

# ANNUAL REPORT 2015/16

High-Value Nutrition National Science Challenge

National  
**SCIENCE**  
Challenges

HIGH-VALUE  
NUTRITION

Ko Ngā Kai  
Whai Painga

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## BOARD CHAIR'S FOREWORD

While New Zealand's food and beverage sector is by far the largest contributor to our merchandise export revenue, it is not growing fast enough to lift New Zealand's GDP per capita, relative to the OECD average, back to the levels it experienced in the 1970s. The government's Growth Agenda seeks to address this by supporting the expansion of export revenues to 40% of GDP by 2025. However, we remain stubbornly steady at 30%. We simply cannot make that transition by producing and selling more of the same or similar products – there isn't the productive capacity nationally to do that.

We need to obtain greater returns for our exports – and food and beverages must be at the vanguard of creating and capturing more value from our international markets.

The government's investment in the High-Value Nutrition National Science Challenge is one of many levers the government is pursuing to enable that transformation; this Challenge supports businesses to design and deliver foods with scientifically validated health benefits that consumers desire and will pay more for. High-Value Nutrition is a 10 year Challenge aiming to build the science capabilities that will put New Zealand at the forefront of food for health science. If we succeed, it will add another competitive advantage to our existing advantages in food production, quality and safety.

High-Value Nutrition is little more than 1 year old and, as Chair of the Board delegated to oversee the Challenge, I've been delighted with the progress we have been able to make in such a short time. We have an exciting portfolio of investments in place which are starting to demonstrate progress. We have a clear strategy based on understanding food consumers, especially in our growing markets in Asia, and our research seeks to address the key science knowledge gaps that will enable businesses to better design, produce and market foods with validated health benefits. We have a strong network of interacting groups all working towards the common vision. These include our Science Leadership Team, International Science Advisory Panel, Industry Advisory Panel and Business Managers Network. We are well supported by our collaborating partners AgResearch, Massey University, Otago University, Plant & Food Research and our host organisation, the University of Auckland.

Many of you will have shared the passion of the "HVN team" at our first Science Symposium in April. This was driven by the outstanding leadership provided by the HVN Head Office team over the past year and I'd like to acknowledge and thank them for their efforts as they now move on to new opportunities.

While able to reflect on a year well done, the Board is now looking forward to the next phase of the Challenge and is delighted with the new team we are bringing together to lead that.



Bob Major, High-Value Nutrition Board Chair



## CHALLENGE DIRECTOR'S REPORT

National Science Challenges are just that. **National** in the scale and scope of the issues they seek to address and the collaborations needed to succeed; where the problem or opportunity can only be resolved through **science** of the highest quality and where that science involves the integration of approaches across diverse disciplines; and where the **challenge** is framed in terms of a mission to achieve an outcome that will move the dial for New Zealand. High-Value Nutrition's challenge is to bring about a change in the global perception of New Zealand to a country that has integrity in the evidence based approach to the scientific validation of food health relationships – and subsequently in the development of foods for health.

National Science Challenges are also a new model of organising science investment in New Zealand. Working to build a national alliance of researchers and stakeholders around a common mission while, at the same time, investing in a set of prioritised investments which by necessity involves a subset of the national alliance, is its own challenge. This first full year can be seen in terms of finding our feet in that new model. I hope when you read this first Annual Report you will agree that we have made good progress. There is much to do in the years ahead but we have started the journey with as much urgency, fairness, rigour and enthusiasm as we could muster. When I say "we" I mean the all the people you will see listed in the pages of this first Annual Report for High-Value Nutrition. We have had a great team in the "HVN Head Office" and we have enjoyed equally great support from the wider HVN community (Science Leaders, Science and Industry Advisors and Business Managers) and from the many researchers and businesses aligned with the Challenge strategy. Thank you for that support.

This report is intended to provide you with a flavour of what High-Value Nutrition is doing – what investments we have in place, what our partners are doing that is aligned to the mission, how we are measuring our progress towards our 10 year goals (and how the government through the Ministry of Business Innovation and Employment (MBIE) is measuring us) and the profile we have begun to grow. At just one year into the Challenge we are not yet able to point to significant science achievements but I'm confident the building blocks are in place.

I'm looking forward to reading next year's Annual Report and am confident it will be starting to show the benefits of the ground work the team has put in place this year.



Dr John Smart, High-Value Nutrition Challenge Director



# 2015-16 KEY HIGHLIGHTS

**\$10.9m**

priority research invested

businesses  
using HVN  
capabilities

**20+**



12 april 2016  
regulatory workshop  
EAS strategies  
[More information](#)

**\$7m**

contestable research invested

**13** research  
organisations

**6** industry co-  
funders

**99**

funded researchers

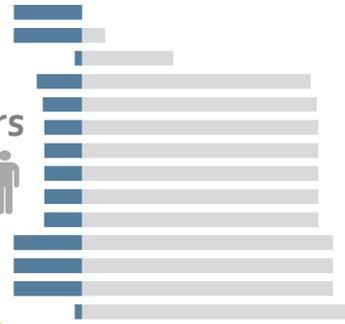
**166** aligned researchers



**>10**

products in  
development

all investments on track



videos  
produced

**53**

**\$1.1m** industry  
co-investment

2 dec 2015  
contestable research  
announcement by  
minister steven joyce  
[More information](#) | [Video](#)



13&14 april 2016  
2016 HVN  
science symposium  
foods of the future  
[More information](#) | [Videos](#)



**49** media releases  
tv = 6 | radio = 3  
press/news articles = 40

**6,127** youtube views

## OVERVIEW

High-Value Nutrition (HVN) aims to increase the value of New Zealand food and beverage (F&B) exports by enhancing the value proposition to consumers through a health claim on a product, ultimately leading to increased premiums and/or increased sales volume. Research is focused on the health targets, regulatory standards, consumer preferences/values, and F&B types that offer the greatest economic opportunity to New Zealand exports.

Central to this is a consumer-pull philosophy supported by strong science and business drivers in the core "Priority Research Programmes". These Programmes formed part of the Research Plan approved by the Science Board in 2015 and were further validated by industry prior to contracting. This initial suite of five Programmes (focused on Metabolic Health, Immune Defence and Gastrointestinal Health supported by scanning projects in the Science of Food and Consumer Insights) commenced in October 2015 and will allow HVN to build the science capabilities for businesses to design, develop and validate the health benefits of F&B products.

To ensure HVN is learning from and supporting businesses through to the market we have also invested in seven product/market focused research projects via an initial open contestable funding round all of which commenced in early 2016. This gives HVN a balanced portfolio of both precompetitive research (developing science capabilities that will benefit multiple businesses) and contestable research (focused on defined product/market/business opportunities).

Progress has also been made in engaging with stakeholders – both aligned researchers and relevant businesses. This culminated in the inaugural HVN Science Symposium held in April 2016.

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Keywords: Food Nutrition Health

## PROGRESS AGAINST KEY PERFORMANCE AREAS

The government's Performance Framework for National Science Challenges (NSCs) is based around the seven performance areas below. These are intended to assist MBIE in their assessment of whether the Challenges are achieving their missions as well as performance against the policy model of NSCs. Delivery of Challenge Objective is customised to High-Value Nutrition, and the other areas are generic to all NSCs.

This section provides a narrative report of progress against each performance area over the 2015/16 year. Each performance area has specific Key Performance Indicators (KPIs) which are detailed later in this report.

### Delivery of Challenge Objective

The High-Value Nutrition Challenge objective as approved by Cabinet is:

"To develop high-value foods with validated health benefits to drive economic growth"

To achieve this objective we have set ourselves dual goals of supporting generation of an additional \$1b in F&B export revenues by 2025 from "NZ Inc" while at the same time enhancing New Zealand's international reputation as a producer of high quality F&B with scientifically validated health benefits. These are lag indicators and we are currently establishing base line estimates that will measure the progress of the Challenge towards them over time.

To determine if we are making progress in the short and medium term we have developed a series of lead indicators – these ensure our investments are focused on consumer/market/business opportunities and are progressing to plan; to the identification of new biomarkers required to define food health relationships; evidence of business engagement; and co-investment in research through to the generation of evidence dossiers to support regulatory approval of food health claims.

While the investments made by HVN are at the very early stage a number of the pre-existing "aligned" investments are active along this value chain as evidenced in the KPIs reported later in this report.

HVN has also been active in establishing an investment portfolio of both longer term "Priority Research Programmes " and shorter term "Contestable Research Projects". These research investments are profiled later in this report (under the Investments Update section) and will be critical in delivering the Challenge Objective. The Priority Research Programmes are precompetitive in nature and are positioned to build research capabilities that will support multiple paths to market in the future. The Contestable Research Projects have clear business cases linking through to significant projected export revenues, if successful, by 2025.

