAOs) who undertake services on MPI's behalf. In some official assurance programs (OAPs), MPI also registers organizations (e.g. growers) to perform specific activities. For example, in 2018 the avocado industry in New Zealand wanted to set up an export program to China, up until this time there had not been access to this extensive market. In 2018 MPI published the MPI Phytosanitary Official Assurance Programme (OAP) for the export of Avocados to the People's Republic of China. (Some revisions have subsequently been made). <https://www.mpi.govt.nz/export/food/fruit-and-vegetables/official-assurance-programmes/>

This document set out the rules which growers, packhouses (MAOs) and exporters had to follow. MPI commenced a series of in-depth audits of intending growers and packhouses to ensure they complied with the very prescriptive rules which had been negotiated with the Chinese government. The focus of the OAP was primarily on phytosanitary requirements and food safety, including full traceability of all product. Segregation of China compliant product was required in the packhouses, cool stores and when transporting. The Avogreen pest monitoring program was mandatory and was confirmed by surveillance audits undertaken by the IVAs. AvoGreen is a responsible and auditable avocado production system which uses the principles of Integrated Pest Management (IPM), an internationally recognized approach, to ensure pesticides are used only when needed. Growers are required to monitor their crops for a variety of pests and take action where set thresholds are exceeded. If the tolerance is exceeded, it is permissible to apply an agrichemical. This effectively replaces the more traditional model of "calendar spraying".

NZ Avocado as an industry body was involved in the process throughout primarily in a liaison/technical role. There were seven packhouses who initially opted into the program. Each packhouse involved their IVA (e.g. AsureQuality) in preparing for the MPI audit. Following the MPI audit, the IVA was charged with closing out any non-compliances issued and reporting to MPI. MPI then issued a formal letter of approval for each facility.

NZ Avocado then collated the data, that is the lists of approved packhouses and growers, and submitted to MPI, who in turn submitted it to the Chinese Government. Once approved, MPI published the lists on its website. Compliant growers and packhouses are required to re-register annually to update published lists. <https://www.mpi.govt.nz/resources-and-forms/registers-and-lists/>

Process control and risk management approaches are generally accepted worldwide for producing credible official assurances for plant and plant products. These systems-based approaches sometimes replace end-point inspection as the principal method of providing official assurances such as MPI certification. Although MPI authorizes IVAs and approves organizations to undertake services on its behalf, accountability for the issuance of official assurances is retained by MPI.





MONITORING FOOD SAFETY

Potential food safety risks are identified through the monitoring programs put in place by MPI. This monitoring includes approving plans documented by the multitude of food businesses throughout New Zealand. The aim of the plans is to identify any potential food safety risks involved in making food and develop operating procedures which will minimize these identified hazards.

MPI also oversees monitoring programs to make sure food produced in New Zealand stays within safe limits for toxins, chemical residues and other contaminants.

MPI also monitors food imported into New Zealand. This includes:

- *checking that acceptable levels for microbiological pathogens and chemical residues are not exceeded on imported food*
- *identifying any new food safety issues*
- *continuously reviewing food safety controls both offshore and in New Zealand*

HOW IS THIS DONE?

Food importers must register as a food importer with MPI or use an agent who is registered. This applies to all food being imported for sale in New Zealand. “Unregistered importers have their consignments held until they gain their food importer registration. MPI lists registered food importers in a public database. <http://mpiportal.force.com/publicregister/FoodImporterSearch>

Furthermore, food for sale in New Zealand must comply with the <https://www.foodstandards.gov.au/code/Pages/default.aspx>. This sets rules about what is allowed and not allowed in the food, and how it must be labelled when it comes to be sold.”²

Agricultural compounds and veterinary medicines (ACVMs) can help support and increase New Zealand’s food production, however they can also cause serious problems in areas ranging from human health to international trade. To manage this risk, all ACVMs imported, manufactured, sold, or used in New Zealand are:

- *assessed under the Hazardous Substances and New Organisms Act 1996*
- *tightly controlled under the Agricultural Compounds and Veterinary Medicines Act 1997.*

MPI’s website provides the link for importers to check what the acceptable agrichemical levels (MRLs) are in food. Residue levels in food must not exceed the relevant MRL. <http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/pesticides/en/>

Similarly, MPI also maintains a database for producers of food intended for sale, both domestically and for export. <https://www.mpi.govt.nz/resources-and-forms/registers-and-lists/maximum-residue-levels-database/>

² Industries, Ministry for Primary. “Food Importing Requirements.” Ministry for Primary Industries. Ministry for Primary Industries, November 16, 2020. <https://www.mpi.govt.nz/import/food/food-importing-requirements/>.

The central part of the food safety system requires evaluating and verifying that food businesses are meeting their food safety requirements at all levels.

Territorial authorities and certifying bodies, who are formally recognized as having sufficient competence and independence carry out the necessary verifications. MPI and all territorial authorities (local councils) are registration authorities under the Food Act 2014. They register food businesses operating under the two risk-based measures:

- *food control plans (FCPs)*
- *national programmes.*

Local councils in each municipal area develop their own systems to manage the registration processes for food businesses. All councils are however required to enter their data into MPI's electronic database MAPS (Multiple Approvals Processing System). The Food Act 2014 requires MPI to maintain a public register of risk-based measures. This is easily accessible on the MPI website:

<https://www.mpi.govt.nz/food-business/food-safety-registers-lists/>.

MPI also verifies that premises processing meat, seafood and other animal products follow appropriate risk management and food safety programs. Some types of businesses are able to choose whether they operate under the Animal Products Act or the Food Act.

MPI also investigates breaches of the Food Act and the Animal Products Act, and coordinates product recalls for unsafe or unsuitable foods. "MPI's chief executive can issue food recalls when needed, and make statements warning the public of broader food safety risks."³

Some overseas governments require the New Zealand government to provide assurances that exported products meet New Zealand standards, as well as any special standards or requirements negotiated with export markets. This includes food safety, biosecurity, and animal welfare requirements. MPI issues these assurances.

An export certificate provides an importing country with confirmation from the New Zealand Government (MPI) that a particular product or commodity meets certain standards and requirements.

Codex also plays a significant role in New Zealand's food safety management and it is MPI who manages New Zealand's involvement with Codex. (See Module Three Case Study 2).

³ Industries, Ministry for Primary. "Introduction to Food Safety Legislation." Ministry for Primary Industries. Ministry for Primary Industries, November 16, 2020. <https://www.mpi.govt.nz/legal/legal-overviews-legislation-standards/food-safety-legislation/introduction-to-food-safety-legislation/>.

WHY DOES MPI UNDERTAKE FOOD SAFETY MANAGEMENT?

New Zealand's Food Safety Risk Management Framework 2010 (<https://www.mpi.govt.nz/dmsdocument/22000-NZs-food-safety-risk-management-framework>) summarizes the “global and domestic drivers of change in food safety:

- *Greater public demand for health protection*
- *Increasing volume and diversity of traded foods*
- *Changing agricultural practice and climate*
- *More complex food chains*
- *New hazards*
- *Changing consumer behaviour and choices*
- *More sophisticated detection methods for hazards*
- *WTO SPS Agreement obligations”⁴*



⁴ New Zealand, Food Safety Authority. “New Zealand’s Food Safety Risk Management Framework,” January 2010.

NZ Avocado and Zespri are two key bodies in the New Zealand horticultural space. What is their relationship with MPI? To understand this, it is necessary to explain how each of them operate. An explanation of how ZESPRI works will be given in module 4, case study 2.



The History of NZ Avocado Industry Ltd

Throughout the last 40 years there have been a number of name changes for this industry body as its focus shifted from being simply a domestic grower of avocados to a million-dollar exporter of world class product.

The **New Zealand Avocado Promotion Association (NZAPA)** was established in 1980 for the promotion of New Zealand avocados.



In 1989 **NZAPA** changed its name to the **NZ Avocado Growers' Association Incorporated (NZAGA)** and opted to come under the **Horticultural Export Authority (HEA)** for the export of NZ avocados. NZAGA remains the grower owned not for profit incorporated society, with all growers as members. See on next page for an explanation of the HEA.



The Avocado Export Council was the product group under HEA and incorporated in 1992. It changed its name in 1997 to the **Avocado Industry Council (AIC)** and became a limited liability company.



In 2018 Avocado Industry Council Ltd changed its name to **New Zealand Avocado Industry Ltd**.

The New Zealand government officially recognizes NZ Avocado as representing growers and packers. Any exporter who wants to export avocados must be licensed with the NZ Horticulture Export Authority (HEA) – see explanation of HEA on the next page.

NZ Avocado has established quality standards, export grade standards and rules and procedures that must be followed by Avocado growers, packhouses and exporters. These rules and procedures are documented in their annually reviewed Quality Manual and the Export Marketing Strategy (EMS). The review involves consultation with industry participants as well as customer feedback, it is then approved by NZ Avocado's board and distributed via NZ Avocado's website. Access to this part of their website is by log-in as a grower, packhouse or exporter.



WHO IS HEA?

- *“A statutory authority charged with the application of legislation – NZ Horticulture Export Authority Act 1987*
- *Product groups opt (volunteer) to come under the HEA model*
- *The Product Group determines how much value is extracted from the legislation – using the Export Marketing Strategy (EMS)*

It is the product group’s role to determine its goals/objectives. The industry uses the HEA legislation to apply industry-wide programmes (it decides which programmes) – primarily delivered through the export marketing strategy.”⁵

While the HEA reports to the Minister for Primary Industries, it is funded 100% by its industry sector participants via fees from the Recognized Product Groups (11 in total, including avocados) and License Holders (exporters). The Act promotes the effective export marketing of horticultural products. It does this by providing horticultural product groups (representing all growers and exporters of a particular horticultural product) with a regulatory structure within which they can co-ordinate their export marketing, and market and sector development. If a product group wishes to establish compulsory export standards, they can apply to the Minister for Primary Industries to come under the authority of the HEA.

NZ Avocado is effectively an industry body setting out quality standards which packhouses must meet if exporting avocados. Growers are required to meet a food safety standard, but NZ Avocado does not offer a grower scheme, this is left to the exporters. New Zealand Avocado is made up of two entities: NZ Avocado Growers Association Inc. (NZAGA) and NZ Avocado Industry Limited. These two entities have come to be known as NZ Avocado. One Board governs the activities of the two entities.

Governance includes:

- *Setting and reviewing industry policies and objectives.*
- *The development (and periodic review) of the vision and the strategy to deliver on the objectives.*
- *Selecting, appointing, supporting and reviewing the performance of the CEO.*
- *Ensuring the financial stability and the availability of adequate resources.*
- *Approving annual business plans and budgets.*
- *Accounting to stakeholders for the organisation’s performance.*⁶

There is a further player in the avocado industry – AVEC, the Avocado Exporters Council Inc. AVEC is an incorporated society made up of New Zealand avocado exporters who are registered with NZ Avocado and licensed under HEA. Under the export marketing strategy, exporters are required to attend 80% of AVEC meetings, including fortnightly conference calls held during the export season. There are currently 11 exporters with a license to export avocados from NZ.

⁵ Design, Vision Web. “About HEA.” Horticultural Export Authority. Accessed March 31, 2021. <http://www.hea.co.nz/about-us>.

⁶ “Governance.” New Zealand Avocado, September 21, 2020. <https://industry.nzavocado.co.nz/about-us/governance/>.

“Growers intending to export avocados must meet the following conditions:

- *Have a current registration with NZ Avocado for the season they intend to export in.*
- *Abide by the rules set out in the Export Marketing Strategy.*
- *Be AvoGreen compliant as at 1 November the year prior to the start of the export season.*
- *Maintain an up-to-date electronic spray diary.*
- *Meet the rules, terms and conditions of the Quality Manual, AvoGreen standards and Food Safety.”⁷*

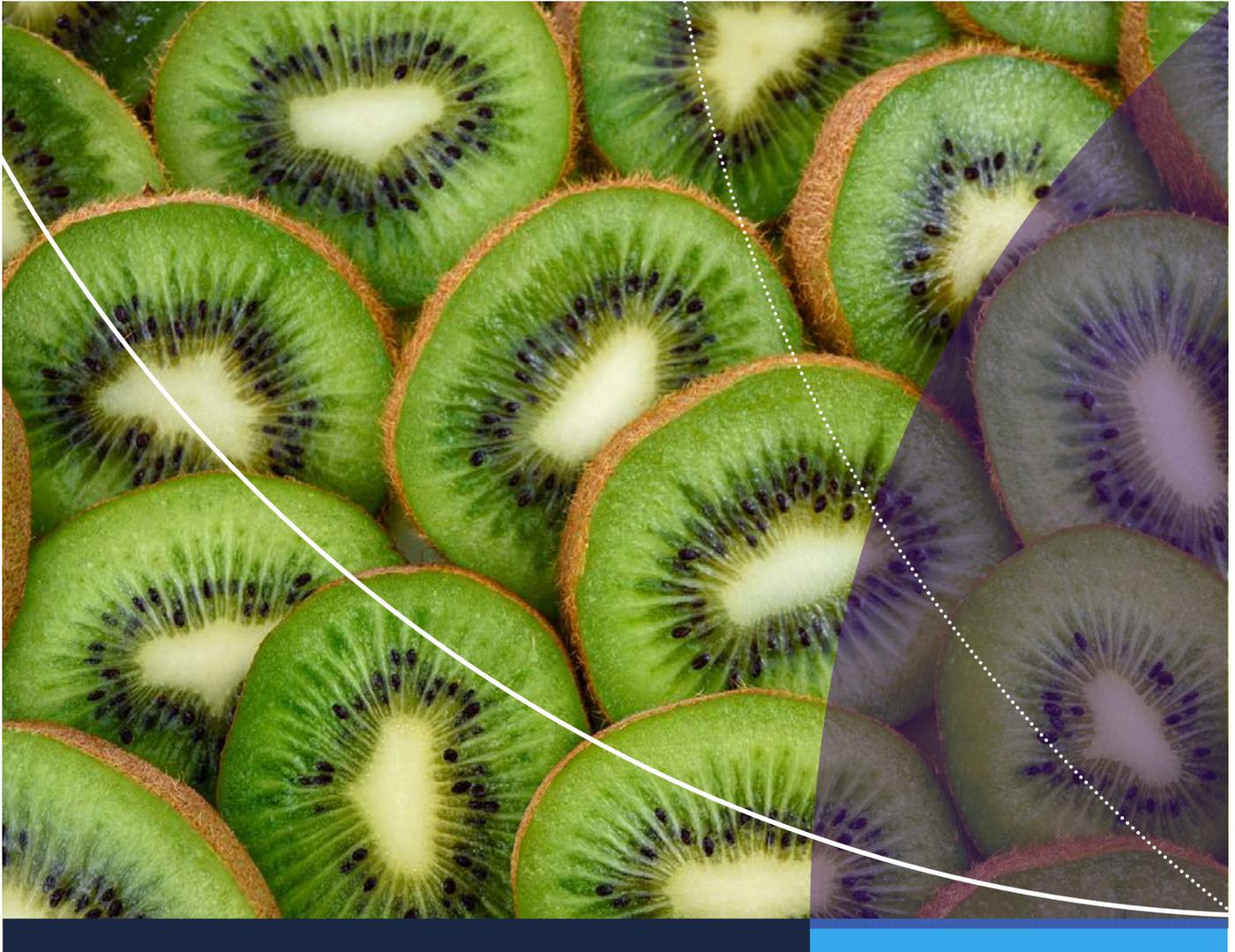
Should a food safety issue arise, and a recall or withdrawal be required, MPI would become involved. This involvement may start from a notification from a grower, packhouse or exporter that a recall/withdrawal is necessary. Under each packhouse’s MAO approval, notification within a designated timeframe is mandatory, just as it is to their IVA and/or certifying body under their BRCGS/GlobalG.A.P. certification.

To illustrate the link between NZ Avocado, MPI and HEA, it is worth quoting directing from NZ Avocado’s Quality Manual 2020-2021(Part 5, Section 3), remembering that it comes under the jurisdiction of HEA’s EMS (Export Marketing Strategy):

- 3.14.1 Any packer, exporter or local market handler identifying a breach of the food safety programme in relation to the use of unregistered pesticides, or a breach of the preharvest intervals, or residues in excess of the allowable MRL’s or communicable disease, will immediately notify NZ Avocado in writing. This notification will clearly identify the grower PPIN, the packer, the pack date, pallet numbers, transport operators and destinations of affected product. Failure to immediately notify NZ Avocado will constitute a major non-compliance.
- 3.14.2 Each packer and/or exporter/local market handler will develop a written procedure clearly identifying the actions to be taken in the event that consigned product, which is subsequently found to pose a major health risk, can be tracked through the distribution system. This procedure will include 24-hour contact details for the individual assigned responsibility for product recalls.
- 3.14.3 NZ Avocado will immediately notify the MPI. Together with the MPI NZ Avocado will determine whether the circumstances dictate that the interests of the consumer are best served by a withdrawal of the affected product from the market or if a full product recall should be implemented.

As can be seen from this case study, there are a number of players in the New Zealand food safety space. They each have a role which at times can overlap but in total, they ensure that compliance is not left to chance. Responsibilities are delineated for each player – growers, packers, exporters, industry bodies and governmental agencies such as the Ministry for Primary Industries (MPI). The reputation of New Zealand as a producer of safe food is at the heart of it.

⁷ “Governance.” New Zealand Avocado, September 21, 2020. <https://industry.nzavocado.co.nz/about-us/governance/>.



Institutional Structure

A look at how the New Zealand food safety structure has evolved over time:
Zespri International Limited



The origins and timeline of New Zealand kiwifruit production and its relationship to Government regulators

The New Zealand Government has played a role throughout the history of the kiwifruit industry in New Zealand. This role has developed and strengthened just as the industry has developed and strengthened. Food safety has become a key focus, with consumers around the world wanting to know the origin of their food (in order to eliminate for example potential agrichemical and microbiological contamination), an awareness of vulnerable consumers and food trends such as veganism. (See Module 2, Case Study 2).

In 1904 seeds of the mihoutao - macque fruit, (a reference to monkeys loving the sweet fruit) were originally brought to New Zealand and based on their place of origin, the fruit is called “Chinese Gooseberry”.

