

CONSUMED

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Kathy Glass: *close up on Listeria*

Kathy Glass grew up on a small dairy farm in Wisconsin, one of the leading States in the US for dairy. She initially started her science career as a biology teacher before going back to earn a Masters degree in microbial genetics.

Says Kathy, "I stumbled across a position at the Food Research Institute in the University of Wisconsin-Madison (UW-Madison) when I was looking for my first job after graduation. I learned food microbiology on the job and then when I eventually went back for my doctorate in food science at UW-Madison. It took me 10 years to complete the degree, while working part-time and raising two sons. I've been in charge (officially) of our applied food safety laboratory since 2002 (unofficially since 1992). I find helping food companies and inspectors to trouble-shoot food safety problems and formulate safe foods very rewarding."

Kathy was unfazed by the light snowfall in Dunedin when she attended the Centre's annual symposium and facing NZIFST conference in July. Wisconsin has much

more severe winters. Average snowfall is ~130 cm with temperatures typically between zero and minus 10 degrees Celsius.

She accepted the invitation to come to New Zealand with enthusiasm, though unfortunately her visit ended with a COVID-19 infection, spoiling her week's leave after the conference. Kathy knew about New Zealand food science departments and dairy sciences from Wisconsin faculty colleagues who have visited or worked here.

"There are great researchers in New Zealand, but they're not as well-known as they should be. I appreciated the opportunity to learn more about their activities." Despite jet lag, Kathy was a conscientious conference delegate, as well as an important keynote speaker at both the symposium and NZIFST conference.

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"I was there for the conference and I didn't want to miss anything. Personal travel was secondary. I was very appreciative of the Women in Science breakfast event which discussed imposter syndrome openly and honestly.

I entered the field of microbiology when only 25 percent of colleagues were women, compared to about 60 percent now. It was rare to find mentors so I learned to navigate on my own and not make waves. But, I'm a 'do-er', so hard to hold back."

Kathy's presentation at the symposium focussed on the increasing risk of listeriosis, a disease caused by the bacterium *Listeria monocytogenes*, which can cause severe illness, including sepsis, meningitis and even death in immunocompromised people, the elderly, and pregnant women and their unborn children.

In the US, at least **90%** of people reported with listeriosis are in these vulnerable groups, with a consequential **20%** mortality. New Zealand typically has 20-40 reported cases of listeriosis every year.

While the case numbers are relatively low, the stakes are just as high, with four deaths reported in 2021.

Kathy highlighted that the medium age for listeriosis in the US is over 70 years.

By 2023, **21%** of the US population will be aged over 65, compared to **16%** now, signalling a much larger risk group for listeriosis.

There is considerable effort in the US to explore ways to decrease the risk of *Listeria* in foods, in order to protect the vulnerable.

Foods that can support the growth of *Listeria*, even during refrigerated storage, are commonly ready to eat products like deli hams, soft cheese and cold-smoked fish. These are particularly risky as they are not cooked or treated before consumption and have been associated with outbreaks in New Zealand and overseas.

The changing food landscape is seeing new challenges. "It's tricky," says Kathy,

"Every time we think we understand what foods are of greatest risk, there are surprises, such as some fresh produce and frozen foods that are not typically associated with *Listeria*, so we need to be vigilant."

New trends, including emerging plant-based products and the consumer desire for fewer and smaller amounts of additives that would traditionally be used to control *Listeria*, may present new risks for listeriosis. Other ready to eat products like prepared salads might have ingredients that do not support the growth of *Listeria*, but once mixed with other ingredients, provide an environment where *Listeria* can thrive.

Kathy's laboratory conducts hundreds of experiments, frequently on behalf of industry, to see how *Listeria* grow/ do not grow in various food products.

These studies are used as validation for food safety plans and to support changes in State or federal food safety regulations. Her team defines the efficiency of different processes and novel food formulations that can be used to kill or control *Listeria*.



As an example, Kathy's team investigated the use of various combinations of temperature, pH and water content for optimal management of *Listeria* in plant-based dairy analogues. They have also looked at the use of natural, organic or clean-label ingredients such as culture sugar vinegar as an antimicrobial to inhibit *Listeria* growth in ready to eat deli meats. See Kathy's presentation at www.nzfssrc.org.nz for details of her experiments.

New Zealand expert in *Listeria*, Lucy Rivas, senior scientist at ESR, says

"The US do a lot of regulatory testing and a mountain of (whole genome) sequencing to boot, so they find outbreaks and links to foods much quicker than ever before."

Obviously, the rapid detection of an outbreak source helps contain the outbreak to fewer people and can save lives. On top of that, the genomic



Dr Lucy Rivas,
ESR

information also helps inform scientists and the food industry about the presence and role of different non-pathogenic *Listeria* species in the food

production environment. Kathy says these non-pathogenic species of *Listeria* can complicate testing and environmental controls.