HVN has focused its investments across a series of consumer "Health Targets" supported by platforms in Science of Food and Consumer Insights research. The flow of investment across these themes is illustrated in a diagram in the Research Funding Summary section of this report. However, the Challenge is organised in such a way that the investment portfolio is operating as an integrated whole with multiple points of interaction and engagement.

## Science Quality

The research funded by the Challenge is just underway and there are no substantive research outputs as yet. To date, we have invested in five Priority Research Programmes and seven Contestable Research Projects.

The Priority Research Programmes are designed as science-led precompetitive research platforms that will create new and world-leading research capabilities for New Zealand. These research programmes were developed by nationally selected and interdisciplinary expert groups to ensure they brought the best ideas to bear on the objectives of the Challenge. The expert groups defined research options that were included in the HVN Research Plan submitted to MBIE. The plan was assessed by the International Assessment Panel established by MBIE and subsequently approved by the government's Science Board. Over the past year we have progressed from the high level plans to validated science investments, which were reviewed by the HVN International Science Advisory Panel. This series of reviews gives us the confidence that the programmes are of high quality and are internationally competitive science investments.

The health focussed Priority Research Programmes in metabolic health, immune health and gut health are taking a systems biology approach employing state of the art "omics" technologies to identify nutrition responsive biomarkers or targets related to consumer wellbeing and health. The Science of Food and Consumer Insights programmes have completed phase 1 projects involving stocktakes of existing knowledge, which is informing the identification of knowledge gaps that will guide the design of phase 2 of these research programmes.

The seven successful HVN Contestable Research Projects were selected from 33 applications after a rigorous assessment process. This involved the use of international peer review involving over 65 individual reviewers undertaking around 125 individual reviews. These helped the Assessment Panel ensure the science in the funded projects was of a high international standard.

## Best Research Team Collaboration

The portfolio of investments made by HVN over the past year involves 99 researchers, including 9 PhD students and 8 Postdoctoral fellows, across 13 research organisations. This involves a spread of disciplines that has seen teams of researchers formed across New Zealand that have not previously worked together.

The design of the HVN Research Plan was a nationally collaborative process. An open call for members of expert groups under each research theme was made and the groups selected to ensure a spread of disciplines and institutions were involved. The Priority Research Programmes derived from this open collaborative process. These five Priority Research Programmes are lead by members of the HVN Science Leadership Team who are actively engaging across the programmes to share standards, methodologies, guide research and establish critical knowledge exchange networks.

The Contestable Projects involved an open call for proposals and were assessed against criteria that included research collaboration. The majority of the Contestable Research Projects are aligned to the priority health themes for HVN and are being included in the exchanges under each theme.

The investments we have made are unique in the new combinations of researchers and approaches they have brought together. The individual programmes and projects are not independent pieces however, but part of an integrated whole. In early 2017 we intend to hold a series of mini symposia around each research theme which brings not only the HVN funded research together but also the "aligned" researchers nationally to build a common purpose, share best practice and ensure we are empowering the best research teams to collaborate in supporting us achieve the HVN mission.

## Stakeholder Engagement

We have implemented a staged and multi-dimensional stakeholder engagement campaign over the past year. The approach has been to build engagement across the inner HVN team first (our Science Leadership Team, Business Managers Network and Partner contacts) before extending that to the wider New Zealand coalition of science and related business contacts. This will build further into a broader industry, international and public engagement over the next year.

This staged approach was initiated with a national roadshow to mixed science and business audiences in Palmerston North, Wellington, Lincoln, Dunedin and Auckland in July 2015, outlining the vision and priorities for HVN. The roadshow also introduced the Request for Proposals for our inaugural contestable funding round. The RfP sought both science-led and business-led innovation and facilitated strong engagement between researchers, research organisations and businesses – much of it forming new relationships. The seven successful Contestable Research Projects have all built effective relationships with innovative businesses looking to create new, or add value to existing, F&B with validated health benefits.

Following the national roadshow HVN held a series of industry workshops to seek feedback and input into the five Priority Research Programmes before confirming investment. Following contracting in late 2015 each of these programmes have established Industry Reference Groups, with 6 to 10 industry representatives each, to further build the relationships and two way knowledge exchange processes with this key stakeholder group.

In April 2016, HVN held its first Science Symposium over two days at the Villa Maria Estate in Auckland. This was our major stakeholder event for the year with around 160 participants from across New Zealand. Videos and presentations from the Symposium can be viewed on the HVN website:

<http://www.highvaluenutrition.co.nz/en/news-and-events/events/2016-high-value-nutrition-science-symposium-speakers1.html>

Stakeholder feedback on the Symposium was very positive as seen by the informal "Post It Note Poll" at the end of the event, shown to the right.

A formal stakeholder survey has been conducted by Colmar Brunton on behalf of MBIE and provides baseline information on how HVN is viewed by interested stakeholders. The preliminary findings of the survey are included in the KPIs table later in this report. As we move ahead into 2016/17 we aim to build on this base with an Industry Forum scheduled for October 2016 which will help guide our stakeholder engagement plan.



## Māori Involvement and Mātauranga

The focus for HVN is in enhancing the returns from New Zealand F&B exports through scientifically validated health benefits desired by consumers in our target export markets. Our focus is thus not “on farm” production systems but the evidence standards required by New Zealand and in-market regulators.

This focus on F&B exports leads us to target our stakeholder engagement on businesses involved in the exporting and marketing of F&B products from New Zealand. It is through this lens that HVN has looked to identify and engage with Māori stakeholders – those Māori owned F&B businesses looking to grow their export returns through products with health benefits for their consumers. This is aligned with the economic innovation theme of the government’s Vision Mātauranga policy. Complementing this approach, we have also sought to support Māori researcher capability development. These two approaches were given effect in the contestable funding process completed during 2015/16 where funds were targeted to both engagement with Māori businesses and the development of Māori researchers. Two of the seven contestable projects funded delivered against these two objectives – one involving the milk company Miraka and the second involving development of a new Māori researcher. As outlined in the section on KPIs under Māori Involvement and Mātauranga two other funded projects are exploring opportunities to develop greater involvement with Māori.

Despite these successes, we have found that there are few Māori owned F&B exporting businesses in this field with the scale and capacity to be able to engage actively with HVN research on a one-to-one basis. To overcome this capacity issue, HVN is intending to follow up on earlier interactions with the Nuku ki te Puku network of Māori businesses established by Callaghan Innovation and is also exploring the possibility of establishing a “HVN Cluster” of Māori owned businesses under this umbrella to facilitate two way engagement with potential Māori innovators.

Similarly, there are few Māori researchers actively engaged in HVN research and we have found it difficult to recruit Māori PhD students into our projects. We have also not yet identified a senior Māori researcher to join our Science Leadership Team, despite an open call for applicants.

These difficulties underline the importance of these elements of the Challenge in supporting development in this area and will require an ongoing adaptive process to find solutions.

## Public Participation

As the focus of HVN is on enhancing food and beverage export returns, it does not have an explicit public engagement strategy. Our approach has been to build the profile of the Challenge through the media, with which we have made great progress. A key to this has been in the innovative and extensive use of videos to profile the research and the researchers of HVN. These are not only to communicate effectively with our stakeholders but also to facilitate the uptake of HVN messages to the media. The success of this approach can be seen by visiting the media coverage page on the HVN website:

<http://www.highvaluenutrition.co.nz/en/news-and-events/Media.html>

While too early to measure the impact of this coverage the 6127 YouTube views of our videos is a promising early indicator.

## Effective Governance and Management

HVN was the first NSC launched and was the first to be fully contracted by MBIE. From its inception, the HVN management team has put a priority on establishing robust governance and management arrangements supported by high quality business processes. These arrangements derive from a formal Collaboration Agreement between the Challenge Member organisations (University of Auckland as host, University of Otago, Massey University, Plant & Food Research and AgResearch) which established the Challenge Board and devolves responsibility to it to oversee the performance of the Challenge. The HVN Board commenced oversight from mid-2014 and worked with the management team to establish best practice processes to govern and manage the Challenge. Although HVN has drawn from the experiences of other national research collaborations such as the Centres of Research Excellence, as the

earliest Challenge contracted, many of the processes and arrangements have been developed from scratch. The HVN business processes, frameworks and templates are now viewed as high quality exemplars across the NSCs. These processes have been tested over the past year in the finalisation of both the collaborative Priority Research Programmes and the Contestable Research Projects. These involved rigorous external review including feedback from the HVN International Science Advisory Panel and Industry Advisory Panel. Board investment decisions were well informed and conflicts of interest scrupulously managed. HVN finances are reported quarterly to the Board and monitored by the University of Auckland Finance team against Board approved investment decisions or delegations, and for compliance with University financial policies. A summary annual financial report is provided later in this report.