In 1952 the first export of Chinese Gooseberries from New Zealand to England occurred and by 1959 the fruit had been renamed kiwifruit. A number of cultivars were developed in the intervening years and eventually it was a green variety with a slightly fuzzy skin (*Actinidia deliciosa*) that became the commercial variety. It was known as the Hayward variety, named after one of the cultivar’s developers and is still grown commercially.

1979 The country’s first organic kiwifruit were grown in Katikati, in the Bay of Plenty. In the same year, various international standards were introduced, including one for flavor which stipulates that kiwifruit’s sugar levels must be a minimum of 6.2° Brix when harvested, this is so the fruit is not perishable for at least four months. Brix is a measure of the total soluble solids (TSS) present in the fruit. TSS is mainly made up of sugars but also includes other compounds. The total soluble solids are made up of sugars, such as sucrose, fructose. A refractometer is used to test each fruit’s brix level.

1982 Cultivation of Gold kiwifruit (Hort 16A) commenced and in 1984 Kiwifruit was exported for the first time by boat to Zeebrugge in Belgium and Kobe in Japan.

1987 Kiwifruit Marketing Licensing Authority (KMLA) was established. It was government supported.

1988 KMLA was superseded by the New Zealand Kiwifruit Marketing Board (NZKMB), with a clear emphasis on export sales.

By 1998 the Government (MAF and Ministry of Health) had been working on food administration reform for a number of years and they set out a set of key objectives aimed at protecting and promoting public, animal and plant health and safety in relation to food products and by-products and facilitating market access. “The vision for good food regulation in New Zealand is that the food administration system should be an integrated regulatory system based on the optimal regulatory model and should achieve the Government’s objectives, maintain public confidence, ensure clear accountabilities and provide consistency.”¹

¹ Ministry of Health and Ministry of Agriculture and Forestry. “Assuring Food Safety An Integrated Approach to Regulating the Food Sector in New Zealand,” August 1998.

2000 A further change was made to establish Kiwifruit New Zealand (KNZ) when the New Zealand Kiwifruit industry was restructured through the Kiwifruit Industry Restructuring Act 1999 and Kiwifruit Export Regulations 1999. KNZ is effectively the regulator of the kiwifruit industry. Each year KNZ report to the Ministry for Primary Industries comparing their statement of intent performance indicators with KNZ's actual performance for the preceding year.

KNZ's primary functions are to cost effectively:

- *authorize the export of kiwifruit at the point fruit is on board the transport ship and set the terms of authorization in accordance with the regulations*
- *monitor and enforce the non-discrimination and non-diversification rules, and the information disclosure and collaborative marketing requirements*
- *determine collaborative marketing applications in accordance with the Regulations*

KNZ approves collaborative marketing agreements. A Collaborative Marketing Arrangement is defined by the regulations as “an arrangement by which a person may export New Zealand grown kiwifruit in collaboration with Zespri® Group Limited”. Collaborative marketing has “the purpose of increasing the overall wealth of New Zealand kiwifruit producers.”²

The Act also established Zespri® with associated regulations containing export related, monitoring and enforcement provisions. It was effectively based on harnessing grower co-operation to create an organisation which was a united front to export kiwifruit to the world. Strength in numbers!

2002 The industry implemented a new traceability system allowing it to track every carton of kiwifruit back to a specific part of the orchard where it was grown. There had been increasing demands from offshore to know point of origin and Ministry of Agriculture and Forestry (MAF) was also keen to have confidence in traceability should any recall be required.

2003 Zespri® and the New Zealand kiwifruit industry were awarded a EUREPGAP certificate in recognition of their adherence to good agricultural practices. Growers began exporting Zespri® Gold Kiwifruit all around the world.



² “Welcome to Kiwifruit New Zealand.” Kiwifruit New Zealand, March 7, 2021. <https://www.knz.co.nz/>.

2010 Kiwifruit growers suffered a massive blow in the form of a bacterial vine disease, *Pseudomonas syringae* pv *actinadae* (Psa). By July 2012, nearly half of New Zealand's kiwifruit orchards suffered loss through Psa infection. Gold Kiwifruit were particularly susceptible to the Psa bacteria and their vines were badly affected and all eventually destroyed.

Three weeks on from the discovery of bacterial disease Psa in a kiwifruit orchard in Te Puke, Zespri® teamed up with all kiwifruit post-harvest operators, industry body New Zealand Kiwifruit Growers Incorporated (NZKGI) and the Ministry of Agriculture and Forestry (renamed Ministry for Primary Industries in 2012) to manage the industry's response to the outbreak.

Once again, strength in numbers! The Psa issue honed in on the importance of traceability, a key element of food safety. It looked at which workers had been on an orchard, which equipment had been used, where the plants had come from and in general, what were vectors for transmission. It encouraged growers, packhouses and exporters to interrogate their entire operations and processes. It was a way of thinking which was to prove helpful when considering food safety.

2015 A Review of Kiwifruit New Zealand was prepared for MPI with the analysis focusing on four issues:

- *balancing accountability to Government and the industry*
- *supporting the take up of collaborative marketing*
- *supporting innovation*
- *monitoring the impact of internationalization*

A copy of the report can be found here: <http://www.knz.co.nz/wordpress/wp-content/uploads/Scrimgeour-Locke-Kiwifruit-Report-11-Nov-15-Final.pdf>.

Reasons for the review included that the current regulations were promulgated 15 years ago and required revision for a significantly different economic setting. The self-regulation with statutory sanction was seen as no longer appropriate as many wider stakeholders were now involved. It was noted that Zespri® continued to move from being an “exporter” to a “brand” selling both New Zealand produced and non-New Zealand produced fruit into global markets. “This is part of a Zespri® strategy of brand development to ensure it is recognized as the leading brand 12 months of the year. This strategy is seen by Zespri® as an essential component of maintaining returns to New Zealand growers in the longer-term. However, it does have risks associated with it as does any strategy and therefore raises questions as to the benefit of this activity for New Zealand and New Zealand kiwifruit growers in particular. Operational success to date is evidenced by Zespri® providing 12-month supply without significant offshore investment in production and supply chains, and also reporting positive returns to shareholders associated with off-shore production.”³

Zespri® requires growers to be GLOBALG.A.P. compliant and has established a grower group under the GLOBALG.A.P. certification scheme to assist in the management of this. It is not compulsory to belong to this grower scheme but, growers must otherwise be GLOBALG.A.P. compliant as an individual. 99% of growers belong to the Zespri® GLOBALG.A.P. PMO (Producer Marketing Organisation) – 850+ growers across the country.

³ Scrimgeour, Frank, and Stuart Locke. Rep. Review of Kiwifruit New Zealand, n.d. <http://www.knz.co.nz/wordpress/wp-content/uploads/Scrimgeour-Locke-Kiwifruit-Report-11-Nov-15-Final.pdf>.

How does this work from an organizational point-of-view? The simplified version is as follows:

- *Zespri® has a documented quality system covering all the clauses in the GLOBALG.A.P. regulations, which applies to all kiwifruit packing facilities and growers.*
- *Each packing facility has approved GLOBALG.A.P. inspectors who carry out an annual audit on all their growers, covering all the control points. Non-compliances are issued and closed out within 28 days.*
- *Zespri® contract AsureQuality as an approved certification body to audit their Produce Marketing Organisation (PMO) to confirm compliance. This involves annually auditing their quality management system, and a selection of their packhouses and growers. The number of packhouses and growers is based on the square root of the total number. Non-compliances issued are to be closed out within 28 days.*
- *Should any food safety issue be identified, particularly if it involves a recall or withdrawal, at any time in the year, Zespri® has an obligation to report this to AsureQuality as their certifying body. Zespri® must also report this to Ministry for Primary Industries and the Ministry of Health, depending on the cause of the problem. Packhouses under their independent obligations to MPI as approved Ministry Approved Organizations, must report such issues to MPI. time frames are delineated and must be adhered to and if not adhered to, are likely to result in suspension of that facility, meaning no kiwifruit can be produced/sold until MPI is confident that food safety is no longer an issue.*
- *To illustrate how a potential food safety issue is dealt with within the Zespri® context, an actual example is detailed below. A kiwifruit packhouse is notified that one of their key staff members, the Head Grading Supervisor has a notifiable disease, campylobacteriosis. This notification is received from MPI who have been advised by the Ministry of Health. New Zealand operates a system whereby it is mandatory that when an individual with a notifiable disease works in any food production facility, the facility is notified. MPI have also advised Zespri®. The site is required to immediately investigate what possible effect this sick staff member may have had on other staff and possible contamination of fruit/packaging. The site, in consultation with Zespri®, collates information listing what grower lines may be impacted, that is those that were being packed over the previous 48 hours, what staff were present over this time, cleaning records of the production area and amenities, handwashing rosters (rosters list a supervisor overseeing handwashing after breaks), training records showing staff have been instructed to wash hands after all breaks and that they are not to attend work if sick. Specialist technical advice was sought from an enterologist to determine the likelihood of fruit being contaminated. The investigation determined that the risk of fruit/packaging having been contaminated was very low, the staff member had not attended work once she became ill, hygiene procedures such as cleaning and handwashing were well implemented at the site. Records of cleaning etc. were fully completed and verified. There was no evidence that other staff were unwell. The site and Zespri® compiled their report and submitted it to MPI. MPI and the Ministry of Health considered the findings and determined that no further action was required as the risk is minimal. This was all completed within 24 hours of the original notification and the site was not permitted to transport any packed product until the clearance was given.*



Should such a food safety issue arise in an avocado packhouse, NZ Avocado as the industry body would assist the packhouse but they do not have the same degree of authority. It is the GlobalG.A.P certification which underpins Zespri's involvement and effectively, gives them authority to direct the kiwifruit packhouses on how food safety is managed. The packhouses also have to meet MPI's regulatory requirements, including those under the Food Act 2014, so the various strands all combine to ensure that horticultural produce from New Zealand is of high quality and safe to eat.

The Zespri system provides what might be described as a “wrap around” model. The growers are all compliant to the same standard as part of their GLOBALG.A.P. Produce Marketing Organization. Zespri can and does, readily provide information to their growers to assist with achieving compliance. This information includes risk assessment templates for a number of the checklist control points - site selection, hygiene, water management, organic fertilizer use and health and safety hazards among others. It can also update growers with emerging information in a timely manner. By supplying this information, a consistency of approach to food safety can be achieved.

The packhouse inspectors attend annual refresher training which advises of any new information as well as reporting on what the independent third party GLOBALG.A.P. inspections found in the previous 12 months. For example, the independent inspections may have found that growers were not being questioned thoroughly enough in terms of identifying all the sources of water they were using for their growing operations. Consequently, the water risk assessments will be incomplete and the water testing regime inadequate to meet the GLOBALG.A.P. standard.

The Zespri model requires their growers and packhouses to be compliant throughout the year, records must be kept up to date in an ongoing fashion. It is not sufficient to prepare everything for the annual inspection the day before it is scheduled! Why does an organization such as Zespri require such a level of compliance? There are two main reasons, one is to assure their customers and the New Zealand regulator, MPI, that kiwifruit are safe to eat and secondly, that there is complete traceability of all inputs in kiwifruit production. The inputs are many and include – kiwifruit plants, fertilizer, agrichemicals, water, staff, picking/packing equipment and packaging.

Consistency of approach to kiwifruit production from growing to packing to storage to dispatch is what the Zespri model achieves.





Risk assessment, enforcement, and inspections



How risk assessment, enforcement, and inspections in New Zealand have evolved

As previously outlined in Module 3, Case Study 2, New Zealand implemented a Food Act in 2014, how does this Act work in practice?

The central tenet of the Food Act 2014 is the identification of food safety risks. To assess food safety risks, food producers create risk profiles which in turn set the scene and provide the background required to put procedures/processes in place to mitigate those identified risks. The risk profiles are also used by the independent auditors to determine how well the food producer has done in identifying potential food safety risks and secondly, how they are managing them.

So, how then does any food producer - individual, group (including educational facilities) or business - determine what the requirements are for them?

The Ministry for Primary Industries (MPI) has developed an [interactive website](#) to assist all these entities determine what they need to do under the regulations.

Once an option is selected, the individual, group, or business proceeds to answer a series of questions to further determine the path they need to follow. Some may not need to take any action, for example, a small apple orchard who sells all their produce as whole, fresh apples at their gate, is not required to register as a food business. Or an apple grower who sells at their gate and donates some of their apples to their local school for fundraising, does not need to register.

REGISTRATION

If registration is required there are two linked elements:

- *National Programmes which set rules for medium and low risk operators. These operators are not required to have a specific written plan but do need to register and will have their food safety standards checked by a Ministry for Primary Industries (MPI) approved verifier. There are three levels of national programmes.*
 - *National Programme 1 – lower risk [National Programme 1 guidance](#)*
 - *National Programme 2 – medium risk [National Programme 2 guidance](#)*
 - *National Programme 3 – higher risk [National Programme 3 guidance](#)¹*
- *Food Control Plans (FCPs) which are written plans with clear detail of how food safety is to be managed.*

¹ Ministry for Primary Industries, “National Programmes: Steps,” Ministry for Primary Industries (Ministry for Primary Industries, November 16, 2020), <https://www.mpi.govt.nz/food-business/running-a-food-business/national-programmes-steps/>.

To understand how these two elements work in practice, let us illustrate using the apple industry as the model.

- *Growers and packhouses register under NP1.*
- *A facility manufacturing apple cider vinegar will come under NP2.*
- *A facility manufacturing apple sauce will need to comply with NP3.*

Before proceeding with an explanation of the differences, it is important to remember that alongside complying with the Food Act 2014, growers, packhouses and food manufacturing facilities are likely to already have other relevant certifications. In recognition of this, The Ministry for Primary Industries (MPI) has established some approved FCP (Food Control Plan) templates to be used. Effectively this means that these growers, packhouses and food manufacturing facilities can achieve compliance via their existing certification. From a practical and economic point of view this makes a lot of sense, as it reduces cost and duplication.

To date, the approved templates include those for:

- *BRCGS (British Retail Consortium)*
- *GLOBALG.A.P.*
- *NZGAP (New Zealand Good Agricultural Practice)*



What are the differentiating factors for each of the National Programme levels? It is useful to have an in-depth look at each of the apple industry examples. Apples have been selected as the example for this case study because they can readily be used to demonstrate how a food item can start as a low-risk product and depending on what process they undergo, become medium risk or even high risk.



THE GROWERS

Orchardists are growing the apples and to supply a packhouse they will have achieved GLOBALG.A.P. or NZGAP certification. Their operations are deemed low risk with the checks and balances that are in place through the control points in the certification programs. The auditing of the control points looks at:

- *site selection, that is, previous land use, neighboring land use (potential run-off/contamination), likelihood of flooding.*
- *hygiene practices such as handwashing, provision of toilets, rules around staff illness, cleanliness of harvest equipment (picking bags, bins)*
- *traceability (orchard address, block number, pick date, variety, picker)*
- *staff training*
- *spray diaries including withholding periods and active ingredients and legality of use*
- *fertilizer application records including source, organic matter, method of application*
- *potability of water for drinking, handwashing, irrigation, spraying.*

The audits for GLOBALG.A.P. are annual and auditors will visit when harvesting is in progress. These audits meet the requirements of the NZ Food Act.

Growing apples is categorized as a low-risk process because when the apples leave the orchard, they are whole fruit having had no processing or adulteration.



THE PACKHOUSES

The packhouses receive the harvested apples, carefully following their documented procedures for raw material acceptance, and in doing so, they confirm that it is certified product. They will for example, have copies of each grower's GLOBALG.A.P. certificate on file. Any non-certified product will be rejected, segregated, and disposed of. Their HACCP plans (as required by BRCGS certification) detail the entire process, all inputs and outputs and what controls are in place at each step. The emphasis will be on staff training and hygiene practices. The training will be very specific, relative to each control point in the packhouse's HACCP plan. For example, the employee who cleans the apple water dump must know the frequency of the cleaning, how to do the cleaning, the equipment, and chemicals to be used and what records must be signed off to evidence the cleaning. There will need to be fully completed records (names of trainee and trainer, date, and subject matter) to evidence that training has happened and where relevant, refresher training has been provided.

Residue testing will also be in place with independent sampling of fruit to be tested. The packhouse grades and packs the whole apples into clean packaging, usually cardboard cartons. Packaging will be sourced from approved suppliers and checked for cleanliness prior to use.

Quality controllers select samples for closer inspection at designated intervals. Records are maintained. Apples that do not meet the specified quality standards relating to any food safety concerns, will be dumped and the details documented.

The passed packed product is placed in clean cool stores until an order is received and the product is loaded out. The container into which the pallets of apples are loaded is checked for cleanliness – forms are completed and signed off confirming this.

The auditing of the packhouse to meet the BRCGS (Brand Reputation Compliance Global Standards) standard will take place over 2-3 days. The auditor will carry out a site walk interviewing staff and observing the packing, storage, and dispatch operations.

Throughout the audit, an extensive review of all records pertaining to food safety will be undertaken by the auditor and will include:

- *training*
- *cleaning*
- *traceability*
- *quality*
- *storage*
- *pest and rodent control*
- *water*
- *equipment*
- *mass balance*
- *staff amenities*
- *recalls*
- *maintenance*

The BRCGS audits are annual and must take place when packing is in progress. These audits meet the requirements of the NZ Food Act. It should be noted that although it is commonly called BRC in New Zealand, it was rebranded in 2019 to BRCGS (Brand Reputation Compliance GLOBAL Standards).

Packing whole fruit is also deemed a low-risk process.



A FACILITY MANUFACTURING APPLE CIDER VINEGAR

The facility receives the whole fresh apples directly from the orchardist or from an approved packhouse. In either case, the apples are certified (GLOBALG.A.P. or NZGAP). The facility's HACCP plan is once again the guiding document. However, in this HACCP plan, there will be Critical Control Points (CCPs). A CCP is a step in the process when a control is applied and is essential to eliminate or prevent a food or product safety hazard - or at least reduce it to an acceptable level.

Examples of CCPs are: - the checking of the pH. levels of the apple cider and the temperature to which the pulped apples are heated. CCPs are constantly monitored and there will be a defined schedule for this monitoring. Records of the monitoring will also be verified at designated intervals by specifically trained staff. The best cider is made from apples that are juicy, sweet, well ripened and have adequate levels of natural acids and tannins. The apples are not peeled because the skin adds to the flavor of the cider.