Kathy concluded that minimising listeriosis needs a multipronged approach which must include consumer education. She feels more can be done in this area. "There needs to be constant reinforcement of public health messages, targeted at vulnerable groups and their carers," says Kathy.

Denver McGregor: *Listeria* Case Study

If anyone knows about ongoing guerrilla warfare with *Listeria*, it's NZ King Salmon's award-winning food safety and quality manager, Denver McGregor. He's pretty much won the war, though it requires constant vigilance.

At the Centre's symposium in July, Denver presented a prime example of the advantages of whole genome sequencing (WGS) in the workplace to identify and eradicate different strains of *Listeria*. They discovered that the isolates from the floor surface were not actually a match with those found elsewhere in the processing plant, and therefore not the origin of the problem. This led Denver and team to look deeper, and with thermal imaging they found *Listeria* embedded beneath the floor surface



Denver McGregor

– the bacteria were receiving enough moisture to survive. WGS proved these to be a match.

As a result, the team changed tack from resurfacing the floor multiple times to replacing the floor completely.

Denver was able to get to the bottom of the problem with funding from the Centre to pay for research by Lucy Rivas at ESR and Graham Fletcher at Plant and Food Research. Denver will bring all these challenging experiences to his role as the new Chair (from February 2024) of the Centre's Industry Advisory Group, which is critical to the direction and coordination of the Centre's research programme. Building on the progress Denver has made at NZ King Salmon, creating a robust food safety culture, he sees this new role as an opportunity to both share knowledge and experience gained, and learn from other

like-minded professionals.

"Food safety needs a collaborative industry approach – it's not a competitive advantage. We all benefit in this industry from positive association, and likewise can suffer negative association, too." Denver says.

New Zealand King Salmon employs over 450 people to produce, on average, 6,000 tonnes of product, sold nationally and internationally each year. The product needs to be unquestionably safe and of the highest quality, something that Denver and his team are "laser-focused on".



GM AND GENE EDITING: A QUICK REFRESHER

In anticipation of a public discussion about GM and gene editing, it is time to refresh our knowledge, and consider how we might respond to concerns about food safety in relation to these technologies.

Centre director **Libby Harrison** was deeply involved in the issues around GM for about ten years – arriving in NZ immediately following the Royal Commission into Genetic Modification (2000/1). She worked for the Ministry for the Environment (MfE) as Leader of the New Organisms Policy Team and then with the Environmental Risk Management Authority (ERMA) as General Manager New Organisms. She went on to help establish the Environmental Protection Authority (EPA) in 2011. Libby also worked in science investments at MBIE for a couple of years prior to joining the Crown Research Institute, ESR.

Libby prepared this information, including a resource summary, for the benefit of research partners who may want to do some quick revision.

TIP: Please click or scan the QR codes to view the relevant resources

- Gene editing is different from some genetic modification techniques; as it is more precise technology and, in many instances, does not introduce new genetic material into the plant, animal or microorganism.
- Gene editing technology, in and of itself, is not a food safety issue.
- There are perceptions, misinformation and disinformation that can lead to public concerns about things related to GM, including GM food. This is why high quality, peer-reviewed, published science is important to inform the debate.
- For New Zealand food producers many concerns relate to markets both national and international, and what consumers or customers want to (or are willing to) buy.
- No viable fresh food grown in NZ is genetically modified or produced with gene editing. If non-GM (or “GE free”) remains an economic benefit for producers, there is less incentive to produce food in NZ using gene technologies.
- It is twenty years since the Hazardous Substances and New Organisms Act 1996 (HSNO Act) regulations were last reviewed; it is timely to discuss with tangata whenua, industry, society, and government the benefits and risks of gene editing and whether gene edited organisms should continue to require approval as new organisms under the HSNO Act.
- In New Zealand and Australia, GM Foods are regulated by Food Standards Australia New Zealand (FSANZ). FSANZ is a statutory authority in the Australian Government Health portfolio and develops labelling and compositional requirements for food for sale, including GM foods, under the Australia New Zealand Food Standards Code.
- In New Zealand the Ministry for Primary Industries (MPI) regulates compliance with FSANZ standards and biosecurity requirements.
- Foods that are viable organisms, e.g. viable plants or seeds cannot

enter New Zealand without approval by the EPA under the HSNO Act. MPI is responsible for enforcing the HSNO Act at the border, through the Biosecurity Act 1993.