Following the Science Symposium in April, the HVN Board held a full day strategy session with HVN management, Science Leadership Team, International Science Advisory Panel and Industry Advisory Panel to take stock of progress to date and to identify options to take HVN to the next level. These informed the development of the 2015/16 HVN Annual Plan published on 30 May 2016.

Key to the operation of HVN over the past year has been the "Head Office" team which has established key relationships and processes for the Challenge. A recent survey was conducted of the HVN committees (ie. Science Leadership Team, international Science Advisory Panel, Industry Advisory Panel and partner contacts) on perceptions of the management performance of HVN for the 2015/16 year. The survey was sent to 28 individuals and 21 completed the survey.

At a high level the survey respondents rated HVN Management (defined as the Head Office Team) very positively (consistently rating over 4 on a 5 point Likert scale where a rating of 3 is neutral). Specific attributes rated included:

- Quality of national leadership (4.38/5)
- Development and clarity of science strategy and mission (4.24/5)
- Management of operations (4.57/5)
- Clarity and effectiveness of communications (4.33/5)
- Services provided relating to developing/reviewing/assessing/validating and/or contracting science (4.10/5)
- Organising/structuring/leading and/or facilitating meetings (4.52/5)
- Logistics (travel and accommodation) (4.38/5)

The survey also indicated strong support (76%) for the operational model of HVN as being:

"Create a virtual centre and network that provides services /advice to business, invests in high quality pre-competitive science and leads/facilitates a national change agenda to transform the NZ food and beverage sector"

These results support the view that HVN has established high standards of operational excellence over the past year.

The HVN Board reviewed the leadership model for the Challenge early in 2016 and decided to move away from a single Challenge Director model to a dual leadership model with both a Challenge Director, responsible for the overall performance of the Challenge, supported by a half time Chief Scientist, responsible for the quality of the science. Recruitment of these two new roles was completed late in the 2015/16 year and the new leadership team will commence later in 2016 to take the Challenge into its next stage of development.

The HVN Board is currently undertaking a self-assessment to ensure its own performance is of high quality and is adding value to both the leadership/management team and the Challenge. This is intended to lead to an annual process for Board self-assessment to ensure continuous improvement in the governance processes of the Challenge.

## RESEARCH FUNDING SUMMARY

High-Value Nutrition has made a total of \$18.2M in research investments to date (for the period to mid-2019). These investments fall under eight research themes. Five are related to major consumer health targets in metabolic, immune, gut, mobility and weaning foods supported by underpinning food science and consumer science platforms. The strategic framework is completed by two special projects, which are establishing baseline measures and developing the methodology for measuring the impact of HVN on New Zealand export revenues and international reputation over time.

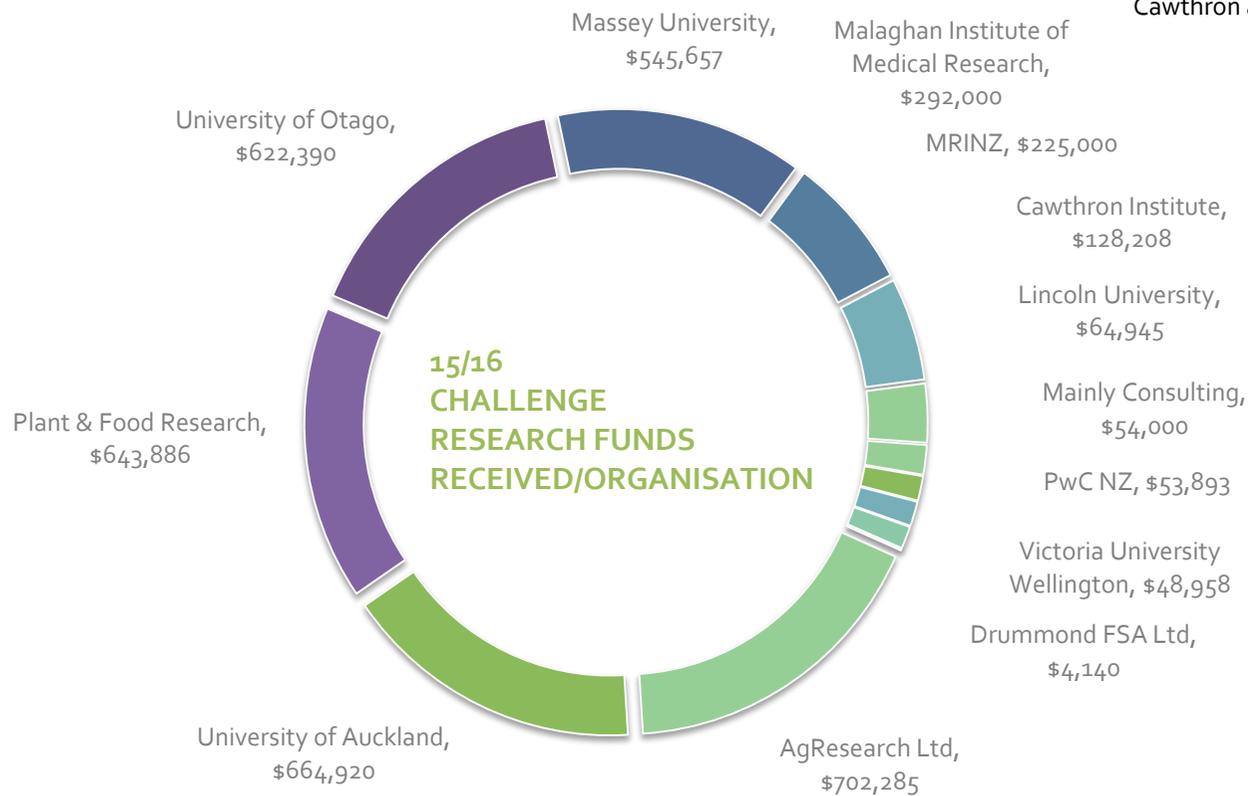
The diagram to the right shows the overall framework with the Priority Research Programmes associated with each theme darkly shaded and the related Contestable Research Projects in a lighter shade.

Further investments in the period to 2019 are planned under both the Consumer Insights and Science of Food themes to build on initial scanning projects. A Priority Research programme on Infant Nutrition is also intended.



The research funds invested by HVN to date flow through 14 subcontracts (within which there are a further 20 sub subcontracts). In total, 13 organisations received research funds from HVN with the amount of funds received by each in the 2015/16 year shown in the diagram to the left.

The five Challenge Member organisations all received a similar level of funding in the year, with Malaghan, MRINZ and Cawthron all receiving significant levels of investment.



# INVESTMENTS UPDATE

## Priority Research

- > Improving Gastrointestinal Function and Comfort
- > Building Immune Defence
- > Peak Nutrition for Metabolic Health (PANaMAH)
- > Scanning the Horizon
- > Consumer Insights Project 1

### IMPROVING GASTROINTESTINAL FUNCTION AND COMFORT

*\$3.6m Challenge funds | Oct 2015 - Mar 2019 | AgResearch Ltd*

The programme Improving Gastrointestinal Tract (GIT) Function and Comfort focuses on the aspirational ELITE GUT of motivated 'Worried Well' Asian consumers. The 'Worried Well' consumer represents the emerging middle and upper classes in Asia who want to excel as their careers and age advance. They will purchase Food and Beverage (F&B) products to feel physically comfortable and fit, to stay mentally sharp and to slow cognitive decline. This programme will generate unique opportunities for the NZ F&B industry to market new, high-value F&B products with validated scientific claims. The ELITE GUT research programme will recruit a cohort of Irritable Bowel Syndrome (IBS) patients (COMFORT cohort). The initial focus from 2015 to 2019 will be the recognition of the newly established COMFORT cohort as a central element of a food-health claim for ELITE GUT. Recruitment of the COMFORT cohort is underway. Development, refinement and validation of various methodologies are on-going with significant progress towards a storage solution for breath samples and improved plasma preparation for metabolomics analyses. These improved methodologies will ensure that the measurement of all metabolites present in breath or plasma of human subjects can be carried out without interference, to identify biomarkers and gain mechanistic insights into IBS phenotype(s).

For more information, visit the [Improving Gastrointestinal Function and Comfort webpage](#).