The apples are ground up into a fine, smooth consistency. This mixture is then juiced, and the liquid extracted. If the cider is to be fermented, sugar and other chemicals will be added. There will be testing of acid levels. The product will be bottled and sealed. Throughout the entire process traceability is maintained with different batches being labelled accordingly. The BRCGS audits are annual and must take place when processing is taking place. These audits meet the requirements of the NZ Food Act.

Manufacturing cider is a medium risk process.



A FACILITY MANUFACTURING APPLE SAUCE

Just like the cider maker, the facility receives the whole fresh certified apples directly from the orchardist or from an approved packhouse.

Also just like the cider maker, the apple sauce manufacturer will have a very detailed HACCP plan outlining the CCPs from start to finish. Making apple sauce involves peeling the fruit, cooking, cooling, and bottling. Many things can go wrong, such as:

- *Insufficient cooling*
- *Incorrect volume of additives*
- *Unclean surfaces*
- *Dirty bottles, broken bottles*
- *Staff with infectious diseases*
- *Dirty cutting equipment*
- *Pest/rodent infestations*
- *Insufficient temperature when heating apples*

Manufacturing apple sauce is a high-risk process requiring auditing to a precise level. The consequences of apple sauce being manufactured incorrectly may in the worst instance, result in the death of a consumer. The auditing process must carefully consider the CCPs identified and how they are being controlled and monitored. If the monitored results indicate a trend towards a loss of control, there must be clear, unambiguous documented actions to be taken by specified personnel. This would include for example, identifying the extent of the problem and the quantity of product affected. Such product must be identified, segregated, and safely disposed of. Recall notices may need to be issued. In such instances the Ministry for Primary Industries (MPI) would be advised as well as the certifying body.

What can be seen from the apple examples above, is that the Food Act 2014 and the independent certifications of BRCGS and GLOBALG.A.P. in particular, work well together. All the programs are extensively based on risk assessments for every aspect of operation, with a matrix of severity vs likelihood underpinning it all. HACCP is the key here.





TRAINING

GLOBALG.A.P. and BRCGS are annually audited by independent third-party auditors, the Food Act verifications are also carried out by independent verifiers. The individuals carrying out the verifications and audits will have completed comprehensive training prior to commencing the work. The GLOBALG.A.P. and BRCGS auditors will have completed their initial training via the international certification bodies, and they will be required to maintain competency when a new version is issued. Regular peer reviews are completed, and additional training completed if deemed necessary.

Verifiers approved to operate as part of the Food Act program must complete modules designed by the Ministry for Primary Industries (MPI). Similarly, to maintaining competency for BRCGS and GLOBALG.A.P., Food Act verifiers are also required to meet annual competency standards.

INSPECTION BY MPI AUTHORISED PERSONNEL

If an orchardist or a packhouse packing fruit or vegetables has attained the NZGAP, GLOBALG.A.P. or BRCGS standard, they are not required to have an additional inspection under the Food Act regulations. NZGAP is primarily for producers of domestic market produce. GLOBALG.A.P. and BRCGS are mainly for those operators exporting produce as they are internationally accepted certifications.

AUDITING

It is important to note that packhouses and processing facilities will not only be audited by external third-party auditors at regular (mostly annual) intervals, but they are required to have comprehensive internal audit schedules in place. Internal audits will be undertaken by trained individuals, these maybe employees or external contractors. Either way, they must have particular qualifications such as having attended a recognized training course. Internal auditors may not audit their own work.

These internal audits will cover all aspects of operations to ensure that safe food is being produced. These audits will not be “one-off”, they will be carried out at a frequency based on risk. For example, the apple packhouse may operate for only 6 months of the year, it would therefore be expected that an internal audit was carried out pre-season to ensure that all equipment/cool stores were clean, equipment was calibrated (scales, temperature probes, refrigeration equipment, measuring/weighing devices), pest control devices were in place and packaging was in a clean and useable condition. Once the packing commences, these elements are likely to be audited at least monthly as well as the additional aspects of staff hygiene practices, facility cleaning, quality, and traceability. Any non-conformances issued will have an associated timeframe and must be signed off. The independent third-party auditors will look to verify that not only have the internal audits been occurring, but that they are closed out satisfactorily.

“Internal auditing is a key factor in ensuring continued compliance with the requirements of the BRCGS Standard, and must be regarded by the management of the company as critical to its operation. Internal audits demonstrate whether control systems are working correctly and effectively, and identify areas for improvement. Internal auditing forms part of the verification of systems; this is a crucial step within the control of the HACCP or food safety plan.”²

² GLOBAL Standard Food Safety (Issue 8) Interpretation Guideline,” 8th issue. Section 3.4 (BRCGSGS, 01 August, 2018).





NON-CONFORMANCES

Each audit program has the ability to issue non-conformances which are then required to be closed out within a set timeframe once suitable evidence is provided. Frequently, root cause analysis is required. The purpose of this is to reduce the likelihood of repeat non-conformances for the same issue. Sanctions and suspensions can be applied if close-out is not completed.

“CERTIFICATION WITHDRAWAL The certificate may be withdrawn by the certification body in a number of circumstances where the site may no longer comply with the requirements of the BRCGS GLOBAL Standards certification scheme. Examples of these instances are:

- evidence that the site no longer complies with the requirements and protocol of the Standard, raising significant doubt of the conformity of the products produced
- failure to implement adequate corrective action plans within appropriate timescales
- evidence of falsification of records.”³

If a packhouse does not close out their non-conformances, their BRCGS certificate will be withdrawn thus meaning they can no longer sell their produce to supermarkets, domestically and offshore. And, in order to regain to certification, they will be subject to additional audits at an increased frequency.

MPI REGISTERS

The Ministry for Primary Industries (MPI) publishes lists of approved growers, packhouses and food manufacturers on their website, as well as the names of approved verification agencies and individuals. This gives the program authenticity and transparency. <https://www.mpi.govt.nz/food-business/food-safety-registers-lists/>

Such congruity of application between the Food Act and the BRCGS and GLOBALG.A.P. certifications ensures that every step of the food production process is consistently monitored with the aim of producing safe food in New Zealand. This food can then be confidently sold on the domestic market or worldwide.

³ GLOBAL Standard Food Safety (Issue 8),” 8th issue. Section 5.3, General Protocol – Post Audit Section (BRCGSGS, 01 August, 2018).

One of the key aspects of MPI's program to manage food safety is the necessity for all food businesses to register with MPI or a local council in each region. MPI has delegated the authority for processing registrations to all municipalities throughout New Zealand. The only food businesses that must register with MPI are high risk businesses requiring a custom food control plan. High risk businesses include those making meals and prepared food; food for vulnerable populations – such as infants or the elderly; dairy, meat, poultry, or fish products; ready-to-eat salads; processed egg products. By requiring all businesses to register, a database is maintained which categorizes types of businesses, locations, and risk profiles. This has an important advantage as it enables MPI to rapidly contact any group of food producers should a need arise to do so, for example, if a new contamination risk is identified for any food product. This contamination risk may be from overseas information such as the widely publicized malicious placement of needles in strawberries in Australia in 2018. Having a central body such as MPI to disseminate reliable information to food producers is vital.

In conclusion, it can be seen from the information presented in this module, that risk assessments pervade all areas of food production in a positive manner. They set the ground rules for growers and packhouses in terms of their orchard/packhouse site selection, hygiene protocols, staff training, water use, agrichemical/fertilizer selection, equipment, packaging type, storage, and transport arrangements, etc. The effectiveness of risk assessments is based on their comprehensiveness, being current and understood by those managing them. Regular reviews must be scheduled and carried out by the staff who understand the processes involved and the implications of getting it wrong. Customer requirements may drive changes in procedures and processes, and these must be acted upon promptly to ensure established and new markets continue.

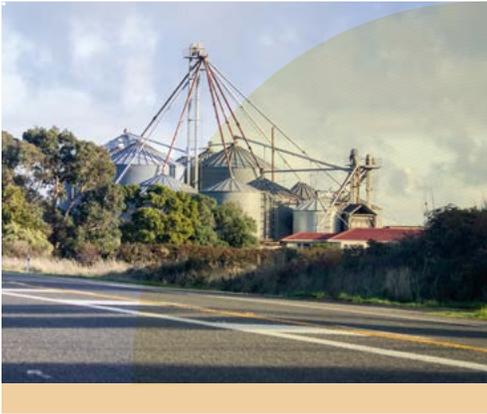
The risk assessments required by standards such as GLOBALG.A.P. and BRCGS integrate well with New Zealand's Food Act and as such, link the international standards with the Ministry for Primary Industries (MPI) regulatory model.





Traceability and its role in food safety

Traceability in maize in New Zealand



Traceability and its role in food safety: maize

The New Zealand maize industry produces maize for the following uses:

- *Silage (form of animal stock feed)*
- *Animal stock feed*
- *Seed sale*
- *Food processing.*

In New Zealand, the vast majority of maize harvested for grain is used in animal stock feed, with a very small percentage used as an ingredient in food processing. In fact, New Zealand currently imports grain from eight other countries and only exports a small amount to New Caledonia, the Pacific Islands and Australia.¹ For more information on the maize industry in New Zealand, download the [factsheet](#) available from [Tupu.nz](#).

IN NEW ZEALAND TRACEABILITY IN MAIZE AS AN INGREDIENT BEGINS AT THE SEED

The certification of seed in New Zealand (NZ) is voluntary and without governance from parliamentary acts or regulations. New Zealand's Seed Certification Scheme is overseen by the Ministry for Primary Industries (MPI) who provide a framework for ensuring the integrity of important agricultural plant species through generations of multiplication.

The product has full traceability through breeding, production, processing, and export (if required) and will have a high level of varietal purity. This means that farmers can be assured that the maize seed they plant will have a high level of purity. This results in a high degree of confidence that when the crop is harvested that only the targeted produce (maize) is contained within the field.

The rules for the production of a certified crop, including Maize, can be found here [Appendix 1 Seed Field Production Standards 2014](#).

To certify maize in NZ, the maize variety must first be entered into the NZ Seed Varietal Certification Scheme. To do this the breeder or agent must register a new variety by submitting information to an Independent Verification Agency (IVA) that works on MPI's behalf. The application must include the Breeder's authority (permission to multiply the seed line) and the morphological description of the variety or parent seed.

Once the new variety has been entered into the certification scheme full traceability can be achieved. The grower or agent carrying out the multiplication of the seed registers the crop details with the Seed Certification Bureau and the information is entered into the Seed Certification Database. This includes information about the seed line (verified by seed bag label submission) and the location of crop using a registered farm map.

¹ (<https://www.nvinteractive.com>), NV Interactive. Commercial maize growing NZ: statistics and guidance. Accessed April 27, 2021. <https://www.tupu.nz/en/fact-sheets/maize-grain>.

The Seed Certification Database keeps records and checks the paddock/field history requirements, including details of all previous crops produced to ensure seed line contamination does not occur. If the crop entry is accepted, a field inspection report is generated, and the crop inspected by an official crop inspector according to the requirements specified in [Appendix 1 Seed Field Production Standards 2014](#).

Crops are inspected by an independent official crop inspector. The inspection includes ensuring that the crop is sufficiently isolated from other maize plants (sources of viable pollen) and that the plants are true to type (match registered variety morphological description). In the case of hybrids, crops are inspected three times during flowering. Any issues with the crop are notified to the agent who is responsible for the production, de-tasseling, removal of non-true to type maize plants. Presence of specific weeds are also recorded. The crop inspector will pass a crop if it is deemed acceptable and meets the requirements for the certification class outlined in the field standard.

On completion of the inspection the grower/agent is sent the Growers Declaration report and field dressed labels to identify the harvested crop in transit to the Seed Processing Plant.

Seed Maize in New Zealand is harvested as cobs, and normally goes through a drying process prior to shelling and grading and sizing of the seed. The seed lots are traced at all times through a documented production system in which all crops are assigned a field / harvest number. This number is fixed onto the cob / seed bags throughout the seed processing.

The Seed Processing store requests official labels from the Seed Certification Bureau and these are sown onto the bags of cleaned seed prior to official sampling and testing of the seed lot. A seed analysis certificate is issued for each seed lot and then the seed can be released.

In conclusion, the process of seed certification is critical in ensuring the provenance of the crop grown. The management of certified maize seed production ensures that crops grown from this seed are fit for purpose, for example a specific variety of seed will be best suited for corn starch productions. Further to this, the process ensures only the targeted maize species is contained within the production field of interest.





FROM SEED TO GRAIN

As maize grain is not a major export product for New Zealand, there are few relevant pieces of legislation for growers of grain. Food manufacturers will operate under the Food Act 2014 and as such, will have traceability requirements. Those are:

“133B Tracing and recall

A person to whom this subpart applies must, in accordance with any regulations made under section 133C and any notice under section 405,—

- a. *have in place procedures for—*
 - i. *tracing food; and*
 - ii. *recalling food; and*
- b. *conduct simulations or other tests of those procedures; and*
- c. *implement those procedures to trace and recall food.”*²

A key component of this traceability system is the provision for internal and external auditing to ensure traceability across the food chain is fit for purpose. Under the Food Act 2014, manufacturers will be required to have an internal audit system in place to monitor, test and review their traceability procedures. They will simulate a product trace and recall procedure to ensure the system is working well and no gaps exist.

Manufacturers will have independent third-party audits under the Food Act 2014. The independent auditor will also check the manufacturer’s traceability system, procedures, and records to ensure full traceability of product, back to farm and paddock is possible. The third-party audit will also include a review of internal audits on the traceability system.

To ensure their compliance to the Food Act 2014 and to provide safe food to the New Zealand market, food manufacturers will impart many of their legislative requirements on to the growers, commercial dryers, and millers. This is so that food manufacturers can ensure traceability throughout their product. Whatever the requirements, they must allow for trace forward and traceback.

To meet the manufacturer requirements, growers will generally follow the steps below:

Growers set each paddock to grow certain seed variety crop types (this is assured in the seed certification process described earlier). These paddocks typically have their GPS co-ordinates mapped and are made available to the manufacturer. In some cases, the manufacturer may request that a third-party verifier complete a crop inspection to ensure that that paddock holds the type of crop stated.

The Ministry for Primary Industries requires all food (including grain) grown in New Zealand to comply with the Food Notice: Maximum Residue Levels for Agricultural Compounds and amendments.³ The notice, provides guidance on acceptable residue levels in product. For example, the maximum residual level for Chlorpyrifos in Maize is 0.02 mg/kg.

² “Food Act 2014.” Food Act 2014 No 32 (as at 23 February 2021), Public Act Contents – New Zealand Legislation. Accessed April 25, 2021. <https://www.legislation.govt.nz/act/public/2014/0032/latest/DLM2995811.html>.

³ Industries, Ministry for Primary. “Pesticide Maximum Residue Levels (MRLs) for Plant-Based Food for NZ and Other Countries.” Ministry for Primary Industries. Ministry for Primary Industries, November 16, 2020. <https://www.mpi.govt.nz/agriculture/plant-products-requirements-and-pesticide-levels/pesticide-maximum-residue-levels-mrls-for-plant-based-food-for-nz-and-other-countries/>.

Food manufacturers are required to ensure zero food safety issues arise because of use of agricultural compounds. As such, they will expect growers to comply with the food notice. Growers are required to keep a spray-diary detailing all herbicides and pesticides sprayed on the paddocks and the concentration used. The spray-diary must include the paddock location, date of spraying, product used and its withholding period.

Should a food manufacturer require it, growers may also be required to provide samples of maize from the field to test for Aflatoxins before harvest. These samples are generally collected by the commercial drying or milling organizations and are sent to a third-party laboratory for examination. More information on aflatoxin risk in New Zealand is outlined later in this case study.

On rare occasions, the grain is harvested before the expected sale date, and will be held on farm. For grain stored on farm, growers will be expected to meet industry standards for storage. The standards required will be detailed by the food manufacturer and will include aspects such as temperature and moisture control, cooling systems, etc. to control the growth of mycotoxins. Growers will be expected to keep a record of how they meet the requirements.

FROM Paddock TO FOOD MANUFACTURER

In New Zealand, most grain maize must be mechanically dried to about 14.5% moisture content, and this is done by commercial drying organizations at central locations. In this case, the post-harvest is under the control of the drying organization.

Traceability measures are also in place for transportation from the paddock to the drier. Crop will be transported with a label containing detailed information of the grower, paddock(s), and crop variety.

At the commercial dryer, the grain is stored in large commercial silos. Using the grower and paddock diaries and dockets, the drying organization can identify which silo a particular grower's maize goes into and the grain quantity. The silos must have controls in place for temperature and movement of grain and adjust temperatures accordingly. Maximum levels are set by the organization, and cold air will be pumped through silos at different stages to control the growth of mycotoxins. The commercial dryer will also test samples of the maize grain after drying. These samples will be sent to an independent laboratory to test for mycotoxins and aflatoxins.

Once the drying process is completed and negative results for mycotoxins and aflatoxins are received, the grain will be sent to the mill.

At the mill, the maize will continue to be identifiable to ensure full traceability is possible. Testing for aflatoxins and mycotoxins may take place at this stage. "Testing and tracing continues throughout the entire milling process with finished milled products being packaged and coded for traceability. Certificates of analysis are completed for every product dispatched from our warehouse, so our customers can be sure of accurate, consistent traceability from the field right through to every product they receive."⁴

On plant, food manufacturers will ensure detail records of grain used as an ingredient are kept. The manufacturer should be able to identify what grain was used as an ingredient in each product.

Food manufacturers will then be audited under the Food Act 2014. The independent verifier checks the processor has documented procedures in place and that records are being maintained. In this way, raw material (maize) traceability to each mill, farmer, paddock, and seed supplier is possible. Importantly, should any product recall be required, the supply chain is fully transparent.

⁴ "Traceability: Corson: Goodness at Heart." Corson, July 16, 2019. <https://www.corson.co.nz/the-corson-way/traceability/>.

Further to the statement regarding verification under the Food Act, depending on the level of risk, the manufacturer may be required to document a Customized Food Control Plan. For more information on Food Control Plans, see module 5 or the link below:

<https://www.mpi.govt.nz/food-business/running-a-food-business/food-control-plans/custom-food-control-plans>

As well as being audited under the Food Act, food processing facilities in New Zealand may also be audited under other international, independent programmes such as BRCGS (Brand Reputation Compliance Global Standards) and FSSC (Food Safety Management Systems) 22000. Food producers will select these programmes based on what their customers require, and for New Zealand producers, this will primarily be offshore customers (mainly large supermarket chains) all around the world. Traceability is a key auditable component of these standards and the origin of all ingredients must be known. The manufacturer of each raw ingredient must be identified, and these manufacturers must also meet auditable standards. No stone is left unturned!