- In relation to food, FSANZ is currently reviewing GM food definitions under **proposal P1055: Definitions for gene technology and new breeding techniques (foodstandards.gov.au).**



(view QR code). The purpose

of P1055 is to make the definitions clearer and better address new genetic modification techniques such as gene editing and therefore which foods need to be assessed by FSANZ and approved as GM foods. Proposal P1055 will involve further stakeholder engagement and public consultation. As noted above, even if a product is assessed as safe and approved for sale as food, HSNO Act approval must be sought from the EPA before any new GM organism can be grown or otherwise introduced into New Zealand. A GM food may be approved as safe for consumption in New Zealand and Australia, but not approved to be grown. To date, approximately 90 GM foods are approved for consumption in New Zealand and Australia, all derived from plants including soybeans, canola, corn, potato, sugar beet, cotton, lucerne and rice. The NZ EPA has not approved any GM crops as food (or animal feed) for full release for cultivation in New Zealand.

- Over 15 years have elapsed since the US and other nations began intensive cultivation of GM crops, particularly soya bean, maize and cotton. No credible evidence has been found of harm to human health or permanent ecological damage¹. There is overwhelming, general scientific consensus that GM foods are safe to eat. Internationally, scientists² agree there is no evidence that a GM food, e.g. a crop plant, is unsafe to eat just because it is GM. However, a specific new gene introduced by a GM technique could have associated risks, e.g. increased allergenicity,

which is why GM food is subject to a safety assessment so that any new risks are appropriately managed.

- It remains important to recognise that if one type of modification or group of modifications has been safely and successfully used, that does not automatically mean that all genetically modified organisms are safe. By the same token, it cannot be assumed that the products of conventional breeding are inherently safe either.
- At its first public consultation on proposal P1055 (see above) FSANZ suggested pre-market safety assessment exclusions for foods derived using new breeding techniques (including genome editing) if foods have the same product characteristics as conventional foods with a history of safe use. This was based on the conclusions of its safety assessment (view QR code).



- Many other jurisdictions are changing, or have changed already, the regulatory approach to gene editing of organisms and are considering it separately from genetic modification. The approach of many countries to gene editing is de-regulation or low regulatory hurdles. The situation in NZ is different. Approval for genetically modified organisms is required in every case under the HSNO and related Acts for gene-edited plants, animals and microorganisms grown outside of containment³.

Following are some links and summaries from New Zealand's leading science organisations.



¹2010 Te Apārangi emerging issues paper on GM Forages.



²GM plants: Questions and answers. London: The Royal Society, 2016.

³Containment according to the HSNO Act means restricting an organism or substance to a secure location or facility to prevent escape; and includes, in respect of genetically modified organisms, field testing and large-scale fermentation.

Following are some links and summaries from New Zealand's leading science organisations.

In February 2023, Science NZ, the umbrella organisation for all Crown Research Institutes, published a paper on gene technologies.



IN SUMMARY:

- 01** Regulations that govern genetic modification research in New Zealand are 20 years old and in need of urgent review, particularly those relating to new organisms in the environment.
- 02** [Crown] Research Institutes, which have extensive experience with this technology, welcome an informed discussion about how these technologies can be applied to meet the challenges New Zealand faces.
- 03** Rapid advances in gene editing technologies mean they are safer and more accurate in many areas of potential use.
- 04** These technologies have the potential to offer multiple benefits. For example, they can accelerate the development of new crops to help feed growing populations; enable better farm management and healthier ecosystems, with fewer pests and diseases and cleaner freshwater systems; and deliver more trees where they are needed (and fewer where they are not). All this can help develop more sustainable jobs and more prosperity in the regions.
- 05** Many countries make it easier to trial and use gene editing technologies. New Zealand risks falling behind if sectors are unable to fully realise the benefits on offer.
- 06** Bringing the HSNO Act regulations up to date would be a game-changer in helping to advance the wellbeing of New Zealanders and the country.

The Royal Society Te Apārangi is a prestigious organisation that supports New Zealanders to explore, discover and share knowledge, through public outreach, education, and by supporting the research community. It also provides advice and information to government and the public on issues of public concern.



In March 2010, Royal Society Te Apārangi produced an 'emerging issues' paper on GM Forages (view QR code).

IT STATES: The social acceptability of new technologies is influenced by people's identities and values, the trust they place in authorities, and a natural desire to preserve options in the face of uncertainty.



See further information on gene-editing (view QR code) including in August 2019 when the Royal Society Te Apārangi set up an expert panel to consider the implications of new technologies that allow much more controlled and precise 'editing' of genes.



This expert panel has concluded it is time for an overhaul of the regulations and that there's an urgent need for wide discussion and debate about gene editing within and across all New Zealand communities. **More information is available here** (view QR code).



The following resource produced by the Science Learning Hub, which provides support for teachers, is an easy to digest summary of **GM food and New Zealand consumers** (view QR code).