### BUILDING IMMUNE DEFENCE

*\$3.5m Challenge funds | Oct 2015 - Mar 2019 | Malaghan Institute of Medical Research*

An appropriately functioning immune system is essential for health and wellbeing. The Building Immune Defence research programme will leverage off the extraordinary demand for productivity to achieve excellence in education and the workplace across generations in Asia. This demand is driven by the consumer recognition that impaired immunity effects physical and mental wellness resulting in diminished productivity.

This programme seeks to fast-track opportunities for New Zealand F&B businesses to develop scientifically validated, value-added products to build immune defence against respiratory tract infection and manage pollution-driven respiratory inflammation. The initial focus of phase I of the research programme is to address the knowledge gaps in our understanding that currently limit the demonstration of beneficial modulation of immune function in these target areas. Investigations are currently underway, including an exploratory study to determine if there is a link between gut microbiota and vaccine-induced immune defence against influenza in adults, as well as the development of pre-clinical models of immune defence to enable the measurement of food health relationships.

For more information, visit the [Building Immune Defence webpage](#).

## PEAK NUTRITION FOR METABOLIC HEALTH (PANAMAH)

*\$2.9m Challenge funds | Oct 2015 - Mar 2019 | University of Auckland*

The Peak Nutrition for Metabolic Health [PANaMAH] programme is directed towards building a long-term science strategy, platform, capability, expertise and knowledge based on evidence from human studies to support the NZ food and beverage (F&B) export industry and to provide options for developing foods for better metabolic health and prevention of diabetes in Asian consumers.

Highlights during the first year have included the successful development of a national interdisciplinary multi-user platform MetabolicIMP, alongside the first of a series of human studies focused on improving metabolic health and preventing type 2 diabetes in Asian consumers known to develop this disease much earlier and faster than their Caucasian counterparts, when still young and outwardly slim. The TOFI, or 'thin on the outside but fat on the inside' trial aims to identify whether central 'belly' and organ fat is an important cause of diabetes in Asian Chinese, and in turn to identify early biomarkers of risk which may guide design of foods and beverages to aid prevention of these risks in Asian consumers. The TOFI study has been recruiting 400 Asian and Caucasian participants in the Auckland region for blood and body composition analyses, including organ MRI scanning. Considerable public and press interest in the HVN TOFI study culminated in a TV3 News feature in April 2016, with a presentation of the TOFI trial submitted to Australian New Zealand Obesity Society (ANZOS) later in 2016.

A wide breadth of researchers and clinicians from across the University and CRI partners provide clinical study and biomarker expertise within MetabolicIMP, supported by the HVN food science and consumer insights platforms, and an industry reference group comprising NZ exporters of food and beverage products targeting better metabolic health. In addition a team of emerging postdoctoral researchers and PhD students have joined PANaMAH at the University of Auckland, AgResearch, and Plant & Food Ltd.

For more information, visit the [Peak Nutrition for Metabolic Health webpage](#).

## SCANNING THE HORIZON

*\$0.6m Challenge funds | Oct 2015 - Jun 2016 | Massey University – Riddet Institute*

The Scanning the Horizon project brought together experts from Massey University, AgResearch, the University of Otago and Lincoln University to support the translation of novel scientific insights into high-value export food products.

Scanning the Horizon has produced comprehensive reports and in-depth analyses of the landscapes within which High-Value Nutrition operates. This includes a breakdown of historical and current patent activity relevant to the Elite Gut, Metabolic Health and Immune Health Platforms, a wide-ranging scan of the 'foods for health' global retail environment and a detailed overview of functional food regulations in New Zealand's major export markets. The Science of Food team has worked closely with Health Platform teams to tailor the outputs of Scanning the Horizon and communicate our findings in an accessible way. Selected New Zealand Food and Beverage companies representing a broad spectrum of export sectors have been kept abreast of our findings, and they have helped to shape our upcoming Bioactive Food Systems research programme.

For more information, visit the [Scanning the Horizon webpage](#).



## CONSUMER INSIGHTS PROJECT 1

*\$0.3m Challenge funds | Oct 2015 – Sep 2016 | Plant & Food Research*

Consumer insights are needed to help guide and prioritise opportunities arising from the High-Value Nutrition health domains. New Zealand food and beverage companies and government support agencies are working with our research scientists on a consumer insights programme that will provide science-based understanding of the complexity and difficulties associated with product development and marketing into Asia. During formal interviews, a dozen companies and agencies confirmed a general interest in Asian markets and many described a specific focus on China. However, there was considerable variability among them in terms of access to Asian consumer insights, ability to commission their own consumer research and in knowledge gaps regarding Asian opportunities for their own products. Alongside the industry

interviews, we have reviewed the Chinese and English Language academic literature for insights on Chinese consumer responses to food-related health and wellness. Through the interviews and literature review we have begun to identify gaps in knowledge that will form the basis for a pre-competitive consumer insights research programme and is relevant to the priority targets.

For more information, visit the [Consumer Insights webpage](#).



## Contestable Research

- > A Good Night's Sleep
- > a2 Milk™ for Gut Comfort
- > Natural Protection of Milk
- > Kiwi, Fruity and Friendly
- > Musseling-Up
- > MultiProMo
- > Complex Lipids for Enhanced Metabolic Health

### A GOOD NIGHT'S SLEEP

*\$1m Challenge funds | Feb 2016 – Jan 2019 | University of Otago  
(Partners: Victoria University of Wellington, Jinan University)*

Food contains complex carbohydrates (dietary fibre) that are not digested by humans. The large bowel (colon), however, is home to a multitude of bacteria that degrade and ferment these carbohydrates. The fermentation products that are produced are organic acids that are absorbed from the bowel and provide energy for the human. The degradation and fermentation of complex carbohydrates takes time and provides a slower, sustained energy harvest compared to the easily digested food components that provide most of human energy requirements. The amount of energy required by the body is less during periods of sleep, but infant waking in the night is commonly believed by parents to be due to hunger.

This project, which started in January 2016, aims to identify options to give young infants a good night's sleep by providing baby food (weaning food) with optimal mixtures of dietary fibres that would enable a sustained energy harvest by bowel bacteria during the night so as to satisfy the body's needs.

For more information, visit the [Contestable Research webpage](#).

### a2 Milk™ FOR GUT COMFORT

*\$1m Challenge funds | Feb 2016 – Jan 2019 | AgResearch Ltd  
(Partners: University of Auckland, A2 Milk Company)*

There is emerging evidence that milk containing only the A2 form of  $\beta$ -casein aids digestive wellbeing, thereby being suitable for those who perceive themselves to be intolerant to cows' milk. However, the health benefits of consuming A2 milk are scientifically inconclusive. The objective of this project is to deliver conclusive scientific evidence for validated benefits of A2  $\beta$ -casein dairy products on increased gut comfort through prevention of intestinal inflammation.

The "a2 Milk™ for gut comfort" HVN project commenced in February 2016. Samples of a2 Milk™, and of milk containing only A1  $\beta$ -casein, for the proposed cell culture bioassays have been provided by The a2 Milk Company Limited (a2MC). The PhD candidate who will be involved in the clinical trials has been recruited, and is expected to start in August 2016. Members of the project team have recently visited key contacts in the USA to ensure that the trial outcomes are best placed to support a structure-function claim for a2MC products, one of the key long-term goals of this project.

For more information, visit the [Contestable Research webpage](#).

## NATURAL PROTECTION OF MILK

*\$1m Challenge funds | Feb 2016 – Jan 2019 | AgResearch Ltd  
(Partners; Malaghan Institute for Medical Research, Miraka)*

The goal of this High-Value Nutrition project, in partnership with Miraka, is to unlock the natural health benefits of milk and address the strong desire of parents to minimise allergy in their children. Epidemiological studies have shown a clear association between the consumption of raw, unprocessed farm milk and reduced incidence of allergy. However, consumption of raw milk is not safe and to-date no 'safe' milk product is available to fill this market-need.

The High Value Nutrition project, Natural protection of milk, was initiated in March 2016 to develop a Growing Up Milk nutritional formulation that preserves sensitive milk components and has demonstrated ability to reduce the risk of allergy development in toddlers.

For more information, visit the [Contestable Research webpage](#).

## KIWI, FRUITY AND FRIENDLY

*\$1m Challenge funds | Jan 2016 – Dec 2018 | Plant & Food Research  
(Partners: Otago University, AgResearch, Zespri)*

Glucose intolerance, in the form of prediabetes and diabetes, is affecting hundreds of millions of people in our Asian markets. New Zealand kiwifruit and kiwifruit products have the potential to reduce blood glucose responses and blood glucose effects within a healthy diet. Fruit sugars are less glycaemic than starch-based sugars, fruits provide components that physically reduce the rate of sugar absorption, and kiwifruit contain a wide range of phytochemicals that potentially counteract the harm done by elevated blood glucose.