AFLATOXIN RISK:

In 2014, the Ministry for Primary Industries published [the New Zealand Mycotoxin Surveillance Program 06-14 report](#). The report found aflatoxin risk levels to be low in New Zealand. It included the following findings in relation to Aflatoxins in New Zealand:

- *“Studies indicate that aflatoxigenic *Aspergillus* species are not present in New Zealand crops (Sayer and Lauren, 1991) and it is generally believed that these toxins only form in tropical or sub-tropical situations.*
- *Processing of maize, by dry or wet milling, results in a substantial decrease in aflatoxin levels. Other processes, such as extrusion cooking and alkaline steeping produce further decreases in aflatoxin levels.*
- *Very limited analyses of maize and maize-based products available on the New Zealand market revealed no aflatoxins, at a limit of detection of 1 µg total aflatoxin/kg (Stanton, 2000a).*
- *Given the low risk of aflatoxins in New Zealand, the Australia New Zealand Food Standards Code provides no maximum limits for aflatoxins in products other than peanuts and tree nuts.”*⁵

Though the risk is believed to be low in domestically grown maize in New Zealand, grain samples and end products are still tested for Aflatoxins. Records of testing and test results are stored by the mill and food manufacturer and can be provided should a potential food issue arise.

Given the low risk and consequent lack of guidelines for control of Aflatoxins in New Zealand, it is necessary to look further afield for harvesting and post-harvesting guidelines to assist with the control of Aflatoxins. Maize Australia, an industry association in the Australian maize industry have produced a comprehensive guidance document on reducing the risk of Mycotoxins, including Aflatoxins. The publication includes guidance on the control of Aflatoxin risk from pre-harvest through to post-harvest. The publication can be found here: http://www.maizeaustralia.com.au/mycotoxin_files/Revised%20mycotoxin%20HACCP%20guide.pdf. The University of Georgia Extension published a paper in 2017 titled [Reducing Aflatoxin in Corn During Harvest and Storage](#) which provides comprehensive guidance information for growers.

Similarly, mycotoxins were of greater concern in New Zealand in the past but are not such an issue nowadays. Research conducted in 1996 by Dr. Denis Lauren, in collaboration with Pioneer suggested employment of the following strategies to minimize mycotoxins:

“Site selection - grow maize in regions where it will mature and be ready for harvest early in the season.

Hybrid selection - select hybrids which are not susceptible to mycotoxin accumulation. Harvest timing - harvest mature maize as early as possible in the season to reduce time for mycotoxins to accumulate.

Harvest areas - harvest areas where conditions favor mycotoxin accumulation first.

Select harvest - leave parts of paddocks unharvested if there are signs of Fusarium (pink fungal growth) on cobs.

Dry grain - dry as soon as possible to 14% moisture.

Store - store dry grain in good conditions and monitor the silo for moisture gradients.”⁶

⁵ Cressey, Peter, and Andrew Pearson. “The New Zealand Mycotoxin Surveillance Program 06-14 Report Series.” Ministry for Primary Industries, May 2014

⁶ Lauren, Denis, Dwayne Jensen, W. A Smith, B. W Dow, and S. T Sayer. “Mycotoxins in New Zealand Maize: A Study of Some Factors Influencing Contamination Levels in Grain.” *New Zealand Journal of Crop and Horticultural Science* 24(1):13-20, March 1996.



What does all of this mean for traceability?

Detailed grower and transportation records mean that should a food safety issue in end product arise, the manufacturer can trace the product back through the supply chain. The manufacturer would contact the mill to request transport, drying, storage, milling, testing, and packaging records. These records can be checked for any non-compliances and remedial action taken as required. If no issues are identified at the milling level, the food manufacturer would contact the grower and request copies of the relevant documentation (e.g spray diaries). The grower identified through the traceback system will have their spray-diaries, paddock records, storage and transportation records examined and checked for any non-compliances relating to residue levels, withholding periods, crop variation, etc.

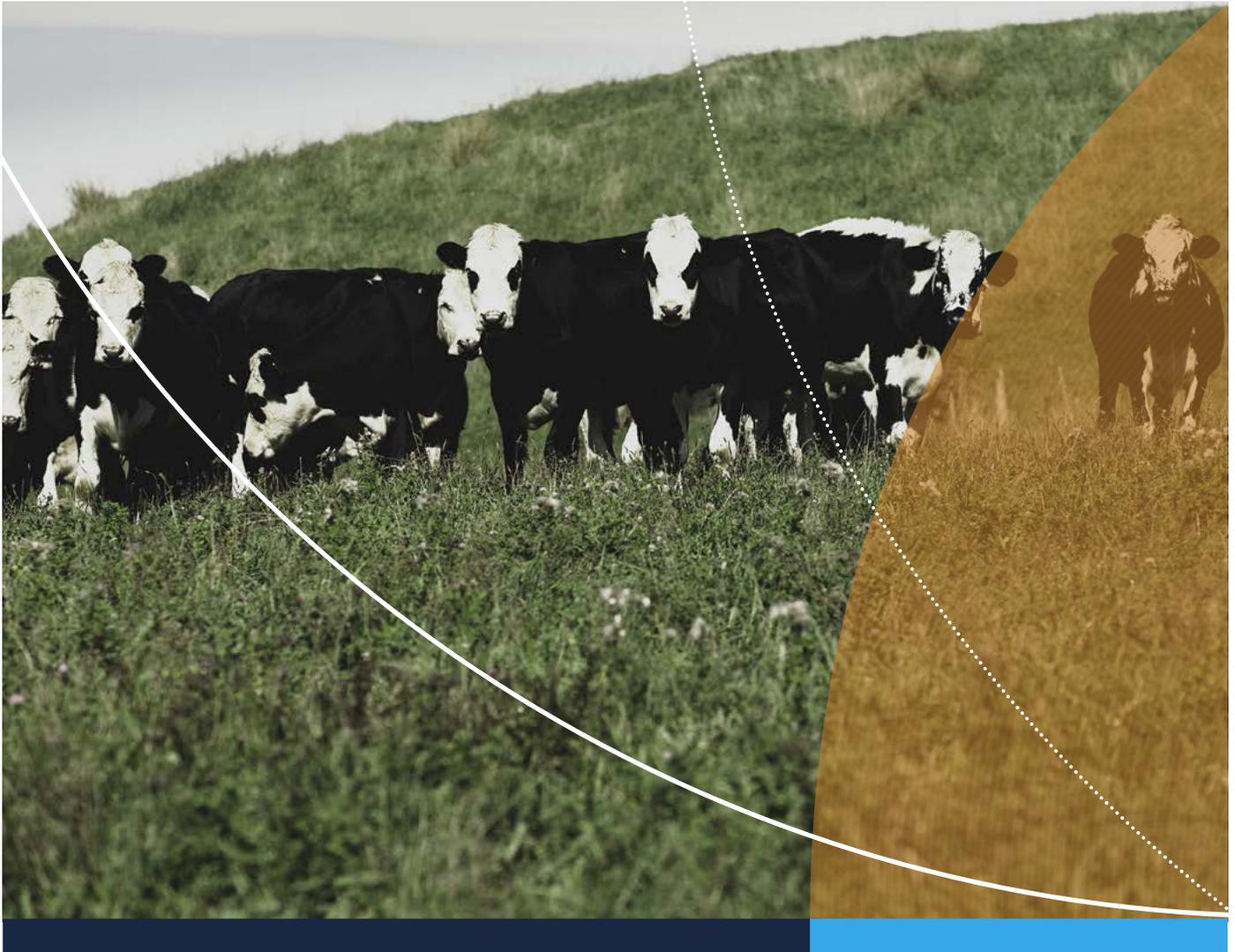
Equally, should a grower be informed that a neighbor accidentally sprayed their crop with an agricultural compound that could cause a food safety issue, the grower can inform the dryer, the mill and manufacturer. The manufacturer utilizes their traceability system to trace forward and recall or withdraw product where necessary.

Provision for traceability of maize used as an ingredient in food products, is enacted through the manufacturer's requirements under the Food Act 2014.

In conclusion, due to the low food safety risks posed to the human population by maize, New Zealand has fewer mandated compliance requirements for the maize industry in comparison to meat or dairy products. However, processes exist across the maize food chain to ensure that where food safety issues arise, they can be traced back or forward.

Robust seed certification oversight, robust grower records, transportation and milling and food production records allow for any given product to be traced through this value chain from the consumer to the source of origin. Robust third-party verification ensures processes within this food chain are fit for the purpose of tracing product forward and back.





Traceability and its role in food safety

How food traceability is implemented on public and private levels for beef in New Zealand



How food traceability is implemented on public and private levels for beef in New Zealand

All product produced in New Zealand for sale for human consumption must be processed in accordance with the primary processor's risk management programme. An important part of the risk management programme is procedures describing recall of product for certain reasons, for example, high microbiological levels, faecal contamination, or chemical residues. Our major trading partners require traceability.

OVERSEAS MARKET ACCESS REQUIREMENTS (OMARS)

OMARS contain the requirements for each country importing New Zealand's meat products. The requirements have been negotiated between the importing country and the New Zealand government (MPI). Countries that do not have their own requirements may 'piggyback' on another country's requirements. For example, Albania's requirements are the same as the European Union.

"The requirements are the same as the European Union.

European Union

Any additional requirements are specified in the OMAR notification 10/023." ¹

RECALL REQUIREMENTS: EUROPEAN UNION AND USA

European Union OMAR

The European Union Overseas Market Access Requirement for product recalls is that operators examine and rectify any issues noted in microbiological test results. These products and any other in the same batch cannot be exported to the European Union and may be recalled.

USDA OMAR

The United States Department of Agriculture Overseas Market Access Requirement for product recalls is that there is an intensified system of trace and recall for presumed positive cases of E.coli 0157:H7 in ground or trim beef. The system will look to identify the source, review process controls and whether or not the issue is systemic.

¹ Industries, Ministry for Primary. "Albania." Ministry for Primary Industries. Ministry for Primary Industries, March 2, 2021. <https://www.mpi.govt.nz/export/export-requirements/omars/search-country-animal-products-wine-organics/albania/>.

The New Zealand legislation related to traceability of meat products include:

- *The Animal Products Act 1999*
- *Animal Products (Risk Management Programme Specifications) Notice 2008*
- *National Animal Identification and Tracing (NAIT) Amendment Act 2019*.

ANIMAL PRODUCTS ACT 1999

“Subpart 1—Tracing and recall

77B *Tracing and recall requirements*

A regulated person must, as and when required by regulations made under section 77C or any supplementary notice,—

- have in place any procedures for tracing and recalling animal material or animal products; and*
- conduct simulations or other tests of those procedures; and*
- implement those procedures to trace or recall animal material or animal products. 77C*

Regulations relating to tracing and recall

77C *Regulations relating to tracing and recall*

- The Governor-General may, by Order in Council, make regulations prescribing requirements that apply to regulated persons in relation to tracing and recalling animal material or animal products.*
- The regulations may (without limitation) do any or all of the following:*
 - identify the regulated persons who are required to have procedures for tracing and recalling animal material or animal products:*
 - set requirements relating to—*
 - the content of those procedures;*
 - the conducting of simulations and other tests of those procedures;*
 - the implementation of those procedures to trace or recall animal material or animal products:*
 - specify matters in relation to tracing and recall that must be included in risk management.”*²

Animal Products (Risk Management Programme Specifications)

Notice 2008

“14 Recall of animal material or animal product

- For the purposes of section 17(2)(c) of the Act where, due to the nature of the animal material or animal product it is possible to recall it from trade, distribution or consumers, a risk management programme must contain a recall procedure, including —
 - the criteria for deciding when a recall will be initiated; and
 - how retrieval and disposition of the relevant animal material or animal product will be managed.
- A risk management programme must contain a system for notifying the following people as soon as possible when animal material or animal product is recalled from Animal Products (Risk Management Programme Specifications) Notice 2008: 8 trade, distribution or from consumers because it is not or may not be fit for its intended purpose —
 - the Director-General; and
 - the recognised risk management programme verifier or recognised risk management programme verifying agency.”³

² “Animal Products Act 1999.” Animal Products Act 1999 No 93 (as at 01 December 2020), Public Act – New Zealand Legislation. Accessed April 12, 2021. <https://www.legislation.govt.nz/act/public/1999/0093/latest/whole.html>.

³ New Zealand, Food Safety Authority. “Animal Products (Risk Management Programme Specifications) Notice 2008,” 2008.

COMPONENTS OF THE TRACEABILITY SYSTEM

Companies must have a system that ensures companies can trace where their products have been exported to. This is partially achieved through the export certification system (see E-cert at end of this publication).

Traceability in end beef products must include:

- *Trace-forward: The origin of the product through the supply chain from the farm to the final customer*
- *Any factor that could affect the fitness of use of the product, for example, chemical contamination from cleaning materials or chemical leakage from plastic or cardboard wrappings.*
- *Trace-back from final customer to the farm of origin.*

To achieve this, there are a number of key steps from farm to plate. Each step is outlined below.

ON FARM

National Animal Identification and Tracing (NAIT) Eartag

NAIT is a tool for providing traceability of farmed animals throughout New Zealand. It includes animals that are on-sold to other farms or meat processing works. It is implemented by OSPRI, a not-for-profit company working in partnership with primary industries and the government.

The National Animal Identification and Tracing Act 2012 was published detailing the requirements of a national tracing system. The act had a number of purposes, of which the most relevant to food safety was: “manages risks to human health arising from residues in food, food-borne diseases, and diseases that are transmissible between animals and humans.”⁴

At the farm level, the Act requires all cattle to be tagged with a National Animal Identification and Tracing (NAIT) ear tag and registered within the designated NAIT system.

Cattle farmers are required to register as a Person in Charge of Animals (PICA). Once registered, an online account is created with details of the farm, including location. NAIT then assign a NAIT location number to identify the location of the cattle. If animals are moved to a different location, a new NAIT location number is required.

Tags with a unique location number can be purchased from local farm stores or vets. Farmers must ensure all cattle on their farm are tagged appropriately. The farmer must also register each tag used in the NAIT system.

Each tag contains a radio-chip with information on the owner or owners of each animal. The tags are scanned at the meat processing plant and details entered into the NAIT data bank.

“Calves less than 30 days old sent directly to a meat processor from their birth farm (bobby calves). Bobby calves are also exempt from the requirement to record a movement.”⁵ More information on the tagging system can be found here:

<https://www.ospri.co.nz/farmers-and-livestock-owners/help-with-tags-and-tagging/>.



⁴ National Animal Identification and Tracing Act 2012.” National Animal Identification and Tracing Act 2012 No 2 (as at 01 December 2020), Public Act 3 Purpose – New Zealand Legislation. Accessed April 12, 2021.

<https://www.legislation.govt.nz/act/public/2012/0002/latest/DLM3732601.html>.

⁵ “Animals Exempt from Tagging.” OSPRI. Accessed April 22, 2021.

<https://www.ospri.co.nz/farmers-and-livestock-owners/help-with-tags-and-tagging/animals-exempt-from-tagging/>.

FARM AUDITS

Farm audits are an important part of traceability. For example if a consignment of veal is rejected at the South Korean border for high levels of sulfonamide, a drug used to treat infections in calves, then the audit records for farm identified by traceback will be examined for any non-compliance related to the storage, security, treatment of animals by veterinary medicines. In a previous case when a shipping container containing veal was opened at port of entry, the odour of a certain veterinary medicine was overpowering, and traceback revealed the farmer did not observe the withholding period for that drug and did not declare its use on the Animal Status Declaration. This case resulted in the loss of his farm.

Farms are audited by an independent agency to ensure the identity, integrity, quality and safety of the product have met customer and Ministry for Primary Industries (MPI) requirements. Audit criteria includes but is not limited to veterinary medicines, agriculture chemicals, animal welfare, records, vermin control, state of animals, stock brought from other farms.

The farmer is issued with an Audit Certificate once the audit is successfully completed.

The image shows a certificate from AureQuality Kaitiaki Kai. The certificate is titled "2012 Farm Assurance Programme" and certifies that Joe Bloggs, located at 1 Window Drive, Canterbury, New Zealand, has been independently audited and found to meet the requirements. The audit date is 19 Jul 2018, and the certification date is also 19 Jul 2018. The certificate expires 3.5 years from the certification date. The certificate includes the AureQuality logo, the text "This is to certify that:", the recipient's details, the audit details, and the signature of Kim Ballinger, Chief Executive Officer. There is also a JAS-ANZ logo and a vertical tagline on the right side: "Helping Aotearoa shape a better food world".

AureQuality
Kaitiaki Kai

This is to certify that:

Joe Bloggs
1 Window Drive
Canterbury
NEW ZEALAND

Has been independently audited by AureQuality Limited and found to meet the requirements of:

2012 Farm Assurance Programme

Company Supplier Code : 00000000000000000000

Audit Date : 19 Jul 2018

Certificate Number : 11111111

Certification Date : 19 Jul 2018

Expires : 3.5 year(s) from Certification

Helping Aotearoa shape a better food world

Kim Ballinger
Kim Ballinger Chief Executive Officer

JAS-ANZ
G
Association for the Joint Assurance System
of Agriculture and Food Inspection
1251999200 (INSPECTION)
www.jas-anz.com

This certificate remains the property of AureQuality Ltd, Ta Pacific Rise, Mt Wellington, Auckland 1060, New Zealand
+64 9 973 0000, info@asurequality.com, assurequality.com

ANIMAL STATUS DECLARATION

All stock submitted for slaughter must be accompanied on arrival at the plant by an Animal Status Declaration. This is a traceability tool detailing the stock owner's name, farm address, animal history, any medications administered and more.