DECLARATION OF INTEREST:

Dr Libby Harrison is a Director on the Board of Grasslanz Technology Ltd, a subsidiary of AgResearch, which invests in the development of plant and microbial technologies.

Grasslanz Technology Ltd is investing in the use of a variety of plant breeding techniques, including gene editing, to develop new plant and microbial technologies with environmental, animal health and production benefits.



Agam Nangul,
Innovation Leader,
Food Safety,
Zespri



Agam Nangul started with Zespri in February as part of its Global Quality and Technical team with his role designed to help manage food safety risks. It was the right time for him to start as he was able to get to work straight away, helping manage the unprecedented situation following Cyclone Gabrielle.

He has the perfect skill set, having spent 10 years at Plant and Food Research (Auckland) working alongside leading food safety scientists like Graham Fletcher and postharvest scientists including Jason Johnston, Jem Burdon and Allan Woolf. After his time at Plant and Food, he spent almost two years as a Senior Scientist with Start A Fresh in Mt Maunganui, leading postharvest and food safety aspects. He has had a complete grounding in all aspects of kiwifruit and apple production, including food safety, postharvest, fruit quality, disinfestation and market access.

Agam says Zespri's first priority after Cyclone Gabrielle was the wellbeing of growers. "After the flooding, Zespri staff spent a lot of time visiting orchards, talking to growers and inspecting vines. Growers in Hawke's Bay and Gisborne were the most affected with around

70% of orchards in Hawke's Bay suffering moderate to significant damage and around

25% of orchards in Gisborne impacted with this also ranging from moderate to significant damage.

It's been a pretty challenging time – growers are resilient though – we saw that in 2010 during the PSA outbreak and we're seeing it again now."

Getting to grips with the aftermath has taken some time, says Agam.

"Zespri is committed to ensuring that our fruit is safe, so we took the utmost care ensuring that any fruit that touched floodwater, including possible splashing exposure, was not harvested."

The industry has certainly seen some challenging weather events recently which have meant we have a lower than expected kiwifruit crop this season. But despite this, the focus the industry has put on improving fruit quality has meant that this is tracking better than last season, with good feedback from all our markets."

Following Cyclone Gabrielle, the key is understanding critical food safety questions. "Through the NZ Food Safety Science and Research Centre (NZFSSRC) we've had good support from government and the science community. Of course we must expect that Cyclone Gabrielle will not be the last such event, so we want to formulate a watertight scientific guide as to how to respond next time.

"Zespri is also very focussed on climate change, and is investing a lot in understanding the ongoing impacts it can have for future generations. We released our Climate Change Adaptation Plan last year which sets a framework for the long-term adaptation approach by the industry."

To top off all his industry experience, Agam has just submitted his PhD in food safety through the University of Sydney, focussing on *Listeria monocytogenes* in the apple supply chain. Agam says he's got much more out of the PhD study, having so much practical experience, including a transferable PhD for the whole horticulture industry. He recently attended the Fresh Produce Safety Centre Conference in Sydney with Centre Director Libby Harrison, and Graham Fletcher from Plant and Food Research. Zespri was a founding member of the NZ Food Safety Science and Research Centre.

NZFSSRC Honours

The Centre gratefully acknowledges the contribution of these people to its work.



Nigel French



Fiona Thomson-Carter



Rob Lake



Philip Wescombe



Michal Dunn



Giselle Byrnes

NIGEL FRENCH CNZM

Inaugural director of the Centre, subsequently Chief Scientist and now Emeritus Director, Nigel French was honoured in the June King's Birthday list for services to epidemiology, becoming a Companion of the NZ Order of Merit. As well as establishing the Centre, Nigel played a key role in the response to COVID-19, as a member of the technical advisory committee and contributor to the genomics and modelling work.

FIONA THOMSON-CARTER

On a very sad note, we honour Fiona Thomson-Carter who passed away in August. She was a central figure for as long as we can remember in the collegial group of food safety scientists, and we will miss her.

ROB LAKE

Rob received this year's NZ Food Safety Award for Significant Contribution to Food Safety, presented at the NZIFST conference dinner on 4 July. Although Rob has retired from ESR, he is still active on the food safety scene, and chaired a session on Food Safety Priorities at the Centre's symposium in July. Rob has been an important link between the Centre and ESR and has an encyclopaedic corporate memory. We await his memoir.

PHILIP WESCOMBE

Grateful thanks to Philip for chairing the Centre's Industry Advisory Group with such efficiency, diplomacy and professionalism. Philip's term ends in February 2024, when Denver McGregor will take over. From August this year, Philip became the new industry representative on the board of NZFSSRC.