The project was initiated in March 2016 and aims to demonstrate that New Zealand kiwifruit may afford protection against glycaemia and its effects by reducing glycaemic response, by maintaining healthy energy metabolism and by retarding the systemic long-term effects of glycaemia.

Presentations on the project given to the recent Zespri symposium on Kiwifruit and Health have generated considerable interest in the New Zealand, Korean and Chinese press.

For more information, visit the [Contestable Research webpage](#).

## MUSSELING-UP

*\$999,955 Challenge funds | Jan 2016 – Jan 2019 | Cawthron Institute  
(Partners: Massey University, Lincoln University, Malaghan Institute of Medical Research, Chester University, Sanford Ltd)*

Developing faster and better ways to identify the goodness in New Zealand's iconic Greenshell™ mussels and ensuring the preservation of those valuable properties, is a key focus for this High-Value Nutrition project.

"Musseling-up: high-value Greenshell™ mussel foods" is a research partnership between Sanford Ltd and Cawthron Institute aimed at identifying and validating the health benefits of Greenshell™ mussels, in particular looking at its potential anti-inflammatory qualities for improved joint and bone health and increased mobility.

Since its initiation in January 2016, the research team have been developing a new test method to allow rapid analysis of mussels, particularly looking at high value components for health. Once implemented, the new test will be able to determine a mussels' composition in less than 10 seconds with one analysis, compared with the previous method which took more than a week to return results, and involved multiple tests. To support the programme, Cawthron has recently invested in new, near-infrared (NIR) technology for rapid analysis of food products. It will be used for the first time in this area for this project.

Alongside this research, Sanford is designing new Greenshell™ mussel food concepts specifically to enhance and protect the bioactives (once identified) so they reach the consumer in the best possible format to deliver health benefits.

Other programme developments include the preparation of an 'evidence dossier' which will contain scientific information about GSM health claims around enhanced mobility, and the establishment of a technical advisory panel of international and national experts to guide and advise the direction of the programme.

For more information, visit the [Contestable Research webpage](#).

## MULTIPROMO

*\$990,852 Challenge funds | Jan 2016 – Jan 2019 | Massey University – Riddet Institute  
(Partners: AgResearch, Goodman Fielder)*

As we age we lose muscle mass and function, and many older people find that muscle weakness limits their ability to stay physically mobile and remain independent. Protein and the amino acid leucine are the major nutrients required for muscle maintenance. This project was initiated in January 2016 to determine how to combine proteins together to improve digestibility and protein uptake for older people. Using this research, we will develop scientifically validated high-protein foods that help to support muscle maintenance in seniors while also meeting their flavour and texture preferences.

Many countries, especially in New Zealand's major export markets in East Asia, are faced with ageing populations and skyrocketing healthcare costs. The high-protein muscle maintenance foods that we develop will be targeted towards seniors in China, and will contribute to improving the wellbeing of older Chinese as well as providing substantial export revenue to a New Zealand food manufacturer.

For more information, visit the [Contestable Research webpage](#).

## COMPLEX LIPIDS FOR ENHANCED METABOLIC HEALTH

*\$974k Challenge funds | Feb 2016 – Jan 2019 | AgResearch Ltd  
(Partners: University of Auckland, Firstlight Foods)*

Consumers are increasingly aware of the risks of metabolic disease and the importance of diet in its prevention. Meat from grass-fed animals contains many complex lipids that have unexploited potential to improve metabolic health. Complex lipids, when extracted from alternate sources including milk and eggs, are effective in reducing cholesterol absorption. However, the effects of these complex lipids extracted from a grass-fed Wagyu beef on cholesterol absorption is unproven. This project aims to provide robust scientific evidence that consuming such high-value beef will lead to reduced cholesterol levels in health-conscious consumers. The project team is working with Firstlight Foods - a leading NZ food company that focus on ethically producing 100% grass-fed Wagyu beef that targets the high-end of the market where customers have high expectations and are prepared to pay a premium price for ultra-premium indulgence and health benefits. The "Complex Lipids for Metabolic Health" project team and Firstlight Foods have initiated studies to determine the levels of complex lipids present in grass-fed Wagyu beef: their distribution and how their levels compared to other breeds of beef. The findings will help developing a hamburger-type product that will be used to assess the effects of beef-derived complex lipids on cholesterol reduction in humans.

For more information, visit the [Contestable Research webpage](#).



## Special Projects

- > **New Zealand's International Reputation as a Producer of High Quality Foods with Scientifically Validated Health Benefits**
- > **Measurement of New Zealand High Value Food Export Revenues**

### **NEW ZEALAND'S INTERNATIONAL REPUTATION AS A PRODUCER OF HIGH QUALITY FOODS WITH SCIENTIFICALLY VALIDATED HEALTH BENEFITS**

*\$130k Challenge funds | Jun 2016 – Jun 2017 | Lincoln University - AERU*

The High-Value Nutrition National Science Challenge seeks to transform the New Zealand food and beverage sector to position itself as a leading international player in the marketing of food products with scientifically validated health benefits for consumers. Consequently, the aim of this research is to provide valid data that can be used to benchmark New Zealand's current international reputation in 2016 as a provider of scientifically validated food products with health benefits.

The Agribusiness and Economics Research Unit at Lincoln University has been contracted to undertake a project on "New Zealand's International Reputation as a Producer of High Quality Foods with Scientifically Validated Health Benefits". The project was just initiated in June 2016 and is in the start-up phase with a workshop of stakeholders held and a comprehensive literature review completed to help guide the project and its focus.

For more information, visit the [Special Projects webpage](#).

### **MEASUREMENT OF NEW ZEALAND HIGH VALUE FOOD EXPORT REVENUES**

*\$180k Challenge funds | Jun 2016 – Jun 2019 | Pricewaterhouse Coopers*

PwC New Zealand will lead a project to estimate the impact of the High-Value Nutrition Challenge on food and beverage exports from New Zealand. These high-value products are new and innovative, so tracking their sales is challenging. PwC will use a novel method to triangulate the level of sales based on three sources of data. To collect and analyse the data, PwC NZ will work with counterparts at PwC Singapore and with researchers in the AERU at Lincoln University.

The project only started in June 2016 and is in the start-up phase. It is currently assessing official export and production statistics and will proceed to interviews with key informants in the food and beverage sector. This will allow consolidation on the methodology to be used to establish baseline data on "High-Value Nutrition" exports.

The project is designed to allow for simple updating each year once the methodology has been developed and established. The approach will allow HVN to determine trends for future years by combining the results from interviews and official statistic.

For more information, visit the [Special Projects webpage](#).

# ALIGNED RESEARCH & PARTNERS

## MASSEY UNIVERSITY

6 projects | \$666k in 15/16

Massey University have the largest number of aligned researchers at 49. Aligned research includes projects on Asian food choice, validation of Asian biomarkers, sports drinks and bone health. The main aligned research capabilities at Massey include food science, technology, manufacture and engineering (including food pilot facilities); sensory and consumer science; public health nutrition; life cycle nutrition; body composition; metabolism and risk of disease; preclinical testing of bioactives; clinical nutrition; carbohydrates and cereals; dairy products; post harvest fruit and vegetables; bone and joint health; nutrient metabolism; nutrition and physical/sports performance.

## PLANT & FOOD RESEARCH

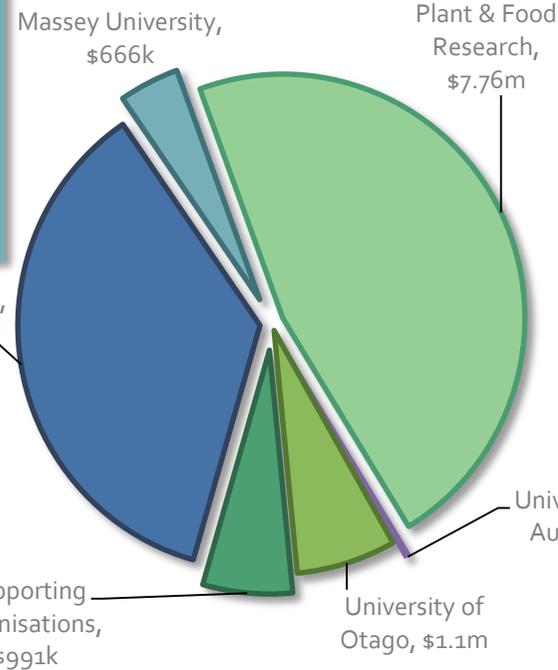
11 projects | \$7.76m in 15/16

Plant & Food Research have 18 researchers aligned with HVN and the largest portfolio of aligned research by value. The aligned research is predominantly related MBIE funded research along with CRI Core funded and business funded research. These projects are already making significant contributions to the HVN KPIs. Plant & Food Research have a diverse range of research capabilities aligned with HVN including glycaemic impact/response; physical and cognitive performance; inflammation/immunity; satiety/appetite control; gut function; consumer insights; food content/claims; analysis of miRNA biomarkers and plant metabolomics.