“The ASD form is a vital component of the market eligibility system that underpins the Government’s ability to sign export certificates.”⁶

| Animal Status Declaration | | Ministry for Primary Industries Mātauranga Ahu Matua | NAIT Linking people, property and products | TBfree NEW ZEALAND | | | | |
|---|---------------------|---|---|---|------|-------|------|-------|
| Declaration: I am the person in charge of these animals and I declare that I have read and understand the requirements for this ASD and that the information that follows is true and accurate. | | | | | | | | |
| Signature (person in charge) | | Address animals moved from (Rapid Number, Road and Town/District) | | AHB herd no. or LIC MINDA code (cattle and deer only) | | | | |
| Name (person in charge) | | | | NAIT no. | | | | |
| Owner/Trade name (if different from person in charge) | | Owner's postal address (if different from above) | | Phone | | | | |
| | | | | Fax | | | | |
| | | | | Email | | | | |
| | | | | Date / / | | | | |
| Stock type | Steer | Heifer | Cow | Bull | Lamb | Sheep | Deer | Other |
| Tallies | | | | | | | | |
| Description (e.g. breed, age, D, etc) | | | | | | | | |
| Destination (e.g. name and location of processor, saleyard or farm destination) | | | | | | | | |
| 1.0 Withholding periods – all animals (see note 1 of the requirements) | | | | | | | | |
| 1.1 Are any of these animals within the withholding period of any treatment? | | | | | | | | |
| | | | | yes | no | | | |
| 1.2 If Yes, state the product name, method of treatment and dates applied (NB: these animals are NOT eligible for slaughter for human consumption until outside the withholding periods) | | | | | | | | |
| Product name | Method of treatment | | Date used | | | | | |
| | | | / / | | | | | |
| | | | / / | | | | | |
| 2.0 Animal history – all animals (see note 2 of the requirements) | | | | | | | | |
| 2.1 Were all of these animals born on your property? | | | | | | | | |
| | | | | yes | no | | | |
| 2.2 Were any of these animals imported into New Zealand? | | | | | | | | |
| | | | | yes | no | | | |
| 2.3 Are any of these animals from either a MPI surveillance listed property or under MPI movement control for residues or any purpose other than TB? | | | | | | | | |
| | | | | yes | no | | | |
| 3.0 Animal feeding – cattle, sheep, lambs, goats, deer, alpacas, llamas (see note 3 of the requirements) | | | | | | | | |
| 3.1 Have any of these animals been fed ruminant protein in their lifetime? | | | | | | | | |
| | | | | yes | no | | | |
| 3.2 Have any of these animals been fed ANYTHING OTHER than milk or pasture (see description of 'Pasture fed') in their lifetime? | | | | | | | | |
| | | | | yes | no | | | |
| 4.0 Johne's Disease vaccination – where applicable (see note 4 of the requirements) | | | | | | | | |
| 4.1 Have any of these animals been vaccinated against Johne's disease in their lifetime? | | | | | | | | |
| | | | | yes | no | | | |
| 5.0 HGP treatment – cattle (see note 5 of the requirements) | | | | | | | | |
| 5.1 Have any of these cattle been treated with a hormonal growth promotant in their lifetime? | | | | | | | | |
| | | | | yes | no | | | |
| 5.2 If Yes, how many of these cattle have been treated with a hormonal growth promotant in their lifetime? | | | | | | | | |
| | | | | Number | | | | |
| 6.0 TB Declaration – cattle, deer (see note 6 of the requirements) | | | | | | | | |
| 6.1 What is the TB status of these animals? Enter status and index number | | | | | | | | |
| Status | Number | | | | | | | |
| | yes | no | | | | | | |
| 6.2 Have any of these animals been tested while under your management? | | | | | | | | |
| | | | | yes | no | | | |
| 6.3 What is the date of the last TB test for these animals and was TB detected? | | | | | | | | |
| Date | / | / | yes | no | | | | |
| 6.4 What is the date of the last TB test for the whole herd and was TB detected? | | | | | | | | |
| Date | / | / | yes | no | | | | |
| 6.5 Is the herd under TB movement control? (if Yes, a permit is required unless going direct to slaughter) | | | | | | | | |
| | | | | yes | no | | | |
| 6.6 Are these animals being moved from a property within a Movement Control Area? | | | | | | | | |
| | | | | yes | no | | | |
| 6.7 If Yes, have these animals been tested within 60 days prior to this movement? (The 60 day test is not required if the animals are going direct to slaughter) | | | | | | | | |
| | | | | yes | no | | | |
| 6.8 Does the herd from which these animals are being moved include cattle or deer which have been introduced from a herd of lower TB status within the last three years? | | | | | | | | |
| | | | | yes | no | | | |
| I understand the obligations under the Animal Welfare Act of persons in charge of animals to ensure that their physical, health and behavioural needs are met in accordance with the minimum standards defined in Codes of Welfare under the Act | | | | | | | | |
| 7.0 Additional information (see note 7 of the requirements) | | | | HAVE YOU SIGNED THIS FORM AT THE TOP LEFT? | | | | |

May 2012

⁶ Ministry for Primary Industries. “Animal Status Declaration Form March 2007 Animal Products Act 1999 Information Pamphlet ,” n.d.



DAILY PROCESS CONTROL CHECK

The stock yards receive a daily control check. It provides evidence that the MPI or overseas market access requirements relating to the storage of animals on the plant are being met. Examples include, animals being humanely treated, the yards construction is being maintained, trucks are reasonably clean and in good repair, stock are identified with a pen card attached to the pen, information that can affect the food safety status of the animals has been transferred from the Animal Status Declaration to the Daily Slaughter Schedule.

During slaughter and dressing, each section of the processing chain receives constant supervision and routine checks to ensure process workers are following the company's good operating procedures which are designed to meet the food safety outcomes of the company's HACCP control checks.

Here is an example of the relevance and importance of the checks: Product is rejected at the border of an overseas market because of high contamination incidence in the forequarters. The product can be traced back to the line of animals in the yards and along the processing line. If the stock yards process check recorded the line was excessively dirty and the Inspection Agencies contamination incidence data was high, appropriate remedial action can be taken.

Ovine Sheeppark Process Control Sheet

Week Ending: 17/12/20
 Inspector: C. Clarkson Signature: CCCL

A) Stock Density Inspection (Daily)

| Pen No. | Sheep | Lamb | Comment | Actual Count | Pen No. | Sheep | Lamb | Comment | Actual Count |
|---------|-------|------|---------|--------------|---------|-------|------|---------|--------------|
| 165 | | 132 | | 79 L | 94 | | 198 | | 158 L |
| 48 | | 23 | | 6 L | 185 | 243 | | | 15 C |
| 71 | | 239 | | 236 L | 65 | 251 | | | 241 L |
| 150 | 39 | | | 21 L | 49 | | 15 | | 9 L |
| 165 | | 96 | | 85 L | 123 | | 213 | | 167 L |
| 148 | | 20 | | 11 L | 128 | | 315 | | 174 L |
| 166 | | 302 | | 180 L | | | | | |
| 43 | | 206 | | 143 L | | | | | |
| 178 | | 54 | | 32 L | | | | | |
| 45 | 44 | | | 39 C | | | | | |

B) Truck Inspection
 Refer to the Corporate FMLIV 001 (Livestock Transport Accreditation Programme Audit Sheet) and the Livestock Transport Accreditation Programme.
 Truck Inspections Conducted for the Week: Y / N

C) Animal Welfare Inspections/Checks
 Key: ✓ = acceptable x = unacceptable

Positive Bolt Gun Serial Number: 126546 MON: ✓ TUE: ✓ WED: ✓
 THU: ✓ FRI: ✓ SAT: ✓ SUN: ✓

Daily Inspection - (cleaned, oiled, stored securely)

| Result: | S | M | T | W | T | F | S | Comments / Corrective Actions |
|---|---|---|---|---|---|---|---|-------------------------------|
| Water Troughs: (cleaned, water available) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Sick / injured stock segregated | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Dying stock humanely slaughtered | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Humane handling of stock | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Gratings in good repair | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Pen rails in good repair | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Gate catches in good repair | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| No sharp protruding objects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Unloading ramps | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Stock Wash Practices | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |

20/11/19 Page 1 of 3 SMI-FRM-227.14

POST-MORTEM INSPECTION

Every carcass is identifiable at post-mortem inspection to its owner by referencing the Daily Slaughter Schedule.

Every carcass is tagged immediately after post-mortem examination with a label that contains all the information related to that carcass in a barcode.

CARCASS RECORD IN CHILLERS

This record covers the date, time, carcass number, shift and kill date of every carcass that has passed post-mortem inspection and has now entered the further processing line.

Carcass List for Unit Room_01_Line_02

Filter: Mizada Ccs

| Date | Time | Num | Shift | Cur Spec | Carcass UID | Prod Id | Weight | Kill Unit | Kill Num | Line | Room | See Date | Kill Date | Scan Date | Client | Carcass Count | Carcass State | Error String | |
|------------|--------------|-----|-------|----------|--------------------|---------|--------|-----------|----------|------|------|-----------|------------|-------------------------|--------|---------------|---------------|--------------|--|
| 10/04/2019 | 8:19:09 a.m. | 415 | 1 | 049FA | 94590326251679444 | 51530 | 16.80 | 1 | 797 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:19:10 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:19:23 a.m. | 416 | 1 | 049FA | 945903812227518360 | 51530 | 16.80 | 1 | 800 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:19:24 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:19:36 a.m. | 417 | 1 | 049FA | 945865879121358690 | 52976 | 16.80 | 1 | 602 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:19:37 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:19:30 a.m. | 418 | 1 | 049FA | 945885670330609273 | 51530 | 17.00 | 1 | 663 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:19:30 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:20:03 a.m. | 419 | 1 | 049FA | 945886220086473177 | 51530 | 17.50 | 1 | 667 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:20:04 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:20:17 a.m. | 420 | 1 | 049FA | 94588841910972794 | 51530 | 17.40 | 1 | 682 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:20:17 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:20:30 a.m. | 421 | 1 | 049FA | 945890618132984429 | 51530 | 17.10 | 1 | 691 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:20:31 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:20:43 a.m. | 422 | 1 | 049FA | 945890618132984433 | 51530 | 17.60 | 1 | 694 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:20:44 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:20:37 a.m. | 423 | 1 | 049FA | 945897215202751389 | 51536 | 17.10 | 1 | 741 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:20:37 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:21:16 a.m. | 424 | 1 | 049FA | 945897764958563505 | 51530 | 18.10 | 1 | 748 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:21:11 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:21:25 a.m. | 425 | 1 | 049FA | 945899414226007045 | 51530 | 16.90 | 1 | 764 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:21:25 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:21:37 a.m. | 426 | 1 | 049FA | 945899414226007050 | 51530 | 18.00 | 1 | 766 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:21:38 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:21:51 a.m. | 427 | 1 | 049FA | 945898314714379223 | 51536 | 17.10 | 1 | 770 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:21:51 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:22:04 a.m. | 428 | 1 | 049FA | 945901613249242685 | 51536 | 19.70 | 1 | 779 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:22:05 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:22:18 a.m. | 429 | 1 | 049FA | 945710248226024739 | 51921 | 19.90 | 1 | 1791 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:22:18 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:22:31 a.m. | 430 | 1 | 049FA | 945798648958382998 | 51536 | 18.40 | 1 | 1793 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:22:31 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:22:44 a.m. | 431 | 1 | 049FA | 945799748470218822 | 51536 | 19.70 | 1 | 1794 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:22:45 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:22:58 a.m. | 432 | 1 | 049FA | 945710847981838649 | 51536 | 17.90 | 1 | 1795 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:22:58 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:23:11 a.m. | 433 | 1 | 049FA | 945710847981838654 | 50520 | 16.70 | 1 | 1797 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:23:12 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:23:25 a.m. | 434 | 1 | 049FA | 945710847981838661 | 51921 | 22.50 | 1 | 1798 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:23:25 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:23:38 a.m. | 435 | 1 | 049FA | 945799198714376996 | 50520 | 18.50 | 1 | 1779 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:23:39 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:24:05 a.m. | 436 | 1 | 049FA | 94571197737652555 | 50520 | 18.80 | 1 | 1799 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:24:06 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:24:19 a.m. | 437 | 1 | 049FA | 945704235912071789 | 50520 | 18.30 | 1 | 1783 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:24:19 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:24:32 a.m. | 438 | 1 | 049FA | 945799748470218815 | 50520 | 18.70 | 1 | 1781 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:24:32 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:24:45 a.m. | 439 | 1 | 049FA | 945799748470218820 | 50520 | 19.80 | 1 | 1786 | 2 | 1 | 9/04/2019 | 9/04/2019 | 10/04/2019 8:24:46 a.m. | | 1 | Good | | |
| 10/04/2019 | 8:24:59 a.m. | 440 | 1 | 049FA | 945997118807401804 | 51536 | 17.50 | 1 | 821 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:24:59 a.m. | | 0 | 1 | Good | |
| 10/04/2019 | 8:25:12 a.m. | 441 | 1 | 049FA | 945997118807401810 | 51536 | 17.40 | 1 | 822 | 2 | 1 | 9/04/2019 | 10/04/2019 | 10/04/2019 8:25:13 a.m. | | 1 | Good | | |

POSITIVE IDENTIFICATION OF PROCESSED MEAT CUTS

Each cut of meat is allocated a Standard Pack (StandPack) number. The number links to a standard manual of cuts, where each individual cut is allocated a unique number. The number is one factor that assists in the identification of a specific line of carcasses that make up a consignment. The StandPack numbers accompany the product description on the Export Certificate.

Product descriptions and accompanying StandPack numbers may be listed in a manual, as in the example below, or may be electronic and developed by the company. StandPack information is not publicly available, instead this is held by each individual company. The company will make their standpack numbers known to customers and can utilize the numbers to trace-back as required.

The example below is from the New Zealand Meat Specifications Guide and is available from [Beef and Lamb New Zealand](#).

3601

Whole shoulder

Short forequarter (breast on)
Cut from a neck string-on carcass. Prepared from a bone-in side by a cut at right angles to the line of the back between the 5th and 6th ribs. The neck and shank are left on.

Additional specifications:

- Number of ribs to be left on forequarters if varying from above.

3610

Boneless flatpack shoulder

Prepared from a bone-in forequarter by the removal of all bones. The resulting boneless cut may be rolled, tied, netted or inserted in a polythene casing.

Additional specifications:

- Number of ribs on forequarter;
- Removal of neck, breast and shank;
- Method of packing;
- Diameter of roll if presented in that form.

3611

Short forequarter (breast off)

Prepared from the breast-on short forequarter. The point end brisket is removed by a cut parallel to the line of the back, just clearing the elbow joint. The neck is removed between the 3rd and 4th cervical vertebrae.

National Microbiological Database

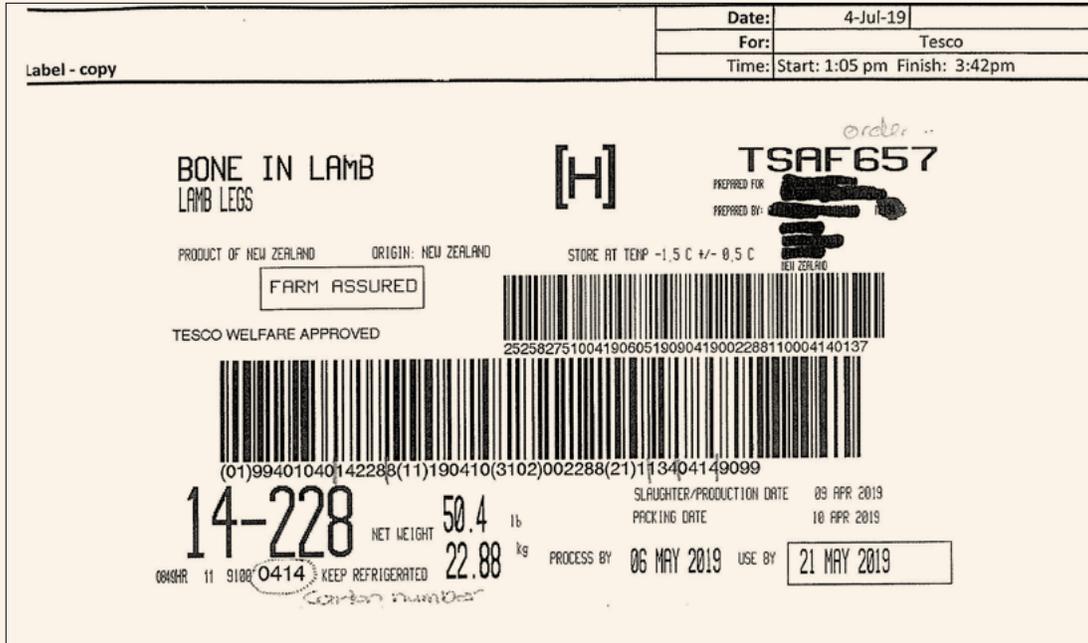
Every meat processing plant is required by the Ministry for Primary Industries (MPI) to participate in the sampling and laboratory analysis of specific cuts. The results of each plant are entered into the national database and can be accessed by MPI and overseas governments.

Although it's not a direct part of the traceability system the National Microbiological Database is a key component of any investigation of product recalled for microbiological food safety reasons.

FROM THE PLANT TO THE CONSUMER

Product security

Every carton containing processed product is identified with a label that details the slaughter date, packing date and bar-coded production details. If a food safety issue is identified at supermarket level and the supermarket is holding NZ product still in carton form or has electronic records of the carton seals, they could provide the Ministry for Primary Industries (MPI) with the unique label number. This allows the product to be traced to the plant and eventually back to the farm.



Carton seals

Every carton of product is sealed with an adhesive label placed across the joins between the lid and carton. The seal can only be removed by cutting. Each seal has a unique number, the Crown Coat of Arms, Plant's Risk Management Program (RMP) number and New Zealand Inspection legend.



Container seals

Every shipping container is sealed with a container seal that has a unique number. The serial numbers of the carton seals and shipping container seals are referenced on the Official Assurance E-Cert.

The MPI maintain an inventory of the carton seal and container seal serial numbers.

Product Wrapping

Wrappings that directly contact product must be approved in accordance with specific United States Department of Agriculture standards. This requirement also extends to inks used to print the inspection legend on the wrapping.