MICHAL DUNN

Anyone who has attended the Centre's physical or virtual meetings has reason to be grateful to Michal for her painstaking travel and other arrangements. She is an administrator par excellence. We receive many compliments about her work. Thank you Michal.

GISELLE BYRNES

Where would the Centre be without our supportive host representative at Massey University, Professor Giselle Byrnes.

TE TIRA WHAKAMANA ON BOARD



L to R > Hone Morris, Fiona Wiremu, Maria Hepi (ESR), Libby Harrison, Richard Brooking, Wendy Newport-Smith, Collier Isaacs

Late last year, the Centre recruited two more people to complete its four-member Māori advisory group Te Tira Whakamana (TTW), now comprising Rauru Kirikiri, Richard Brooking, Fiona Wiremu, and Hone Morris. All are outstanding in their various spheres, with impressive multi-faceted CVs and connections. Under the newly adopted Strategic Partnerships Model, they will now be fully integrated into the Centre as Board members, and may also meet separately as a group.

RICHARD BROOKING

Rauru Kirikiri and Richard Brooking have had long-standing relationships with the Centre through research projects on the East Coast; one at Whakaki Lake (near Wairoa) to understand the impact of bacterial toxins on their taonga tuna/eels, the others in Ūawa/Tolaga Bay, related to watercress and wild food harvest and safety more generally. Their respective involvement in science related to land use and regeneration, and all aspects of the Māori renaissance, make them extraordinarily valuable recruits. Richard Brooking says,

“My interest in the role science has to play in our lives was sparked by meetings with Sir Paul Callaghan when we were planning the national Transit of Venus Forum, involvement with the Allan Wilson Centre (a Centre of Research Excellence) team, and now with the opportunity provided by the NZFSSRC.”



Richard participates in a range of community initiatives, including those related to Māori development. Currently he is: a Director on the Tātau Tātau o Te Wairoa Settlement Trust – Commercial Board; Chair Tātau Tātau Horticulture LP; Director Haumako – Tara Orchard JV; Chair, Patunamu Forest Ltd and Chair of the Whakaki Lake Trust.

RAURU KIRIKIRI

Rauru Kirikiri is a venerable kaumatua and orator, who has been much in demand by universities and CRIs to support various science research projects. He says “This is what I call a breakthrough moment, where NZFSSRC and TTW address a sleeping giant. It is a marriage, where Mātauranga Māori and science come together as one. I think the relationship is already an excellent one. I am encouraged by the progress of the Māori agri-sector, especially with organisations like Wakatū, so I think the future is exciting. Self-sufficiency has always been the hallmark of Māori food production and I hope it will continue to grow the Māori and wider Aotearoa economy even more - I believe it will. Employment and training opportunities for Māori within the food safety sector is something that the Centre might want to highlight/facilitate.



“Māori management is crucial in this, so capability building is critical. The Centre gets this and is very bold and forward-thinking,” says Rauru.

Centre Board Chair Collier Isaacs says “The full inclusion of Te Tira Whakamana is exciting progress and represents a real partnership. We heartily welcome them. We’re all going to learn a lot from each other.”

More about the two new recruits to Te Tira Whakamana:

HONE MORRIS

Hone was a secondary school teacher for many years and finished his time as Head of Department Māori at Rosehill College. After that, he worked at Te Kunenga ki Pūrehuroa as Assistant Director and then Director of the Professional Development Programme, Whakapiki i te Reo from 1999 to 2007, followed by a position with Huia Publishers as Senior Editor Māori. Hone is currently an Associate Professor at Te Kunenga ki Pūrehuroa Massey University, in the position of Pūkenga Reo – Senior Scholar, and is a licensed Translator and Interpreter. He is currently doing a PhD on land blocks in the Takapau, Norsewood, Ormondville area of southern Hawke’s Bay, just south of where he was born in Waipukurau.



Hone sees Te Tira Whakamana as an integral part of the future of the Centre in shaping an authentic partnership under the obligations of the Tiriti o Waitangi.

FIONA WIREMU

Fiona is Chairperson of Te Puna Ora o Mataatua and Rehua Medical Centre (Whakatāne Medical Practice Ltd) and is also an executive director and educator at Te Whare Wānanga o Awanuiārangī. Her research interests are focused on Māori health outcomes and economic initiatives.

Fiona is involved in a research project on kai governance and sovereignty, started in 2018. The abstract on her website states:



“... our focus makes the distinction between ‘kai’ as a culturally defined Māori notion and western interpretations of ‘food’...”

He mōmou kai, he mōmou tāngata” describes a state where our existence and futures as healthy Māori people (Mauri Ora: Human Flourishing) are put at risk because our kai sources (Te Tai Ao: The Natural Environment), including access to kai, growing kai, preparing kai, the lore/law pertaining to kai, and control of kai systems (Whai Rawa: Māori Economies) is diminishing. Without kai or wai the people will perish!