## AGRESEARCH

18 projects | \$5.96m in 15/16

AgResearch have 23 researchers aligned with HVN and the largest portfolio of aligned research by number of projects. The aligned research is predominantly CRI Core funded along with MBIE and business funded research and is already making a significant contribution to the HVN KPIs. AgResearch have aligned research capabilities in the use of *in vivo*, *ex vivo* and metabolomic analysis of gut and immune function; mathematical modelling of food/microbe/host interactions; and food production/processing effects on proteins.



## UNIVERSITY OF AUCKLAND

5 projects | \$86k in 15/16

The University of Auckland has 35 aligned researchers with under \$100,000 in active aligned research focused mostly on identification and extraction of biologically active compounds from a range of sources plus a small study on vit D stability in milk powder. The University of Auckland has research capability in food science relevant to the development and maintenance of bioactive components of foods.

## SUPPORTING ORGANISATIONS

Cawthron Institute | Victoria University of Wellington | Malaghan Institute of Medical Research

5 projects | \$991k in 15/16

In addition to the five Challenge Member organisations, HVN is well supported by the Cawthron Institute, Malaghan Institute of Medical Research and Victoria University of Wellington with collectively 10 aligned researchers, and a portfolio of aligned research and aligned capabilities across bioactives (including marine); algal based ingredients; shellfish breeding; analytical chemistry; food safety; genomics; gut microbiota and immune function.

## UNIVERSITY OF OTAGO

7 projects | \$1.1m in 15/16

The University of Otago have 28 researchers aligned with HVN and a portfolio of aligned research mainly funded by the Health Research Council and MBIE, including projects on probiotics to prevent infant allergies; weaning foods and gut microflora; diet and blood pressure; and impact of foods on antioxidant activity. Otago's aligned research capabilities include preclinical (animal) and clinical trials; *in vivo* and *ex vivo* testing of food health relationships; biomarker development; food bioactives; food processing and its impact on ingredients.

# KEY PERFORMANCE INDICATORS

The KPIs for High-Value Nutrition were agreed with MBIE based on their NSC Performance Framework and are the primary contractual accountability for the Challenge being embedded in the second Challenge Programme Agreement between the University of Auckland (as host) and MBIE (as funder). The following chart outlines the progress made in the 15/16 year against the KPIs.

Performance Area	Measure	Indicative Targets	Targets	Measure for 15/16	Description of progress in 15/16
<b>1. Delivery of the Challenge Objective</b>	1.1 Industry Validation of Research Plans Proportion of priority research investments (programmes and projects) made with good evidence of target consumer's need and demand in export markets coupled with clear NZ F&B businesses endorsement. (With a submeasure relating to engagement with Māori-owned businesses)	Nil	> 50% (score) at initiation (assessed both individually and collectively) > 100% at the 24 month review	100%  (Source: HVN Board paper re Priority Investments, October 2015)	All priority research programmes underwent an industry validation review prior to investment involving both industry reference group feedback and review by the HVN Industry Advisory Panel. All programmes had a clear focus on consumer needs in target markets that were relevant to the strategies of multiple New Zealand food and beverage businesses. All reference and review groups included membership from Māori owned businesses to ensure Māori perspectives were included. The evidence of consumer need/demand was high level at this stage and will become more defined as the programmes progress.
	1.2 Investment Performance to Plan % HVN funded research project and programme research objective end points (results) met on time to specification	Nil	> 60% as budgeted > 80% as reforecast	Nil to report	No contracted research objective end point dates were due in the reporting period (all investments were new in 2015/16).
	1.3. Biomarkers Number of "biomarkers" responsive to nutrition that address consumer health targets identified that underpin applications submitted to FSANZ under standard 1.2.7 or self-substantiated general level claims notified with supporting scientific evidence of the food health relationship	> 2 in total from aligned and related research by 2016 > 4 in total from aligned and related research by 2018 > 4 in total from aligned and related research by 2020 > 6 in total from aligned and related research by 2023	>3 in total from funded research with >1 in each priority health target area by 2018 >6 in total from funded research with >3 in each priority health target area by 2020 >15 in total from funded research with >5 in each priority health target area by 2023	>10 in development  (Sources: Annual reports to HVN)	A number of programmes, both from funded and aligned research, are working on a range of potentially new or newly characterised biomarkers. These include biomarkers that reflect antioxidant activity; identify modulators of glycaemic response; identify quercetin scaffold extracts as indicators of pancreatic dysfunction; define miRNA profiles in milk; profile colonic motility patterns demonstrating prokinetic activity related to constipation; define plasma and brain polar metabolites and lipids involved in gut-brain stress responses; and metabolomics profiles of Chinese women.
	1.4 Businesses using HVN Capabilities Number of F&B businesses using "HVN capabilities" to develop and/or support products as part of the process of validation of health benefits for target consumers. (With a submeasure relating to	>5 in total from aligned and related research by 2016 >5 in total from aligned and related research by 2018 >5 in total from aligned and related research by 2020 >5 in total from aligned and related research by 2023	>10 in total from HVN funded research with >2 per priority research programme by 2018 >16 in total from HVN funded research with >4 per priority research programme by 2020 >20 in total from aligned and related research by 2023	> 20  (Sources: Annual reports to HVN)	In addition to the businesses co-funding the HVN contestable projects (a2 Milk, Miraka, Firstlight Foods, Zespri, Sanford, Goodman Fielder) there are a large number of businesses working across the aligned research projects of our collaborators. These include: GoHealthy, Nutricia, Grasslanz, Fonterra, Malaysian Palm Oil, Unilever, Anagenix, Blackcurrants NZ, NZ Blackcurrant Cooperative, Just the Berries, Comvita, NZ Extracts, Sanitarium, Dairy Goat Cooperative, Manuka Health, Baking Industry Research Trust, and Sujon.

engagement with Māori-owned businesses)				
1.5 Products in Development Number of discrete F&B products in development with significant export potential supported by “evidence dossiers” involving HVN research demonstrating health benefits for target consumers. (With a submeasure relating to products involving Māori-owned businesses)	>3 in total from aligned or related research by 2016 with 5 year sales projections >\$50M >3 in total from aligned or related research by 2018 with 5 year sales projections >\$50M >5 in total from aligned or related research by 2020 with 5 year sales projections >\$50M >5 in total from aligned or related research by 2022 with 5 year sales projections of >\$50M each >5 in total from aligned or related research by 2024 with 5 year sales projections of >\$50M each	>3 in total from funded research (with >1 per priority Health Target Area) by 2018 with 5 year sales projections of >\$50M each >9 in total (with >3 per priority Health Target Area and >2 per priority research programme by 2020) by 2020 with 5 year sales projections of >\$50M each >10 in total by 2022 with 5 year sales projections of >\$50M each >10 in total by 2024 with 5 year sales projections of >\$50M each	> 10  (Sources: Annual reports to HVN)	At least 6 products are in development by businesses working with HVN “aligned” research partners. Sales projections are not available and the product details are confidential to the parties. In addition, Sanford is working with Cawthron on a number of product concepts within their HVN funded project while Plant & Food Research are working with Zespri on new health claims for an existing product with potential to grow sales.
1.6 Industry Co-Investment Value of R&D investment by F&B businesses in “HVN capabilities” to support development and marketing of F&B products with health benefits. (With a submeasure relating to investment by Māori-owned businesses)	>\$1M from aligned or related research in CY2016 > \$2M from aligned or related research in CY2018. > \$2M from aligned or related research in CY2020 > \$2M from aligned or related research in CY2023	>\$1M in aggregate from funded research by year end CY2018 >\$2M from funded research in CY2020 >\$5M from funded research in CY2023	> 1.1M  (Sources: Annual reports to HVN)	Greater than \$1M in direct industry co-investment in aligned research capabilities coupled with over \$100K in co-funding of the contestable projects in the short period from their start date.
1.7 Evidence Dossiers Number of “evidence dossiers” (derived from HVN research or teams) submitted to FSANZ (or notified by businesses under the FSANZ model) in support of approved food health claims	> 2 from aligned or related research by 2016 > 3 from aligned or related research by 2018. > 3 from aligned or related research by 2020 > 4 from aligned or related research by 2022 > 6 from aligned or related research by 2024	> 2 in total from funded research by 2018. > 3 in total (including >1 per priority health research programme) from funded research by 2020 > 6 in total (with >2 per priority Health Target Area) from funded research by 2022 > 10 in total from funded research by 2024	2  (Sources: Annual reports to HVN)	Two evidence dossiers have been submitted to FSANZ by our partner Plant & Food Research from their aligned research with a third in the planning phase.
1.8 Revenues Value of export revenues from discrete food and beverage products supported by evidence based on “HVN research” demonstrating health benefits for target consumers. (With a submeasure relating to revenues from Māori-owned businesses)	> \$10M additional F&B export revenues from aligned and related research in CY2016 > \$150M additional F&B export revenues from aligned and related research in CY2019 > \$300M additional F&B export revenues from aligned	> \$10M additional F&B export revenues from funded research in CY2019 > \$150M additional F&B export revenues from funded research in CY2022 > \$250M additional F&B export revenues from funded research in CY2024	Nil to report	Individual examples of revenue generation from aligned and related research activities are confidential to individual parties and cannot be reported. HVN has commissioned PwC to develop methodology to estimate “HVN” relevant revenues. They are currently establishing baseline estimates for 2015 and 2016 which will be reported in the 2017 Annual Report.