Ministry for Primary Industries

The Ministry for Primary Industries (MPI) audits each farm's and primary processor's compliance with relevant Notices. If all is compliant, the MPI veterinarian issues an Official Assurance (E-Cert) for every consignment destined for overseas markets. The E-cert links to all history of the product and the type of product. The E-Cert (see example on next page) contains all the information required for traceback, including:

- *Consignor*
- *Consignee*
- *Country of Origin*
- *Country of Destination*
- *Place of origin*
- *Place of loading*
- *Date of departure*
- *Mean of transport*
- *Entry BIP in country of Destination*
- *CITES – if applicable. CITES: Convention on International Trade in Endangered Species and is a multilateral treaty to protect endangered plants and animals. This is more relevant to plants that process wild game.*
- *Temperature of product*
- *Total gross weight*
- *Number of packages*
- *Seal/Container numbers*
- *Standpack number if required.*



NEW ZEALAND MINISTRY FOR PRIMARY INDUSTRIES

Certificate Number NZL2021/BLL6/3482

Sanitary Certificate for Meat Products to United Kingdom

| | | |
|-------------------------------|---|-----------------------|
| Name and Address of Consignor | Exporting Country New Zealand | |
| BLL | Competent Authority Ministry for Primary Industries | |
| Blue Lake Limited | Place and Country of Destination | Means of transport |
| Lake View Rd, Rangiora | Liverpool England | Maritime CALI, FC(O)R |
| CHRISTCHURCH | Port of Loading | Port of Inspection |
| New Zealand | Lyttleton | Liverpool |
| | Port of Discharge | |
| | Liverpool | |

| Item | Number and kind of packages | Description of Product | Net Weight |
|------|-----------------------------|---------------------------------------|-------------------------|
| 1. | 390 Cartons | 3611 CHILLED SHORT QUARTER BREAST OFF | 3738.6 kg |
| 2. | 390 CARTONS | 3610 BONELESS FLATPACK SHOULDER | 4216.34 kg |
| | 780m packages in total | | Total weight 7953.94 kg |

| | | |
|-------------|----------------------|------------------------------|
| Species | Identification marks | Container (&Seal) numbers |
| (1.2) Ovine | Not Applicable | MSDU4009554 (NZMPILT9589426) |

Slaughterhouses
(1, 2)

Stores
ME34 Blue Lake Limited, Lake View Rd, Rangiora, CHRISTCHURCH, New Zealand

Stores
ME34 Blue Lake Limited, Lake View Rd, Rangiora, CHRISTCHURCH, New Zealand

Health Attestation

I hereby certify that:

I hereby certify that:

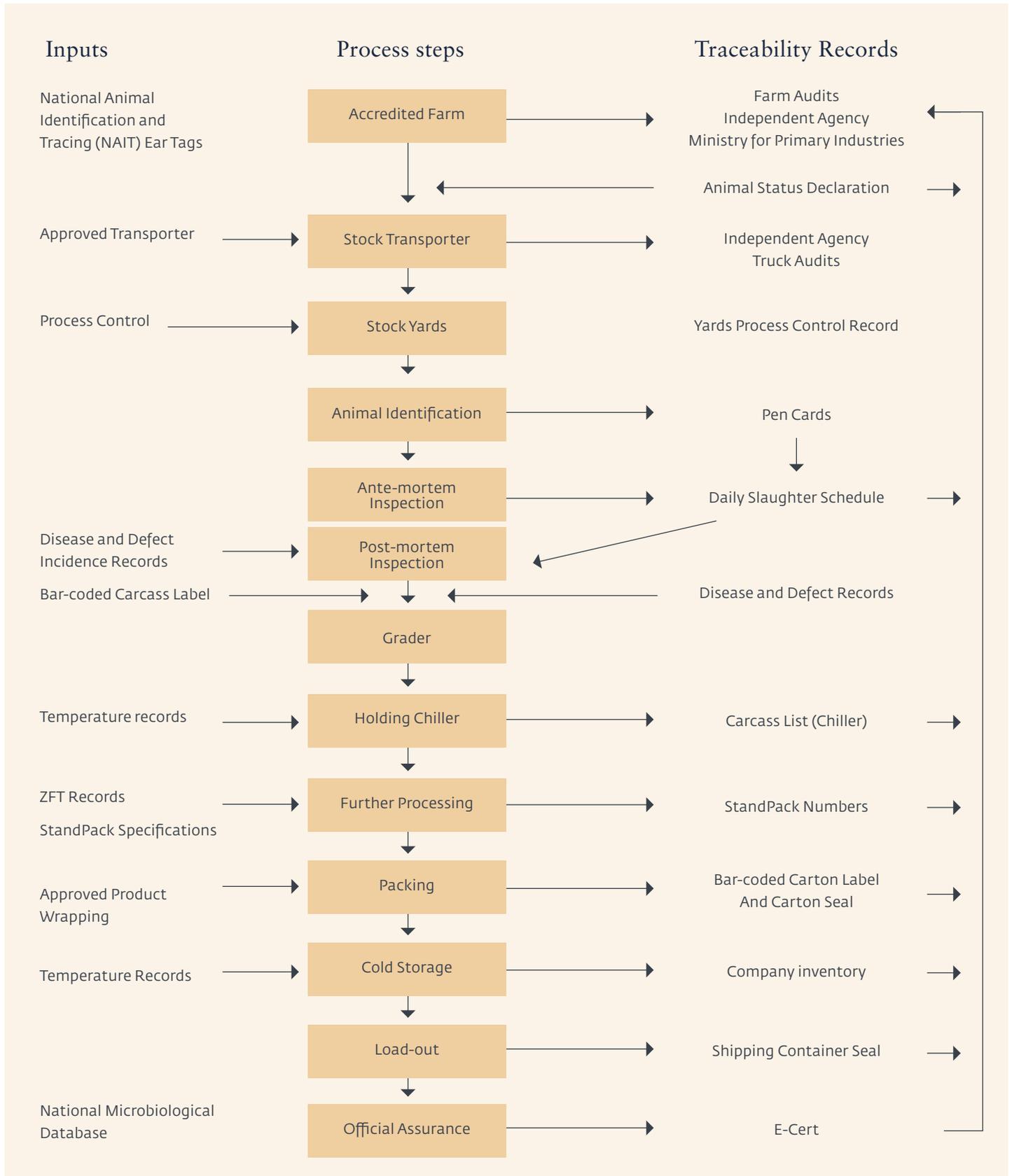
- The products described above are derived from animals which have passed ante-mortem and post-mortem veterinary inspection at the time of slaughter and were processed in accordance with New Zealand law.
- The products have not been treated with chemicals or foreign substances injurious to health.
- The products are deemed fit for human consumption(!).
- African horse sickness, African swine fever, anthrax, avian influenza (fowl plague), bluetongue disease, bovine spongiform encephalopathy (BSE), Brucella abortus, Brucella melitensis, classical swine fever (hog cholera), contagious bovine pleuropneumonia, foot and mouth disease, glanders, lumpy skin disease, Newcastle disease (an asymptomatic lentogenic strain exists in New Zealand), peste des petits ruminants, rabies, Rift Valley fever, rinderpest, scrapie, sheep and goat pox, swine vesicular disease and vesicular stomatitis do not occur in New Zealand.
- The importation of ruminant meat and bone meat and blood meat for use in stock foods, is prohibited.
- The animals from which the meat was derived were of New Zealand origin.
- Hormonal growth promotants registered in New Zealand are approved in accordance with Codex Alimentarius.

1. Refer definition Recommended International Code Hygienic practice for Fresh Meat, CACIRCP 11-1976, Rev. I (1993), In Codex Alimentarius Volume 10 (1994) - Meat and Meat products by Codex Alimentarius Commission,

WHO/FAO, Rome 1993, pp83-111.

Traceability Flowchart (Example)

This flowchart details records required for effective traceback.





Summary and Conclusion

The New Zealand meat industry has comprehensive product traceability recall procedures and resources. The identification of every carcass or carton of frozen or chilled product is underpinned by:

- *Farmer declaration that details the history of every animal*
- *Trucking records that detail the farm's registration number, name of farm, type and number of stock and destination of the consignment.*
- *Time of arrival on plant*
- *Record of ante-mortem examination*
- *Record of time of slaughter*
- *Bar-coded record of every carcass*
- *Time of entering further processing*
- *Every carton identified by a uniquely numbered Official Carton Seal number linked to the E-Cert*
- *Every carton identified by a uniquely bar-coded carton label and a carton label*
- *Company's cold storage inventory system*
- *Time of load-out into a shipping container*
- *Every container identified by a uniquely numbered container security seal linked to the E-Cert*
- *Official Assurance (E-Cert) showing all the above details.*

Traceback

When a product is recalled and the cause of the recall is investigated, the following records ensure traceback to the root cause.

Recall for chemical levels exceeding Maximum Accepted Levels
Chemical residues can include veterinary medicines, agriculture chemicals such as herbicides, pesticides, parasiticides, fertilizers, growth hormones.

The following records are available in addition to the above list:

| | |
|----------------------|---|
| Yards process checks | Chemicals used for cleaning |
| Process line checks | Chemicals used for cleaning Unapproved chemicals |

Recall for chemical levels exceeding Maximum Accepted Levels
Chemical residues can include veterinary medicines, agriculture chemicals such as herbicides, pesticides, parasiticides, fertilizers, growth hormones.

| | |
|----------------------|---|
| Yards process checks | Dirty stock |
| Process line records | Dirty stock Operators not washing and sterilizing equipment. Inspection Agency's carcass contamination incidence records. |

Recall for unacceptable pathological levels

Unacceptable pathological levels may include tuberculosis, *Cysticercus ovis* or *Cysticercus bovis* cysts.

| | |
|---------------------------|--------------------------------|
| Animal Status Declaration | Animals on a surveillance list |
|---------------------------|--------------------------------|

All of these measures provide a robust traceability system, providing assurances to domestic and overseas consumers. Were a food safety issue to arise at any stage from farm to plate, the product can be traced back through the process, the cause of the issue identified and rectified.



Principles of food safety management Application of how HACCP regulations are implemented



Background to the introduction of HACCP in New Zealand

A paper prepared for the New Zealand Government in 1998, (specifically the Ministry of Health and Ministry of Agriculture and Fisheries), *Assuring Food Safety*, signaled the importance of HACCP. It is worth quoting a section from Chapter 2:

“Hazard analysis critical control point regulatory approach.”

“2.17 There is an international trend towards ‘hazard analysis critical control point’ (HACCP) based regulation. The HACCP approach identifies specific hazards and measures for their control to ensure the safety of food. HACCP is a tool to assess hazards and establish control systems that focus on prevention rather than relying mainly on end-point testing. Any system based on the HACCP approach can accommodate change, such as advances in equipment design, processing procedures or technological developments.

2.18 The HACCP approach can be applied throughout the food chain from primary production to final consumption. Its implementation should be guided by scientific assessment of risks to human health. As well as enhancing food safety, implementation of HACCP can provide other significant benefits. In addition, the application of the HACCP approach can aid inspection by regulatory authorities and promote international trade through increased confidence in food safety.

2.19 In New Zealand the framework applied (the optimal regulatory model) requires industry to take a greater responsibility to demonstrate the safety of products by using the HACCP approach in the development of food safety programs/product safety programs/risk management programs. This responsibility for food safety and fitness for purpose becomes part of their overall management program. The regulators who approve these food safety programs also need well-developed competence in HACCP to provide acceptable assurance of the safety of the New Zealand food supply and to maintain the integrity of this new system.”¹

This paper went on to discuss the relationship between the government and the horticultural industry sectors. It stated that there was fragmentation, inconsistency, and unclear accountabilities. It was proposed that all regulatory enforcement was to come under the control of government with functions being contracted out.

“Functions that may be contracted to service providers include:

- *issuing approvals for food/product safety and risk management programs*
- *assessment of auditor/verifier reports*
- *surveillance and monitoring of food regulatory environment*
- *investigation of specific illegal activities, complaints*
- *emergency response action.”*²

¹ Ministry of Health, Ministry for Agriculture and Fisheries. "Assuring Food Safety An Integrated Approach to Regulating the Food Sector in New Zealand," 1998.

² Ibid., 19.

This change to a risk management approach was aimed at firstly, improving food safety for consumers, secondly better control for the horticultural industry with less government intervention and reduced costs, and thirdly, enhancing export opportunities.

To facilitate the introduction of a risk management approach, the New Zealand Food Safety Authority (NZFSA) was established on 1 July 2002 under MAF and by 2007, it was determined that NZFSA had established sufficient credibility to be a standalone entity.

So how does HACCP work? To understand HACCP, it is necessary to understand the link with Codex Alimentarius (commonly called Codex). Simply put, Codex is a group of internationally adopted food standards, guidelines and codes of practice aimed at verifying that food is safe to eat and that food trade is fair. It covers food that is raw, semi-processed or processed. It includes provisions related to food hygiene, pesticide and veterinary residues, methods of analysis and sampling, contaminants, food additives, labelling and presentation and export inspection and certification. For more information on codex, see <http://www.fao.org/3/i5667e/i5667e.pdf>.



Codex outlines the principles of HACCP as the following:

1. *Conduct a hazard analysis and identify control measures.*
2. *Determine the Critical Control Points (CCPs).*
3. *Establish validated critical limits.*
4. *Establish a system to monitor control of CCPs.*
5. *Establish the corrective actions to be taken when monitoring indicates a deviation from a critical limit at a CCP has occurred.*
6. *Validate the HACCP plan and then establish procedures for verification to confirm that the HACCP system is working as intended.*
7. *Establish documentation concerning all procedures and records appropriate to these principles and their application.*

It needs to be remembered that even though HACCP has several principles, its implementation has flexibility. It can work for any business producing food. The working through of the HACCP process to identify the hazards, noting the inputs and necessary controls can be carried out on any process, large or small. Using HACCP principles to produce safe food, is a way of thinking.³

It can be used effectively on a farm producing lettuces that are cut in the field and placed in crates and sent directly to the market. It can also be used in a salad house that takes those same lettuces and turns them into washed bags of ready-to-eat salads. Both situations have risks that must be quantified and addressed. Flow diagrams of the processes aid in this development.



³ CODEX ALIMENTARIUS. "GENERAL PRINCIPLES OF FOOD HYGIENE CXC 1-1969," 2020.

THE NEW ZEALAND SITUATION

Let's look at the food supply chain in New Zealand and consider how each link in the chain utilizes HACCP. The following link provides useful information on the operation of New Zealand's National Program.

<https://www.mpi.govt.nz/dmsdocument/10691-National-Programme-NP-An-Overview>

In terms of compliance to the regulations, verification occurs with different frequencies depending on whether the business falls under NP1, NP2 or NP3. Remembering too, that a food business operating under NP1 such as an orchardist producing apples/kiwifruit/avocados/oranges/blueberries, will have an annual audit to meet the GLOBALG.A.P. control points.

HACCP is not specifically mentioned in the National Program. HACCP comes into play depending on the third-party compliance standard chosen by the business. HACCP has effectively emerged and been formalized on the continuum of:

- *GOP (Good Operating Practices)*
- *GMP (Good Manufacturing Practices)*
- *GAP (Good Agricultural Practices)*
- *GHP (Good Handling Practices)*

Hazard detail

| | |
|---------------|-----------------------|
| Food Type : | Apples |
| Description : | includes dried apples |

| | |
|-------------------------|--|
| Hazard: | Biological -- Enterobacteriaceae -- |
| Source: | Organic fertiliser, irrigation water can contain Salmonella, E.coli O157:H7, Shigella and other bacterial pathogens, e.g. Campylobacter, Listeria |
| Justification: | The application of Hazard Analysis and Critical Control Point (HACCP) principles to the primary production and post-harvest processing of fresh horticultural produce (technical report available as internal MPI report) |
| Control Measure: | Irrigation water and organic fertiliser not in direct contact with fruits therefore minimal risk. Drop apples may be contaminated. See information on good agricultural practice (GAP) for use of irrigation water and organic fertilisers |

Hazard detail

| | |
|---------------|-----------------------------|
| Food Type : | Fruit (raw) |
| Description : | e.g. apples, bananas, pears |

| | |
|-------------------------|---|
| Hazard: | Biological -- Virus -- Hepatitis A |
| Source: | Contamination by infected handler |
| Justification: | Microbial Pathogen Data Sheet. Mixed frozen strawberries and blackberries have been implicated in 4 cases of Hepatitis A (Oct - Nov, 2015) |
| Control Measure: | Food handler Good Operating (agricultural and hygiene) Practice. |
| Reference: | *Report: An outbreak of hepatitis A associated with consumption of raw blueberries. *See section 4 'People Basics' in the Template Food Control Plan under the Food Act 2014 requirements. *Avoiding foodborne illness. |

These four practices emphasize having systematic operating procedures that are both documented and well understood by employees. Operations must be undertaken in a consistent manner, particularly those related to hygiene.

To this end, MPI have established a very useful searchable hazard database providing information on food safety hazards that may be found in New Zealand food and how they can be controlled.

<http://www.foodsafety.govt.nz/registers-lists/hazards/index.htm>

Below left are two examples from the database.

Let's consider what this hazard identification and HACCP means for growers and packhouses in New Zealand.

GROWERS

Growers do not formally document HACCP in most instances as their certification to GLOBALG.A.P. or NZGAP for example, does not require them to do this. It does however require them conduct a hazard analysis for their site(s) and for hygiene. The focus of this hazard identification is food safety. Controls for each of the hazards will need to be detailed. The risk assessments must be reviewed at least annually.

SITE RISK ASSESSMENT

| HAZARD | POTENTIAL HARM | CONTROLS | REVIEW DATE / SIGNED |
|----------------------|--|--|----------------------|
| Previous land use | Contamination e.g: chemicals from industry such as a timber yard – arsenic. | Know what the previous land use was. Soil tests. | |
| Neighboring land use | Contamination e.g: over spraying/rubbish spread. | Build barriers/fences between neighbors. | |
| Flooding | Contamination e.g: riverbanks overtopped and produce covered in dirty water. | Should flooding occur produce must not enter the food chain, is to be discarded. Records kept. | |

HYGIENE RISK ASSESSMENT

| HAZARD | POTENTIAL HARM | CONTROLS | REVIEW DATE / SIGNED |
|--|---|---|----------------------|
| Staff Sickness | Microbiological contamination of product/other staff. | Staff advised to stay home when sick. | |
| Handwashing Water | Spread of waterborne diseases. | Test water to check potability. Provide soap and sanitizer and hand drying equipment. | |
| Unclean picking bags /containers/equipment | Microbiological contamination of product. | Picking containers /bags/equipment cleaned prior to use and again when dirty. Records kept. | |



PACKHOUSES

Packhouses who wish to achieve the BRCGS (Brand Reputation Compliance Global Standards) however, are required to have a formally documented HACCP plan.