Western conceptions underpinning the politics of ‘food’ are generally unable to fully account for Māori understandings related to kai. For most countries the production and consumption of ‘food’ decisions are driven by economics, whereby the ‘food’ industry influences government policies, and takes control or sovereignty of local and national ‘food’ systems, which then limits a choice of what we eat, and threatens health and well-being.

This is reflected in Māori people’s burden of ill-health, for example prevalence of diabetes, heart conditions, mental health, plus other socio-economic impacts, such as high levels of under-achievement in education, high unemployment, lack of housing, homelessness, low or no income, violence and crime.”

Collier Isaacs – it’s the people that count

NZFSSRC Board Chair Collier Isaacs was born in Gisborne, and is of European and Te Ātiawa descent on his paternal side. His family moved to Te Puke when he was too small to remember.

Collier’s interests are firmly rooted in the land. His father had a tractor business, and Collier started helping out on a sheep and beef farm in the holidays when just 12. He was strongly drawn to working with animals, so a Bachelor of Agricultural Science at Massey University was the obvious choice for him when he left Te Puke High. He went on to get a Diploma of Business, Marketing and Agricultural Economics, which set his course. His experience in agricultural management and governance roles is as wide as it is deep. Although he has never farmed himself, he and his family now have a few head of cattle on 25 acres in the Wairarapa – ‘enough to keep the freezer full’ for when his university stage sons and daughter come home in the holidays.

Collier has had many senior executive roles: FarmIQ Systems, Landcorp, Meat New Zealand, the Game New Zealand Board, and was awarded Honorary Lifetime Membership of the NZ Deer Farmers Association ‘For Service to the Deer Industry’. He was recently appointed acting Chair of the critical NZ Agricultural Greenhouse Gas Research Centre (a consortium of five CRIs and two universities)

that won a sizeable tranche of new funding in the 2023 budget.

He says “All these roles involve the same principles – we’re a very small country, not even the size of a minor provincial capital we’ve never heard of in China, and unless we collaborate, we are not going to meet the challenges before us. Most of our businesses are relatively small, and even the large ones cannot undertake a significant amount of fundamental research. We need enabling entities like the NZ Food Safety Science & Research Centre that bestride the production sector, science and government, and coordinate/co-fund projects of mutual benefit. On behalf of consumers, the large food corporations and retail chains overseas are driving ever more exacting standards we have to keep up with. We need them more than they need us. Food safety is a given, not a trade-off with price, and there’s no margin for error.”

Collaboration is the most common word in Collier’s lexicon. He has the skill of identifying the individual and common interests around the Board table, and moving them forward together.

As a New Zealander of mixed heritage, Collier is excited about the dimension Te Tira Whakamana (see profile on page 8) is bringing to the Centre, and regards the Māori agri-sector as one of the most positive developments we’ve seen in our economy – alternate ownership and management structures, philosophies, and aspirations. The NZFSSRC has a small budget, but is rich in a collegial network of highly skilled people and partners.

The limiting factor in our economy, more generally, is not just money but enough people with the right skills. Collier says “We’ve had a bottleneck with COVID-19 immigration strictures which has set us back a bit – especially the university research sector. People underlie everything, so Māori have got it right in more ways than one with their whakataukī (proverb): He aha te mea nui o te ao? Māku e kī atu, he tangata, he tangata, he tangata.

What is the most important thing in the world? Well, let me tell you, it is people, it is people, it is people.



PROFILE: COLLIER ISAACS

PUTTING A PRICE ON OUR HEAD



Prof
Caroline
Saunders

The Centre commissioned the Agribusiness and Economics Research Unit (AERU) at Lincoln University, led by Professor Caroline Saunders, to quantify its economic value to the food industry and New Zealand.

It is difficult to quantify what hasn't happened due to the work of the NZFSSRC; product recalls, factory shutdowns while pathogens are eliminated, export market exclusions, unnecessary and costly market regulations, reputational harm, loss of productivity.

But using cost information from overseas events and case studies (real and hypothetical) from the NZ poultry, kiwifruit and dairy sectors, AERU has made an 'extremely conservative' and transparent estimate of the Centre's economic value, which is sure to impress the hardest economic heads in Treasury and business.

\$164 million per annum is the sum they arrived at. Compare this to the budgeted \$2.5 million per annum from Government, and roughly matching sum from industry, to fund a lean, responsive and non-bureaucratic Centre, which scans the global horizon for emerging risks, coordinates targeted research, helps manage ongoing risks like *Campylobacter* and *Listeria*, pools industry knowledge for everyone's benefit while respecting competitive sensitivities, and provides respected independent scientific advice that directly supports our exporters - for example, providing evidence to assure industry and nervous export

destinations, throughout the pandemic, that COVID-19 could not be transmitted by food or food packaging.