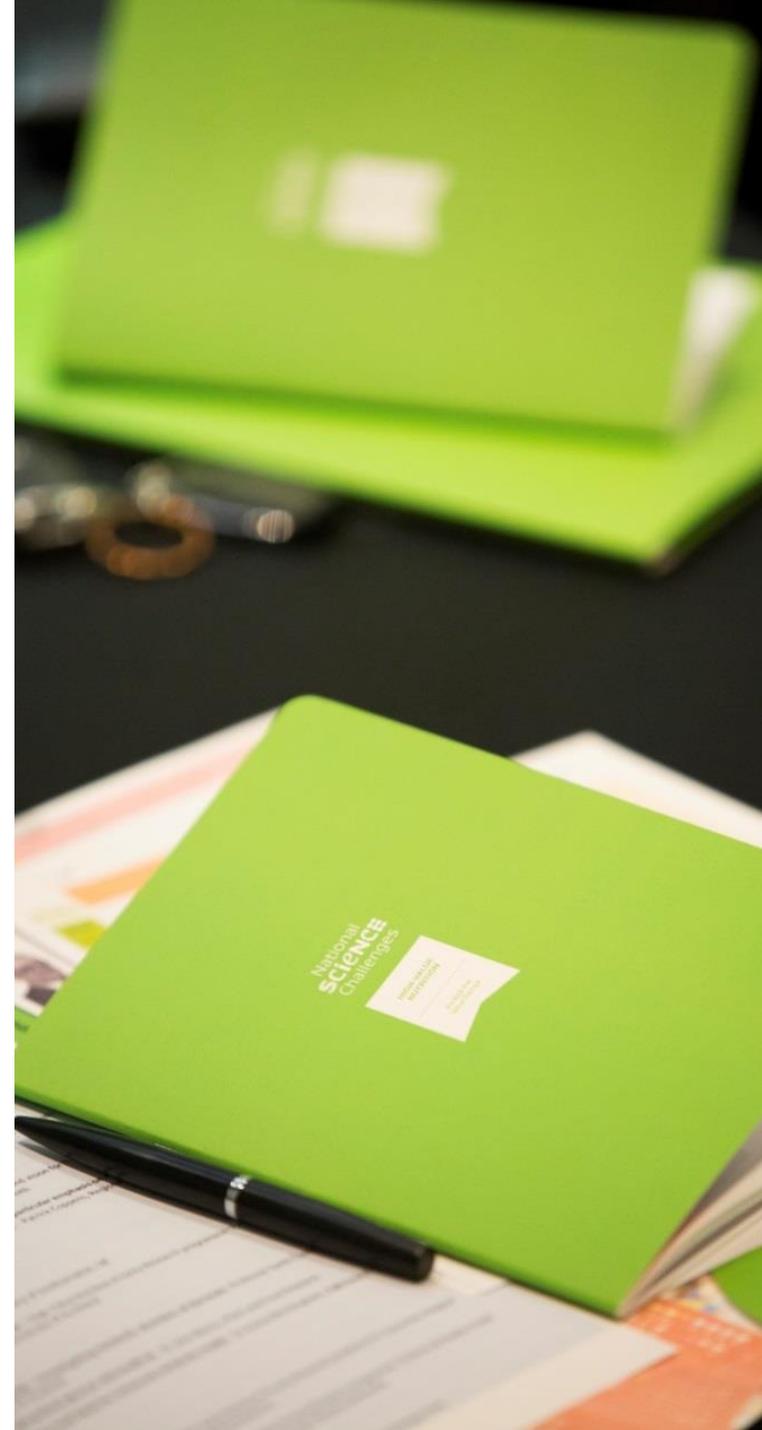
		and related research in CY2022 > \$500M additional F&B export revenues from aligned and related research in CY2024 > \$650M additional F&B export revenues from aligned and related research in CY2025	> \$350M additional F&B export revenues from funded research in CY2025 > \$1B pa additional F&B export revenues from funded, aligned and related research by CY2025		
	1.9 International reputation New Zealand's international reputation as a food producer of high quality and scientifically validated food health benefits is enhanced	Nil	Three yearly survey in 2016/2019/2022 and 2025 (of target international consumers, regulators, importers and other relevant stakeholders) showing positive ongoing increases in "positive" reputation	Nil to report	The 2016 baseline survey is underway and will be reported in 2017.
<b>2. Science Quality</b>	2.1 Citation scores Mean citation scores for journals in which the Challenge has published	Nil	Nil	Nil to report	This will be determined by MBIE from the statistical data provided by HVN. However, there have been insufficient publications from HVN funded research at this early stage to enable any meaningful assessment.
	2.2 Citation index Field weighted citation index of Challenge publications	Nil	Nil	Nil to report	As above
	2.3 Publications top quartile journals Number of publications in journals within the top quartile (field-weighted) of peer reviewed scientific per \$5M invested	Nil initially	Nil initially	Nil to report	As above
	2.4 International science reputation New Zealand's international reputation in the science of food health relationships is enhanced	Nil	Nil	Various  (Sources: Annual reports to HVN)	While early in the Challenge, several of our lead and aligned investigators are already receiving invitations to present at leading international events. These include Sally Poppitt at the 2016 World Life Science Conference, Beijing, China; John Monro at the International Nutrition and Diagnostic Conference 2015, Prague and the 3 <sup>rd</sup> International Conference on Food Structure and Digestion, 2016, Wellington; C. Barthow at the Developmental Origins of Health and Disease Conference, 2015, Melbourne; Nicole Roy at the 5 <sup>th</sup> Molecular Materials meeting, 2015, Singapore and the 3 <sup>rd</sup> International Conference on Food Structure and Digestion, 2016, Wellington; Karl Fraser at the 3 <sup>rd</sup> International Conference on Food Structure and Digestion, 2016, Wellington and the Microbiome-based Foods for Health and Sustainability Workshop, 2016, Brussels; Rachel Anderson at the Korean Society for Microbiology and Biotechnology International Symposium 2016, Daejeon, South Korea, plus others.
<b>3. Best Research</b>	3.1 Collaborative publications % Publications by collaboration	Nil	>80% publications with co-authors from more than one	Nil to report	There have been insufficient publications from HVN funded research to date to enable any meaningful assessment.