“To comply with the Standard, a systematic, science-based approach to the identification of potential food-borne hazards is required, together with the establishment of controls designed to prevent each hazard exceeding acceptable limits. The purpose of these requirements is to create a plan to mitigate food safety risks. The specific terminology used in the standard such as ‘prerequisites’ and ‘critical control points’ is intended to reflect the global terminology used to describe expectations.”⁴

The plan needs to cover all inputs and outputs including:

- *Ungraded fruit (receipt, curing, storage)*
- *Tipping of fruit*
- *Grading*
- *Packing*
- *Labelling*
- *Weighing*
- *Inspecting/Quality Control*
- *Storage*
- *Dispatch*

Each step has its risks categorized under headings such as: physical, quality, vulnerability, food fraud, allergenic, biological, radiological, chemical. A severity vs frequency matrix is utilized to determine the rating. A packhouse will commonly elect to denote risks over a particular number (16+ for example,) as CCPs.⁴

| | | SEVERITY | | | |
|------------|---|----------|---|----|----|
| | | Rating | 1 | 2 | 3 |
| LIKELIHOOD | 1 | 1 | 2 | 3 | 4 |
| | 2 | 2 | 4 | 6 | 8 |
| | 3 | 3 | 6 | 9 | 12 |
| | 4 | 4 | 8 | 12 | 16 |

⁴ GLOBAL Standard Food Safety (Issue 8) Interpretation Guideline,” 8th issue. Section 2 (BRCGS, 01 August, 2018).

The scope of operations will be listed, for example - Washing (apples only), grading, and packing of Pipfruit (apples and pears) and Stone fruit (peaches, nectarines, plums and apricots). Fruit packed into retail cartons, punnets and crates or bagged.

The site will also have to draw up a flow plan detailing all the steps in the process. This flow plan has to be confirmed annually (and when a significant change occurs) by the site.

Prerequisite programs are operational and environmental programs required to produce safe and legal food products. Typically, they include staff training, purchasing, pest management, personal hygiene, transportation, cleaning and sanitizing, allergen controls and maintenance.

Once the product is loaded into containers they are sealed, and these seals will not be opened until the product reaches its country of destination. Control of the product at this point is very limited and totally dependent on the customer's practices.

The main barrier to the successful implementation of HACCP in New Zealand is lack of understanding by employees of what is required in identifying hazards and appropriate controls for these hazards.

To this end, a key element of HACCP under the BRCGS standard is the existence of a HACCP team with a team leader who has been formally trained in HACCP principles. The HACCP team members must cover all departments on the site – quality, engineering, cool storage, logistics and production. Minutes of the HACCP team meetings are kept, actions and responsibilities for actions listed. Sign off dates are noted. It is a very structured program.

There are several benefits of implementing a HACCP program in concert with the requirements of New Zealand's Food Act. Those are:

- *Establishes clear operational processes leading to consistency of safe food production.*
- *Reduces waste and therefore cost saving.*
- *Organizes staff and promotes teamwork and efficiency.*
- *Enhances focus on traceability including better inventory control.*
- *Increases overall food safety standards.*
- *Maintains/enhances safe food reputation.*
- *Ensures compliance with government regulations.*
- *Ensures compliance with additional standards such as BRCGS.*

HACCP is a way of thinking and needs to be all encompassing for it to be successful. Senior management must show their commitment by resourcing such programs and overseeing their implementation. All staff must be made aware of the requirements and given appropriate training, so the controls are put in place and they are monitored as specified. Verification must also occur. Internal auditing is critical. Producing safe food can appear to be a lot of hard work! However, this hard work is essential to protect consumers.





Principles of food safety management History of the AsureQuality laboratory



History of the AsureQuality laboratory

Agriculture is the backbone of the New Zealand economy, with over 95% of agricultural products exported. The drive for quality, research and innovation has long been a feature of the sector, with robust investments in processes, education, animal health, farm equipment and management technology, seed production and plant genetics.

As one of the world's most efficient agricultural economies, with respected pastoral farming expertise and high-quality food production systems, New Zealand is well-positioned to work with other countries facing challenges as the world population heads towards an estimated 9.7 billion in 2050.

AsureQuality was formed in 2007 from the merger of two New Zealand state owned enterprises ASURE New Zealand Limited and Agri Quality Limited. Both companies were originally formed in 1998 from the service delivery arm of the Ministry of Agriculture and Forestry (New Zealand), MAF Quality Management, now known as the Ministry for Primary Industries. AsureQuality provides independent and impartial inspection, certification, verification, and testing services. Its international accreditations, national and international regulatory programs enable AsureQuality customers to access the world's largest markets.

New Zealand has long been renowned for its food. Where growers, farmers, producers, and others right across the supply chain, work hard to uphold what New Zealand stands for in food – a higher standard of quality and safety. AsureQuality are proud to work with them to help build and protect this enduring trust in food. Owned by the New Zealand Government, the AsureQuality name helps inspire confidence. AsureQuality deliver independence of the highest integrity. Helping New Zealand uphold a higher standard in food as partners proudly take their products to the world.

With six laboratories across New Zealand, AsureQuality provide a wide range of testing services to the food and primary production sectors. AsureQuality innovative methodologies and delivery systems place their testing laboratories amongst the best in the world. All AsureQuality laboratory facilities are accredited to the international standard ISO/IEC 17025.

AsureQuality's Auckland laboratory is ISO/IEC 17025 accredited and Australasia's largest and most respected food and dairy testing laboratory. With huge capacity and capability, the laboratory operates 365 days a year and performs up to 10,000 tests per day (more than two million per year) for food and dairy companies in New Zealand and overseas.

With internationally recognized expertise and direct association with Association of Analytical Collaboration International, International Organization for Standardization (ISO), International Dairy Federation (IDF), The Infant Nutrition Council of America (INCA), China Society of Inspection and Quarantine (CSIQ), and CODEX Alimentarius Commission, the specialist team also have extensive hands-on experience and are passionate about sharing this knowledge with customers. Such an unparalleled depth and breadth of experience means that the solution-focused team are perfectly placed to provide technical advice and customized solutions to help customers achieve the optimum results from their production.

In a recent example, AsureQuality were called into action by a customer with an unexpected test result that meant their product no longer met overseas market regulations. With an export order at risk, the customer needed urgent help to ascertain what had gone wrong. Within three hours, an AsureQuality expert was onsite working alongside their customer and was quickly able to identify and therefore fix this problem.

AsureQuality's Laboratory Advisory Services are varied and range from interpretation of analytical results through to identification of root cause for contamination, shelf-life testing, and customizable technical support. Now New Zealand food businesses can engage an experienced expert to help when it matters most – to optimize, to problem-solve or simply to help them achieve the very best results.

This is part of AsureQuality's continuous improvement of analytical service to food and dairy companies who are setting internal standards that are far more stringent than those required by law. Instead of merely complying with regulatory safety requirements, they are aiming for exceptional quality that distinguishes them from their competition and builds consumer trust and brand loyalty.

New Zealand laboratory gains international reputation for safeguarding food quality. Game changing technology at AsureQuality's Auckland laboratory is giving New Zealand's food producers and exporters a vital advantage.

Time is a key element, ensuring they meet stringent quality controls while getting products to overseas consumers as quickly as possible. At the lab, customers have access to the latest GENE-UP® PCR technology which delivers rapid and accurate results when testing food pathogens in a wide range of everyday food products. This is one of the many tests performed at the lab which help ensure the quality and safety of food consumed by millions of people.

The team here spent a long time looking at a technology that would deliver fast test results and reduce false positive results for customers. With one of their largest customers, AsureQuality undertook a worldwide search of all the technologies before settling on GENE-UP® which AsureQuality collectively thought would be the best option for their requirements.

That is great news for manufacturers who can now receive test results quickly and take more timely corrective action in their factories (if required) after waiting just one day – instead of up to seven with other testing technologies. That speed is critical for products with a short shelf life when the manufacturer is making product every day. If, on Monday, you were making a batch and did not find you had an issue until three days later, you have got two or three subsequent days of manufacture that may also be under question. That is a much bigger problem for the manufacturer to deal with.



The testing happens deep in West Auckland at Australasia's most sophisticated food and dairy laboratory, one that has become a world leader in test method development and validation.

The facility is open 365 days a year. It is the size of two-and-a-half football fields and conducts up to 10,000 lab tests per day. Inside up to 450 industry experts ensure the food in your supermarket trolley is safe and true-to-label. They also ease the way for exporters who face a fast-moving, global regulatory landscape.

AsureQuality know their way round the complex local and international codes, standards, and regulations when it comes to food safety and nutrition. If you don't get this right, you don't get to export. AsureQuality removes this as a massive pain-point for Kiwi exporters and let them get on with what they excel at - taking the best of New Zealand to the world. Whether it is red meat, shellfish, honey or dairy, the lab can provide targeted industry-specific solutions.

While AsureQuality has supported New Zealand companies for over 100 years, its commitment to the latest developments in science, technology and innovation continues to set it apart.

The Auckland lab was the first in New Zealand to install an automated microbiology system – KIESTRA, installed in 2005 - that automated a lot of AsureQuality microbiology work and reduced potential for human error. AsureQuality receives testing from Ireland, Australia, and Asia Pacific region because they can do it faster and cheaper, and results are trusted more than those of their local labs.

A recent win includes receiving China National Accreditation Service (CNAS) accreditation. In June 2019, the Auckland laboratory became the first food laboratory to receive CNAS accreditation without having a presence in China; that is quite an achievement. AsureQuality see that as a first step towards Chinese port authorities recognising their certificate of analysis on the inbound goods, so the product will not have to undergo another round of testing in China. Usually, the testing happens while the product sits at the Chinese port. That can cause headaches around the supply chain and the added cost of paying for the product to be tested again in China.

The lab has also been noticed by renowned global standards organizations such as the United States-based AOAC International (Association of Analytical Collaboration International) and the International Organisation for Standardization (ISO), International Dairy Federation (IDF), National Institute of Standards and Technology (NIST) all of whom use AsureQuality Auckland laboratory for various validation studies, in some cases sending samples half way across the globe to leverage their expertise. The lab can work with exporters from the inception of a product right through to readying it for the local and export market.

AsureQuality are in this business because they care about customers and about 'Brand New Zealand'. AsureQuality's commitment is to enable Kiwi food exporters to take the very best of New Zealand to the world. A brand might be looking for a new functional ingredient and AsureQuality can work with them to establish what the testing methodology might look like to be able to support that ingredient and the label claim.



AsureQuality service the following market sectors:

- *Food and dairy (including feed and wine)*
- *Pharmaceutical and nutraceutical*
- *Horticulture*
- *Environmental monitoring and consultancies*
- *Government, Councils, Competent Authorities (domestic and international)*

AsureQuality testing services include:

Chemical Food Safety

- *Heavy Metals (As, Cd, Hg, Sb, Pb, Sn, Cu, Al, Ni, Mo, Ag, Bi) HM list from FCC Guidelines*
- *Mycotoxins (Aflatoxin B1, B2, G1, G2, M1, M2, Ochratoxin A, Fumonisin, Deoxynivalenol / DON, Zearalenon)*
- *Preservatives (benzoates, sorbates, Sulphur dioxide / sulphiting agents, BHA, BHT, TBHQ, Ethoxyquin)*
- *Preservatives (benzoates, sorbates, Sulphur dioxide / sulphiting agents, BHA, BHT, TBHQ, Ethoxyquin)*
- *Foreign matter, impurity, milk fat purity*

Food Composition

- *Nutritional labelling*
- *Macronutrients, dietary fiber (total, soluble and insoluble)*
- *Minerals and trace elements*
- *Full range of water soluble & fat-soluble vitamins and other micronutrients*
- *Fatty acid profile and triglyceride / fat analysis*
- *Shelf-life studies (Medsafe certified stability chambers as per ICH Guidelines)*
- *Raw material analysis (Using compendial monographs of FCC, USP, BP, Ph Eur, CP)*

Science support program

- *Technical support*
- *Testing regime optimization and test method selection*
- *Test method development and validation*

The laboratory maintains a full range of food matrix scope and tests for nutritional label requirements to meet Food Standards Australia New Zealand and other Overseas Market Access Requirements as required by their diverse customer base. Their matrix scope covered by the accreditation is listed below.

- Cereals and cereal products
- Edible oils, fats, and their products (including tallow)
- Nuts, fruits and vegetables and derived products
- Sauces, herbs, spice, and condiments
- Sugars and sugar confectionery
- Dairy products
- Meat, poultry, and derived products
- Fish and fish products
- Eggs and egg products
- Alcoholic beverages including wine and beer
- Non-alcoholic beverages
- Food additives and supplements (vitamin premixes)
- Essential nutrients, including vitamins.



AsureQuality laboratory is accredited to ISO/IEC 17025 and all testing conducted by the laboratory is compliant with the accredited quality systems and deemed technically competent in all services offered to customers.

To ensure that the analytical data provided is valid, the laboratory has measures in place to ensure that the analytical methodologies are performing to expectations. The validation and / or verification is carried out to confirm by examination and to provide evidence that the performance requirements are met for methods to be used by the laboratory for the intended purpose. The laboratory has an extensive Master Validation Plan (MVP) as a guideline prior to commencing any validation / verification studies. The MVP has more than 17 reference documents including International Conference on Harmonization (ICH) Harmonized Tripartite Guideline: Validation of Analytical Procedures: Methodology Q2 (R1) Revised 2005.

Method development and validation are an integral part of the analytical services to improve the scope of the deliverables and as per customer requests. Some of the new methods developed, validated, and standardized by the laboratory were recognized widely as global standards, as given below:

- *AOAC 2019.09, Total proteinogenic amino acids and taurine.*
- *ISO 23305, Biotin (CODEX Type II)*
- *AOAC 2016.02, Biotin*

AsureQuality are experts at developing methods in-house and have many validated and accredited methods for commercial application. AsureQuality value people and work hard to provide their customers with direct access to this expertise to assist whenever required, including providing expert witnesses should this be required to support legal action.

The major components of data quality to have confidence in the validity of results.

- *Analytical Instrument Qualification (AIQ)*
- *Analytical Method Validation / Verification*
- *System Suitability Tests*
- *Quality Control Checks*
- *Reference Materials*
- *Regulatory audits (IANZ, MPI, CNAS, Medsafe, MoH etc.)*
- *Internal Technical and Quality Audits*
- *Customer Audits*

The Auckland Microbiology technical team regularly provides consultancy services to regulatory and commercial customers. AsureQuality has the expertise to support large food monitoring and surveillance projects based on The International Commission on Microbiological Specifications for Foods (ICMSF) format of food product sampling. The laboratory has partnered with the Ministry for Primary Industries (MPI) to deliver microbiological food safety research initiatives across all primary sectors in New Zealand. The most recent project involves supporting Listeria management within the ready-to-eat meat processing business.

The laboratory also has available for MPI's use Polymerase Chain Reaction (PCR) technologies to screen for virulence factors of shiga-toxigenic E. coli as required by the United States Department of Agriculture, with further potential to use this real-time PCR technology for screening for Listeria, Salmonella and Cronobacter spp. The latest technological acquisition allows AsureQuality to identify bacteria and yeast cultures in real time following pure culturing within 15-30 minutes using the Bruker Maldi-TOF Mass Spectrometry Biotyper. Examples of previous support to MPI include, for example:

- *Looking for positive control Shiga toxin cultures to use as positive controls for the MPI-approved PCR screen method.*
- *Evaluation of growth promotion of E. coli O26:H11 (NZRM4523) in mEHEC broth containing raw meat.*
- *Reporting on the validation of the GDS Top-6 nSTEC and Top-7 nSTEC/O157 screening kits under New Zealand processing conditions.*
- *Microbiological surveillance of RTE dried meats.*

In the last few years, AsureQuality laboratories have supported MPI verifiers on numerous occasions by testing samples obtained at border control entry points or from manufacturers to verify result findings.

Science expertise has supported MPI (and its predecessors) in investigations in industry and business practice / malpractice and supported legal proceedings MPI has taken by providing briefs of evidence.

With internationally recognized expertise and direct association with AOAC International, ISO, IDF, The Infant Nutrition Council of America (INCA), China Society of Inspection and Quarantine (CSIQ) and CODEX Alimentarius Commission, the specialist team have extensive hands-on experience and are passionate about sharing this knowledge with customers. Such an unparalleled depth and breadth of experience means that their solution-focused team are perfectly placed to provide technical advice and customized solutions to help their customers achieve the optimum results from their production.

AsureQuality is very actively involved in many Working Groups (WG), Expert Review Panels (ERP), and Multi-Lab Testing (MLT) to establish international standards with AOAC International, ISO and IDF; few examples are given below.