In short, the Centre is a very low-premium, comprehensive insurance policy to protect New Zealand's golden reputation for safe food, where the cost is spread thinly across industry and government.

The AERU report is available on the NZFSSRC website ([view QR code](#)), and is a very readable document.

Here is an excerpt from the executive summary, which outlines the three case studies constructed for economic evaluation.



Case study findings by industry:

1 / DAIRY INDUSTRY

→ **Case Study:** Avoiding costs from a hypothetical *Cronobacter* outbreak in New Zealand.



The existence of the NZFSSRC, as reasoned by an interview participant, helps prevent large food safety outbreaks such as the *Cronobacter* incident that occurred in the United States (US) in 2021/22. Calculations estimated a total cost saving through the work of the NZFSSRC of such an outbreak of **NZ\$691 million** (based on a one-in-ten-years occurrence). If the outbreak was in 5 years' time, then the current value of savings would be **NZ\$541 million** and annual net present value savings of **NZ\$54 million**.

→ **Case Study:** Avoiding dairy plant closure via Whole Genome Sequencing (WGS) arising from NZFSSRC research.

NZFSSRC WGS research allowed the isolation of a harmful pathogen found in a dairy processing plant. Only one dryer at the plant needed isolation. Based on this, the processing firm was able to simply remove that dryer from production at the plant, saving **NZ\$100,000** in costs associated with plant closure and testing.

→ **Case Study:** The prevention of a ban of whole milk powder (WMP) exports to the EU based on NZFSSRC advice to members of the New Zealand dairy sector on the likely shift in EU policy on maximum residue limits (MRLs) in cleaning agents.

NZFSSRC gave advice to dairy companies on EU law changes of the MRLs in cleaning agents in dairy processing plants. This prevented a ban of WMP exports to the EU with an estimated cost saving ranging between **NZ\$5 million** and **NZ\$39 million** assuming a 3 to 24 month transition period to a new cleaning agent for dairy processing plants.

2 / KIWIFRUIT INDUSTRY

→ **Case Study:** Impacts of NZFSSRC-led research on the potential transmission of COVID-19 via food or beverages including their packaging.



NZFSSRC research avoided an approximately 3 to 6 month export ban of kiwifruit into China. Calculations estimated a range of prevented economic cost of **NZ\$80 million** (3 month export ban) to **NZ\$110 million** (6 month export ban). In addition, this research also avoided the development of an unnecessary global (ISO) standard for food packaging.

The calculations resulted in **NZ\$9 million** annual cost savings from avoiding audit costs for all New Zealand food exporting companies. This value is significantly underestimated as it does not include any pre-audit costs for the companies or additional costs occurring during the audit process.

3 / POULTRY INDUSTRY

→ **Case Study:** Impacts of the NZFSSRC-led longitudinal study on tracking *Campylobacter* in poultry flocks.