<b>Team Collaboration</b>	type (ie with co-authors from multiple research organisations and/or with international co-authors) on a 12 month rolling average		NZ based organisation >60% publications with co-authors from more than two NZ based organisations > 15% publications with international co-authors		
	3.2 Research team effectiveness Effectiveness of research team re science leadership, skills mix, etc.	Nil initially	Nil initially	3.1 (confidence in research team)	Of 43 responders in an MBIE sponsored survey by Colmar Brunton of stakeholders 56% were confident in the research team and 18% weren't - giving a positive confidence ratio of 3.1.
<b>4. Stakeholder Engagement</b>	4.1 Stakeholder satisfaction re influence Satisfaction among stakeholders with research priority setting	Nil initially	Nil initially	3.25 (contribute to priorities) 1.0 (setting priorities)	Of 55 responders in the stakeholder survey, 65% felt they were able to contribute effectively to priority setting while 20% felt they weren't - giving a positive ratio of 3.25 Of 52 responders 35% were satisfied with the way priorities were set while 35% weren't - giving a neutral ratio of 1.0
	4.2 Stakeholder satisfaction knowledge exchange Satisfaction among stakeholders with knowledge exchange and technology development	Nil initially	Nil initially	1.34 (confidence in usefulness of outputs)	Of 51 responders in the stakeholder survey, 43% were confident that the Challenge will produce knowledge or technology that will be of practical use for their organisation while 32% were not confident - giving a positive ratio of 1.34
<b>5. Māori Involvement and Mātauranga</b>	5.1 Māori stakeholders satisfaction re influence, engagement and value Satisfaction among Māori stakeholders with their influence on, engagement with, and value received from the Challenge	Nil initially	Nil initially	Nil to report	While the MBIE sponsored ColmarBrunton stakeholder survey canvassed this area there were insufficient Maori stakeholder responses to be able to report any meaningful data.
	5.2 Investment in VM initiatives \$ value of investment by HVN in research and related activities that 1) specifically target Māori needs and aspirations and 2) employ Mātauranga Māori	Nil	Re 1) >\$2M in aggregate of contestable funds in the first funding period (ie by 30 June 2019) >\$2M in aggregate of contestable funds in the second RfP (ie from 2019 to 2021) >\$2M in aggregate of contestable funds in the third RfP (ie from 2021 to 2024)  Re 2) Nil	Re 1: \$2M invested  (Sources: HVN Board paper re Contestable Investments, November 2015 and Annual reports)	Two successful contestable projects were assessed as meeting satisfactory evidence of Vision Mātauranga / Māori engagement criteria and were contracted in early 2016. These were a business-led project with AgResearch involving Miraka and a science-led project involving Māori researcher capability development led by Plant & Food Research. These two projects involved a total investment over three years of \$2M from HVN. Another contestable project funded by HVN with the Cawthron Institute is exploring opportunities to develop Vision Mātauranga elements with its partner Sanford, and the Metabolic Health Priority Research Programme is exploring opportunities with the Nga Uri o te Ngahere Trust.
<b>6. Effective Governance and Management</b>	6.1 Quality of Governance Qualitative assessment of governance processes	Nil	Satisfactory or better in all dimensions assessed	Nil to report	The HVN Board is developing a qualitative self-assessment tool but has yet to complete the process for 2016.
<b>7. Public Participation</b>	7.1 Public Awareness Index of public attitudinal and behavioural engagement in science	Nil	Nil	Nil to report in 2016	MBIE will be surveying the public in 2017.

## FINANCIAL STATEMENTS

The High-Value Nutrition National Science Challenge received \$5.9M from MBIE in the 2015/16 financial year, plus additional revenues of \$18,552 from conference registrations. Total expenditure was \$5.4 M. The surplus will be carried forward to the 2016/17 financial year. The financial statement below has been prepared by the University of Auckland Financial Unit and is subject to the standard audit procedures and financial policies of the University.

	2015	2016	Challenge Total
	Jan 15 – Jun 15	Jul 15 – Jun 16	Jan 15 – Jun 19
	Actuals	Actuals	Actuals + Forecast
<b>REVENUE</b>			
MBIE Revenue	\$393,000	\$5,900,000	\$29,993,000
Other Revenue	\$0	\$18,552	\$18,552
<b>Total Revenue</b>	\$393,000	\$5,918,552	\$30,011,552
<b>EXPENDITURE</b>			
<b>PEOPLE COSTS</b>	\$352,058	\$861,857	\$4,226,772
<b>OPERATING EXPENSES</b>	\$5,442	\$511,881	\$1,834,780
<b>RESEARCH</b>			
Priority research	\$0	\$2,252,784	\$15,000,000
Special projects	\$0	\$729,250	\$1,500,000
Open contestable funding	\$0	\$1,068,248	\$6,964,805
Contingency funds	\$0	\$0	\$485,195
<b>Total Research Expenditure</b>	\$0	\$4,050,282	\$23,950,000
<b>Total Project Expenditure</b>	\$357,500	\$5,424,020	\$30,011,552
<b>REVENUE-EXPENDITURE</b>	\$35,500	\$494,532	\$0



# MEMBERS & ASSOCIATES 2015/16

## Board Members

- > **Bob Major (Chair)** - Independent Director
- > **Dr Jocelyn Eason** - Plant & Food Research appointee
- > **Professor Jim Metson** - University of Auckland appointee
- > **Rodney Wong** - Massey University appointee
- > **Professor Warren McNabb** - AgResearch appointee
- > **Professor Christine Winterbourn** - University of Otago appointee
- > **Paul Morgan** - Independent Director
- > **Dr Andrew Kelly** - Independent Director
- > **Jane Lancaster MNZM CMINstD** - Independent Director
- > **Jane Harding** – until December 2015
- > **Bridgid Heywood** – until August 2015

## Business Managers Network

- > **Craig Armstrong (Chair)** - New Zealand Trade and Enterprise
- > **Rebecca Redmond** – AgResearch
- > **Katy Bluett** - Callaghan Innovation
- > **Abby Thompson** - Massey University
- > **Nick Reilly** - UniServices
- > **David Grimmett** - University of Otago
- > **Augusta Van Wijk** - Cawthron Institute
- > **TC Chadderton** - Plant & Food Research
- > **Lucy Pearce** - Malaghan Institute for Medical research
- > **Eric Walton** - Waikato University
- > **Neb Svrzikapa** - Victoria University of Wellington

## International Science Advisory Panel

- > **Emeritus Professor Sean Strain (Chair)** - Emeritus Professor of Human Nutrition & Director, Northern Ireland Centre for Food and Health (NICHE), Ulster University, Ireland
- > **Distinguished Professor Connie Weaver** - Distinguished Professor and Department Head, Director, Women's Global Health Institute, Purdue University, USA
- > **Professor Bruce German** - Director, Foods for Health Institute, Department of Food Science & Technology, University of California, USA
- > **Professor Philip Calder** - Professor of Nutritional Immunology, Human Development & Health, Academic Unit, Faculty of Medicine, University of Southampton, UK
- > **Professor Yang Yuexin** - President Chinese Nutrition Society, Director, Department Food Nutrition and Assessment, National Institute of Nutrition and Food Safety, China

## Industry Advisory Panel

- > **Dr Kevin Marshall (Chair)** - Director, cDNAk
- > **Vicky Taylor** - General Manager, SmartFoods
- > **Richard Te Hurinui Jones (Ngāti Maniapoto, Te Arawa)** - Chief Ideas Officer, Poutama Trust
- > **Dr Jeremy Hill** - Chief Science & Technology Officer, Fonterra
- > **Gerard Hickey** - Managing Director, Firstlight Foods
- > **Craig Armstrong** - Director, New Zealand Trade and Enterprise
- > **Brett Hewlett** – until May 2016

## Science Leadership Team

- > **Professor David Cameron-Smith (Chair)** - University of Auckland
- > **Associate Professor Nicole Roy** – AgResearch, Elite GUT
- > **Dr Elizabeth Forbes-Blom** - Malaghan Institute of Medical Research, Building Immune Defence
- > **Professor Sally Poppitt** - University of Auckland, Peak Nutrition for Metabolic Health
- > **Distinguished Professor Harjinder Singh** - Massey University, Science of Food
- > **Dr Roger Harker** - Plant & Food Research, Consumer Insights

## Contestable Research Principal Investigators

- > **Professor Gerald Tannock** - University of Otago, A good night's sleep
- > **Dr Matthew Barnett** - AgResearch, a2 Milk™ for gut comfort
- > **Dr Emma Bermingham** - AgResearch, Complex lipids for enhanced metabolic health
- > **Dr Alison Hodgkinson** - AgResearch, Natural protection of milk
- > **Dr Matthew Miller** - Cawthron Institute, Musseling-up: high-value Greenshell™ musselfoods
- > **Dr Simon Loveday** - Massey University, MultiProMo
- > **Dr John Monro** - Plant & Food Research, Kiwi, fruity and friendly

## Head Office

- > **Dr John Smart** - Challenge Director
- > **Professor David Cameron-Smith** - Chief Scientist
- > **Eflamm Allain** - Operations Manager
- > **Polly Hudson** - Senior Communications Advisor
- > **Eleanor Surtida** - Operations Administrator
- > **Eeli Lee** - Operations Administrator



## Aligned Researchers *(Not elsewhere mentioned)*

### AGRESEARCH LTD

Dr Alicia Barnett  
Dr Amy Van Wey Lovatt  
Dr Brendan Haigh  
Dr Cameron Craigie  
Dr Caroline Thum  
Dr Jolon Dyer  
Dr Julie Cakebread  
Dr Julie Dalziel  
Dr Karl Fraser  
Dr Li Day  
Dr Mariza Gomes  
Dr Mark McCann  
Dr Rachel Anderson  
Dr Santanu Deb-Choudhury  
Dr Scott Knowles  
Dr Shalome Bassett  
Dr Stefan Clerens  
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Dr Wayne Young

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