- Biotin: AOAC 2016.02 / ISO 23305
- Carotenoids: AOAC 2016.13 / ISO 23443
- Nucleotides: AOAC 2011.20 / ISO 20638
- Tryptophan: AOAC 2017.03 / ISO 5
- Vitamin A & E: AOAC 2012.10 / ISO 20633
- Vitamin B12: AOAC 2014.02
- Vitamin C: AOAC 2012.22 / ISO 20635
- Vitamin K: AOAC 2015.09 / ISO 21446
- Amino Acid Profile: AOAC 2018.06 / ISO 4214 / IDF 254
- GOS: AOAC 2021.01
- Sugar Profile: ISO 22184 / IDF 244

New methods were developed, validated, coordinated multi-lab studies with laboratories around the world to prove the applicability of the methods; recent examples are:

- Study Director, AOAC International (2021): MLT AOAC 2019.09, Total proteinogenic amino acids and taurine
- Project Leader ISO TC34/WG14 (2019): ISO 23305, Biotin
- Study Director, AOAC International (2018): MLT AOAC 2016.02, Biotin

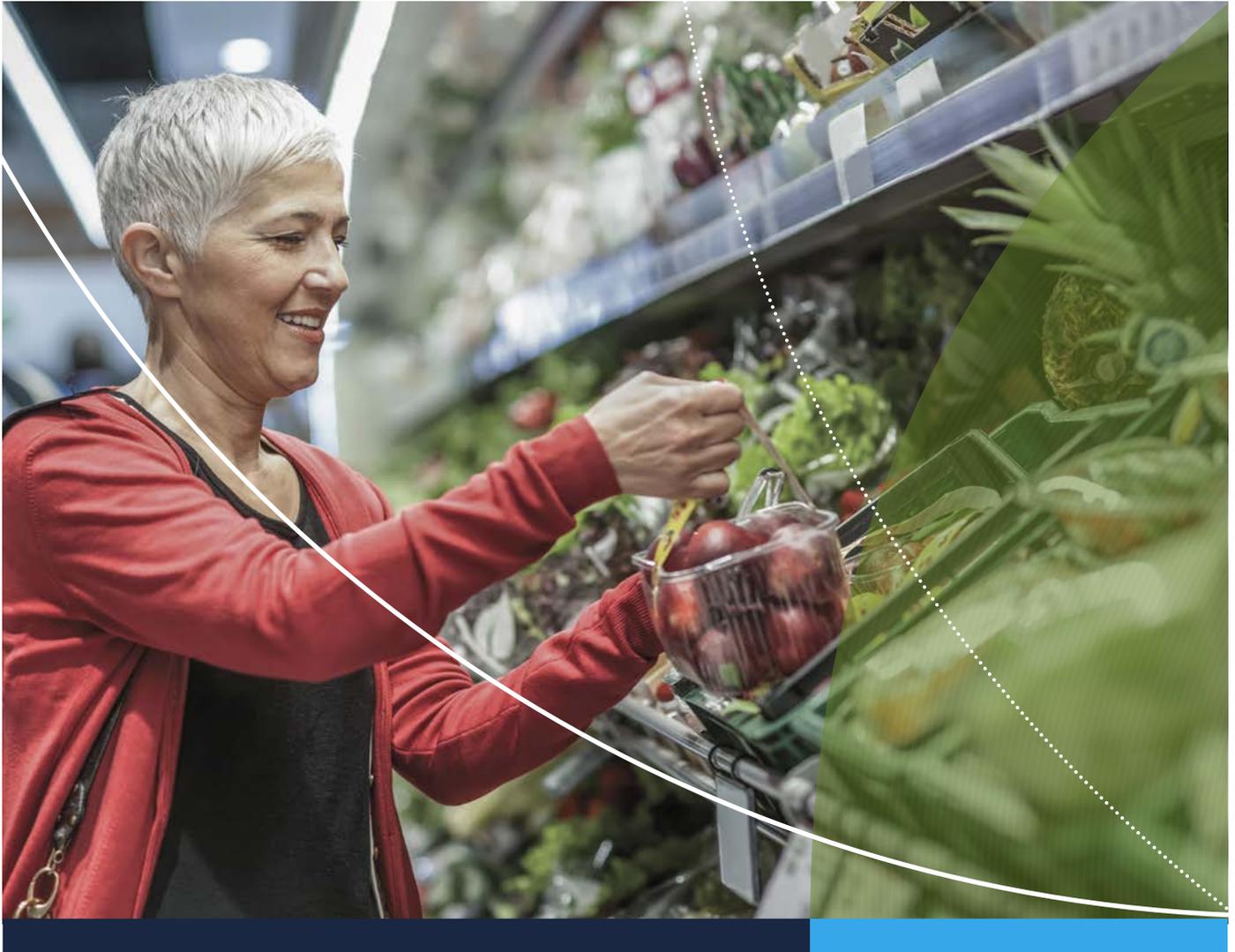
The National Institute of Standards and Technology (NIST) was founded in 1901 and is now part of the U.S. Department of Commerce. NIST is one of the world's oldest and most reputed physical science laboratories. The NIST SRM 1869 is a soy, whey, and milk protein concentrate-based, hybrid infant/adult nutritional powder prepared by a manufacturer of infant formula and adult nutritional products. The SRM is used worldwide as reference material for method validation and AsureQuality is involved in the development and standardization of this reference material.

AsureQuality continues its key involvement in the AOAC Stakeholder Panel on Infant Formula and Adult Nutritionals (SPIFAN) products which use dairy powders. This panel has been established to develop global standards for priority nutrients in infant formula and adult nutritionals. To gain global acceptance, stakeholder panels are made up of key experts from global government, industry, academia, and contract / research organizations.

AsureQuality is actively involved in SPIFAN activities of AOAC International at various capacities and has been from its inception in 2012. The Auckland laboratory has assisted the activity as stakeholder by compiling / reviewing methods, participating in multi-laboratory trials (MLT) and developing standards etc. Two of the analytical methods that the laboratory has developed as part of the activity for Vitamin B7 (Biotin), and Total Proteinogenic Amino Acids and Taurine have been chosen as the AOAC International Official Method of Analysis (OMA) 2016.02 and 2019.09, respectively. The Biotin standard has been adopted by ISO (ISO 23305) and accepted by CODEX Alimentarius Commission as a Type II reference standard. Codex plays a pivotal role in developing international standards for health protection and ensuring fair practices in food trade across the world. A Type II method is the designated reference and is recommended for use in cases of dispute resolution and for calibration purposes.

Many of the SPIFAN Final Action Methods are reviewed and accepted by ISO/IDF and recommended to CODEX for approval. The methods developed by SPIFAN thus become AOAC/ISO/IDF/CODEX standards and a worldwide reference for all the countries including New Zealand and China.





Implementation, monitoring and evaluation

**How to ensure that
different methods of risk
assessment are translated
into public engagement**



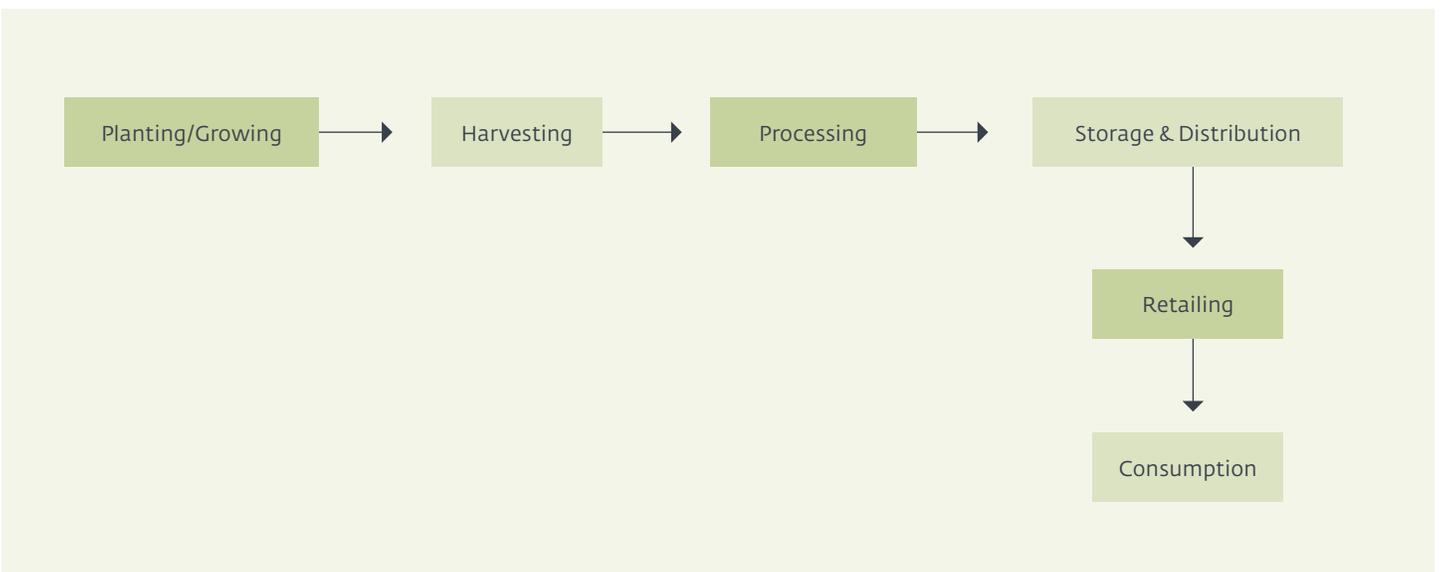
How to ensure that different methods of risk assessment are translated into public engagement

New Zealand's food safety system is based on four key aspects –

- *identifying risks*
- *managing those risks*
- *checking that the risks are being adequately managed*
- *communicating food safety information to all stakeholders including customers.*

In previous case studies the first three aspects have been discussed in full, let us now look at communication of food safety in relation to the various steps in the production of food.

Here are the food production steps:



Firstly, why does the Ministry for Primary Industries (MPI) need to inform stakeholders and consumers (both domestic and international) about the safety status of the food produced in New Zealand?

There are several reasons/benefits. Those are:

Provides information to vulnerable consumers such as those with allergies, pregnant women, the elderly, immunocompromised people.

Economic sustainability, especially the maintenance of offshore markets.

Protection of consumers' health.

Provides reliable information so consumers can make an informed choice about the food they eat, including how to store/handle/prepare certain foods.

Shows that New Zealand takes food safety seriously and that not only are there systems in place to identify unsafe food, but that actions will be taken to protect the public when unsafe product is identified.

Builds trust in the food supply.

In the years leading up to the passing of the Food Act in 2014, there was much consultation with industry groups, food producers and manufacturers, exporters, retailers, and other interested parties.

Through the early 2000s a review was commenced of New Zealand's domestic food regulatory regime (see module 3, case study 2). It was determined that consultation was critical to get all stakeholders' commitment to any proposed reforms.

"During the public consultation on the Food Bill by the Primary Production Committee from 22 July to 2 September 2010, 66 submissions were received. Public enquiries by phone and email up until 2010 numbered 1670 and there have been over 70,000 page views for the Domestic Food Review, Food Bill, and the Food Control Plan. A Consumers Forum was established in 2002 and met 3-4 times a year until November 2008. The Domestic Food Review and subsequently the Food Bill were regularly an item on their agenda. The Forum's mailing list included 61 consumer organizations and 88 individual representatives." ¹

Once the Act was passed, there was further consultation to establish how the proposed elements of the act were to operate in practice. There was effectively a lead in time until it came into force on 1 March 2016.

"Public consultation on the proposed regulations took place between 19 January 2015 and 31 March 2015. MPI held 23 meetings in 12 centers around the country. Over 600 people attended the meetings. 148 written submissions were made on the proposals." ²

MPI very much encouraged public discussion and issued a [FAQ \(frequently asked questions\) sheet](#) on their website. MPI appreciated that many individual operators as well as the larger organizations producing food had a lot of questions about the introduction of such a wide-ranging piece of legislation. The FAQ sheet attempted to reassure all operators by giving information on types of food control plans, timelines for the introduction of the Act's requirements and expected fees/costs.

¹ "Food Act 2014." Wikipedia. Wikimedia Foundation, March 17, 2021. https://en.wikipedia.org/wiki/Food_Act_2014.

² Industries, Ministry for Primary. "Proposals for Regulations under the Food Act 2014." Ministry for Primary Industries. Ministry for Primary Industries, September 12, 2020. <https://www.mpi.govt.nz/consultations/proposals-for-regulations-under-the-food-act-2014/>.

Industry bodies set about notifying their members about the implications and advising of the consultation process.

For example, the New Zealand Tree Crops Association advised its members on their website about the consultation process:

Food Act 2014 – Notice

“The new Food Act – what does it mean for businesses.

28 May 2014

In a few days' time the Food Bill which was passed by Parliament this week will become the Food Act 2014. The new Act intends to make it easier and less costly for many food businesses, while ensuring the food produced is safe. The new Food Act aims to give food businesses the tools to manage food safety themselves based on the level of risk associated with the kinds of food produced and in a way that suits their business.

Businesses do not need to make any immediate changes as the new Act is not the end of the law reform process. Over the next 21 months, MPI will be developing regulations, tools and guidance. There will be extensive consultation during the development time giving people the opportunity to have their say on the detail of the new food safety system.

The period of formal public consultation is likely to be at the end of the year or early 2015 and will be open for around three months.”³

Consultation was also undertaken with horticulture industry bodies throughout New Zealand such as Zespri, NZ Avocado, NZ Apples and Pears, Citrus New Zealand, Vegetables NZ, and Summer fruit NZ. From this consultation it was proposed that GLOBALG.A.P., NZGAP and BRCGS accreditations be accepted as approved templates under the Act. MPI agreed to this which meant that growers and packhouses were not required to undergo an additional audit to meet the Food Act 2014, initial registration was all that was required.

The consultation undertaken in New Zealand throughout the entire process was very much a two-way process. This was essential if change was to be successful. The Food Act 2014 was the biggest shake up of regulations for many years. There must always be dialogue with all affected parties so they can have the opportunity to consider the implications for them. As stated earlier, there can be major economic implications with additional costs and operational changes and businesses need to understand these.

By engaging with all affected parties in this way, it is much more likely that they will take ownership or “buy into” the food safety programme. If everyone can see the reasons/benefits, such as those depicted on page 1, the successful adoption of a food safety program is much more likely.

Further, responsibilities for food safety programs must be clearly defined. Operators must document who comprises their team and 24-hour contact details for key personnel in that team.

³ “Food Act 2014 - Notice from NZ MPI.” Tree Crops, January 29, 2016. <https://treecrops.org.nz/members/food-act-2014-notice/>.

COMMUNICATING WHEN SOMETHING GOES WRONG AND ENFORCEMENT

What happens when a food safety issue is identified? This food safety issue may arise from any number of circumstances, here are some examples:

- *the apple orchardist receives a water test result showing E. coli levels exceed acceptable levels based on the NZ Drinking Water Standard*
- *the avocado grower notices blood on the skin of some harvested avocados*
- *the quality controller at a kiwi berry grower's packhouse finds a needle in a punnet of kiwi berries.*
- *the blueberry grower is notified by the Medical Officer of Health that one of her pickers has hepatitis.*
- *the tomato grower is notified that an unacceptable residue level has been in product offshore.*
- *the kiwifruit packhouse is notified that metal filings have been found in a carton of kiwifruit offshore.*

Under the accreditations that each orchardist and packhouse hold – GLOBALG.A.P., NZGAP or BRCGS, plus the requirements of the Food Act 2014, all four operators listed above must advise their certifying body, industry body and MPI if a recall/withdrawal is to take place. This notification must be within 24 hours of becoming aware of the problem and be in writing.

Carrying out a thorough investigation and determining the extent of the problem/contamination is the next responsibility. This is where having comprehensive records is key, records that detail the volume of the potentially affected product in terms of which block/paddock the product was picked/packed, harvest and pack dates, packaging types, inventory, where dispatched to, staff involved at the time.

Once advised of a recall, MPI will activate their Food Compliance Services team. The team reviews the operator's action based on MPI's recall guidelines:

It is worthwhile here to quote from this guidance document regarding recall management:

"The preferred position of MPI is to support the actions of the responsible business. In this process the responsible business would be:

- Addressing the matter with urgency.
- Keeping MPI fully informed from the first indication of a product 'problem' through all stages of the recall.
- Complying with all reasonable requests the MPI officers may make on the recall process.
- Taking all reasonable steps to inform all persons who may have product that is unsafe or potentially unsafe, and
- Retrieving that product or having it disposed of in a suitable manner."⁴



⁴ Industries, Ministry for Primary. "Download Document." Ministry for Primary Industries. Ministry for Primary Industries. Accessed April 28, 2021. <https://www.mpi.govt.nz/dmsdocument/22288-Recall-Guidance-Material>.



MPI publishes details of all recalls on their website (<https://www.mpi.govt.nz/food-safety-home/food-recalls-and-complaints/recalled-food-products/>) as well as the businesses involved publishing the same details in local and national newspapers. The publishing of details is aimed at operating a transparent system accessible to everyone who may need the information.

The information published includes very specific details such as: name of manufacturer/product, type of product, batch numbers, best before dates, the reason for the recall (for example may be mislabeling, microbiological contamination, presence of foreign bodies), illness symptoms (if relevant), what to do with the recalled product.

The publishing of recall information serves to alert consumers not only about the specific recall at hand, but it increases awareness about other potential food safety issues. This heightened alertness was clearly evidenced in the needles in strawberries incident widely reported from Australia in 2018. In this instance, needles were found to have been maliciously and deliberately placed in strawberries by a disgruntled employee. As New Zealand supermarkets did in fact import Australian strawberries on a regular basis, the case received much publicity here in both the print and social media plus the television news channels. The major supermarkets subsequently decided not to import any more strawberries from Australia until this particular food safety scare had been resolved. This case still resonates in New Zealand and sends shivers down the spines of food producers at the thought of the potential damage such incidents can do both to reputation and the balance sheet.



Following a recall, operators will need to review their HACCP plans and procedures. They must take not only corrective action, but preventative action to avoid a recurrence of events that lead to a recall. Preventative action frequently includes retraining of staff, increased internal auditing and rewriting of standard operating procedures.

In New Zealand, there is also the ability for anyone to make a complaint to MPI if for example, they find food that is incorrectly labelled, for example contains gluten and is not labelled appropriately, is being sold past its use-by date, unhygienic food preparation/storage, an unregistered food business (as per requirements of the Food Act), suffer from a food poisoning incident or have an allergic reaction to food purchased. MPI provide a free phone number and email address for these complaints to be made.

Once the complaint is logged, MPI will set an investigation process in motion and this will involve collecting as much information as possible from the original complainant and then visiting/contacting the business implicated. The complaint may be passed onto one of the independent third-party verifiers to investigate such as the municipal authority under whom the food business is registered. Should any prosecution ensue from the investigation, the prosecution and associated penalty will be publicly notified on MPI's website.



What powers do the investigators acting under the legislation have? Let's look at the legislation <http://www.legislation.govt.nz/act/public/2014/0032/latest/DLM2996402.html>

This legislation permits wide-ranging controls to be placed on any food (or anything that may become food) and any food related accessory if a risk to human health is detected or suspected. It includes any equipment or premises where food is made, any vehicles used for transporting food and prohibits the production of any further food until the matter is resolved. Specific tests can be required such as microbiological/bacterial. Food related accessories are such things as moisture absorbers and packaging.

Should a food producer have their operations suspended then directions will be issued regarding what is to happen to the food or food-related accessory involved. Directions listed include reclassification, disposal, relabeling, regrading, and resampling. Time frames will be assigned and MPI requires that reports be furnished, detailing all product involved.

New Zealand's MPI continues to play a dominant role in not only promoting the production and regulation of safe food, but also in communicating with consumers. Their 2019 Food Safety Action Plan discusses engaging and educating consumers in user-friendly ways about food safety hazards, newly emerging pathogens, and allergens. It also includes a food preparation program "Clean, Cook, Chill".

The action plan lists utilizing greater web content to better inform consumers with authoritative guidance as a key strategy. The MPI website is already a place where consumers in New Zealand turn to for reliable information and everything points to that continuing in the future.