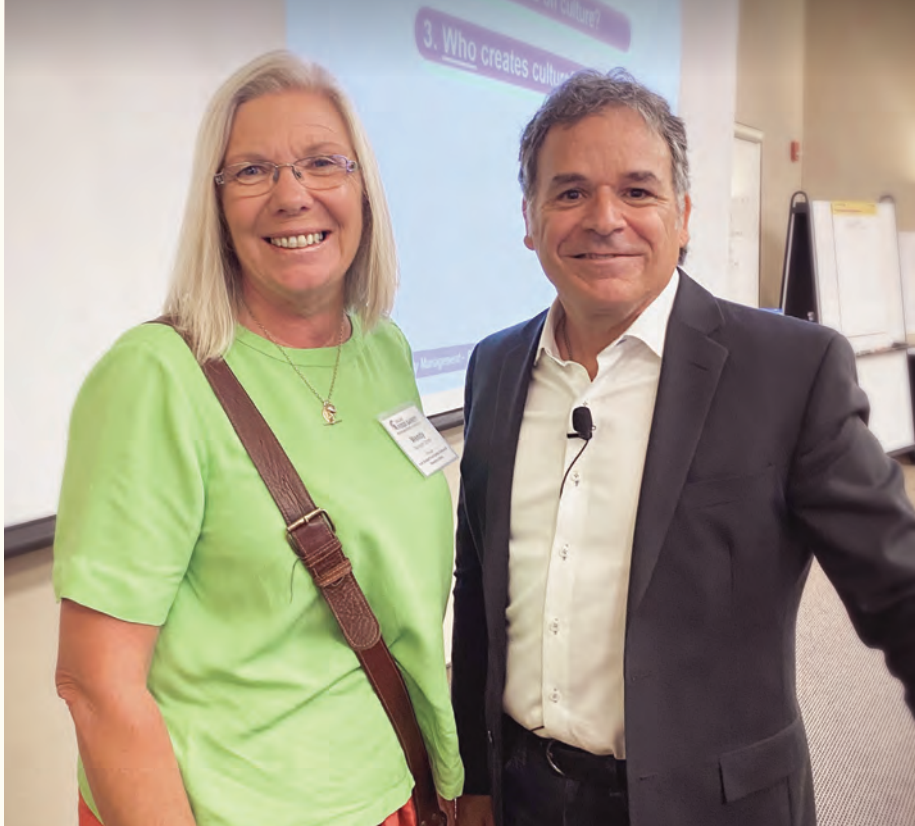


Calculations estimated that prevented costs from the Centre's research range from **NZ\$15 million** to **NZ\$31 million** per annum by avoiding an extension of the processing stage by 2 to 4 hours for 1,121 cases annually.

The report says, "The estimated benefits are extremely conservative. The analysis does not include, for example, the costs of legal action or brand damage to New Zealand companies resulting from a food safety incident. These indirect costs can be more severe than the direct costs of a food safety incident as they usually last longer. However, reputational and brand effects are almost impossible to measure.

Further benefits from the NZFSSRC emerged from the interviews. These are less tangible and difficult to quantify in monetary terms but significant to NZFSSRC industry members. These identified benefits significantly contribute to the prevention or reduction of costs from food safety outbreaks."

Wendy Newport-Smith: FOOD SAFETY CULTURE AND LEADERSHIP



Wendy Newport-Smith and food safety culture guru, Frank Yiannas

Wendy Newport-Smith, manager of the NZFSSRC since its inception in 2016, is in the fourth year of a PhD study of leadership and food safety. One of her supervisors is Distinguished Professor Nigel French, inaugural director of the Centre.

In mid-June, with both manager and research student hats on, she attended a three-day course at Michigan State University, led by food safety culture guru Frank Yiannas, author of the foundation text (2009) which kicked off this field of study. Frank was formerly director of safety and health at the Disney Corporation, Vice President Food Safety at Walmart, and Deputy and Deputy Commissioner of Food Policy and Response at the US FDA.

The course was entitled Creating a food safety culture. Other course attendees were from North America, but Wendy says they were all on the same wavelength. She says it came at just the right time in her studies, and was delighted to have the opportunity to meet Frank and ask questions directly related to her studies and the Centre's research projects.

Frank is a member of the Fonterra Global Food Safety Forum and has been to New Zealand several times. He was brought in by Fonterra after the 2013 whey protein concentrate contamination scare that led to the Centre's establishment.

Wendy says another highlight of the course was the presentation by Bill Marler, a US lawyer specialising in food poisoning cases. He is the central figure in the Netflix documentary "Poisoned: the dirty truth about our food". Scarily for producers exporting to the litigious US, he wants to put all the onus onto the meat producers, rather than retailers. This could mean that there would be no comeback on a restaurant serving undercooked burgers, leading to *E.coli* poisoning – instead, the meat supplier would be in the frame, legally.

Wendy expects to complete her PhD next year. So far, she has carried out 32 interviews with food safety managers in 31 companies. Fonterra, which has been "hugely supportive", has given her access to their enormous datasets for quantitative analysis. Wendy is also grateful to Libby Harrison, Nigel French and Phil Bremer for their support of her research, and hopes to give back to the Centre with new insights into behaviour related to food safety.

A VIRTUAL CENTRE

The NZFSSRC pools the existing resources of partner organisations from across New Zealand. Current NZFSSRC partners are:

INDUSTRY MEMBERS:

AsureQuality	Mataura Valley Milk
Bakels Edible Oils NZ	Meat Industry Association
DCANZ	NewFish
Eagle Protect	NZ Apples and Pears Ltd
Eurofins	Oceania
Fonterra	Open Country
Food Lab Pacific	Poultry Association of New Zealand
Food & Grocery Council	Sanford
Foodstuffs North Island	Seafood NZ
Food Standards Australia New Zealand	Synlait
GSF Fresh Ltd	Tatua
Hill Laboratories	United Fresh
Horticulture NZ	Woolworths
NZ King Salmon	Westland
	Zespri

RESEARCH PARTNERS:



GOVERNMENT SUPPORTERS:



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If you are interested in becoming a member of NZFSSRC, contact Industry Research Liaison Manager,

Kyla Archer
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and find out what the Centre has to offer, including significant research co-funding and professional development opportunities.