agresearch
āta mātai, mātai whetū

An international perspective

AgResearch asked some of its international partners to share experiences from their science system as a contribution into Te Ara Paerangi Green paper submission.

In particular we had some rich discussions with:

- Ireland: Head of Teagasc - Frank O'Mara. Teagasc is Ireland's state agency providing research, advisory and education in agricultural, horticulture, food, and rural development. Frank O'Mara is past member of AgResearch's International Science Advisory Panel with knowledge of New Zealand science system. He was interviewed recently by Dr Liz Wedderburn about Teagasc. You can listen here https://youtu.be/I5iEgtlRfP8.
- France: INRAE - Bernard Hubert, member of the French Académie, Emeritus Senior scientist at INRAE and Professor at EHESS. Also well understands the CGIAR system that is going through a substantial reform.
- Canada: University of British Columbia – Rickey Yada. He reflected on his experience in CORE equivalent: Science director of Network of Centres of Research Excellence (NCE) - 26 universities and a CRI equivalent involved. Rickey was involved as Dean of Faculty of Agriculture.

AgResearch has Science Advisory Panel with national and international membership that meets regularly during the year. They are available if MBIE wishes to engage further (see Appendix 1 for biographies).

General feedback

Make more transparent the need for the New Zealand science system to be embedded within the global innovation system.	The challenges facing New Zealand need to be put into the context of the global challenges such as climate change, biodiversity loss, food security etc. so we need to strengthen the link between New Zealand science and the global science community. Also clarify how New Zealand will contribute to the global challenges as part of a global innovation system. Local issues will be prioritised; however, New Zealand has to be part of a global coalition.
Build an evaluation system into the design	The system must be evaluated for efficiency and effectiveness as there is a need to demonstrate impact. An evaluation system needs to have different levels, for example, institution, workforce etc. Assessment of research must be balanced between international criteria and local priorities. The New Zealand RSI system must have similar criteria to that used globally e.g., quality. How you undertake research must be done using international criteria such as those used to decide on work force promotions etc. For example, INRAE is evaluated every five years by an independent evaluation body. Every two years INRAE conducts an internal evaluation.
Collaboration	Through research policy; not structure. Willingness to work with others does not depend on the organisation size. It is not a structural issue but a research policy one.
Learn from international lessons	To inform the design, although it is a very different situation. Change takes time. A ten-year timeframe will realise the desired change. An example is the CGIAR system of 15 agriculture-focused research institutes, each with a specific statute linked to the host country. Budget year by year is decided by the supporting countries. 50% comes from Europe, $800M USD from new donors such as the Bill and Melinda Gates foundation. Reforms are targeting greater efficiency with a more centralised approach, such as moving from 15 Boards to one, with three General Managers (Science, Admin, International relations) and three focus areas: genetics, production systems and systems (including environment). This will allow the donors to have one strategy. There have been multiple reforms of the CGIAR system. In 2010 they tried to put the centres together to encourage collaboration, which failed after five years and went back to the separate centres. Now the reform is going back to a centralised model.

Priorities

Priority setting

Use of foresight is very important.

Looking out 30-40 years to plausible scenarios and investigation of pathways. Taking this approach means that participants cannot say that they will continue with what they do currently. It is important to involve many different people in foresighting.

Recommend looking at EU Missions

The European Union has done a good job on prioritising where it sees Europe making a real difference. They have recently identified five high level EU missions that will direct funding and so researchers need to be aware of these.

Ireland

National priorities are set for the Irish food and agricultural sector using Teagasc, Ireland's national research and extension agency. Teagasc is mandated in its Act to set priorities that meet the need of its sectors. Priority setting is done every 10 years and revisited every five years, usually only tweaking the long-term themes.

France

Priority setting is currently dependent on the research organisation. Consultation (not co-design) occurs at the organisation level. Consultation with global partners as per the climate change challenge as well as national partners involved in local issues. The main budget of the organisation is to address short to mid- term outcomes.

National priorities – operational elements

Canadian experience

The Canadian Network of Centres of Excellence defined what they are good at and brought people from outside – for example, some had dealt with consumers or regulatory affairs and some with issues around how media looked at science. These weren't too specific which allowed researchers to take more of an organic approach.

Money to facilitate meetings and networking.

Although it was expensive face to face was critical.

Strong Advisory Board

One example of highly qualified personnel is an Advisory Board comprising: the Chair who is an experienced venture capitalist, the vice chair a former researcher who spun out a company, an assistant deputy minister, the president of an international ingredient company, senior elected members from universities and a PhD student.

Note: Canadian NCEs only have eight years of funding (seven years research; one to wind down). The network then largely disappears once funding finishes.

Funding

Baseline experience

Ireland

For Teagasc, base funding pays for running a certain cohort of staff (130 tenured researchers called principal investigators). It funds around 200 of 400 research programmes from this pool and the rest is earned from competitive bids.

The competitive funding allows them to pay for approximately 130 post-doctorates and contractors and 250 graduate students. The principal investigator can be flexible in capability requirements, with the ability to employ post-doctorates with a different or new capability to help in delivering to new areas. All grants involve collaboration.

Research funded from baseline funds tends to be longer term, including applied farmlet programmes that take five to six years to work through the biological cycle. They must ensure that it all comes together as a cohesive overview of programmes.

Maintaining capabilities through down times

Baseline funding helps when some capability is in the valley and no one is looking to fund suitable work. E.g. social science was in the doldrums for a while and now it is in hot demand. Core funding kept it going through the lulls.

Key challenge–lack of career progression

A key negative is that it doesn't allow for enough career progression opportunities for early career, mobile staff such as post-doctorates.

Prior to COVID-19, Teagasc was looking at a system of progression from entry level through to research fellow and senior research fellow, but this work has stalled. The idea was over time how to wean the post-doctorates off the current system and prepare them for permanent positions.

France

Researchers only need to bid for operational monies; their salaries are covered by the French government. The usual path for research is a PhD followed by three to four years of post-doctorate work followed by a permanent post.

Applied research and knowledge transfer critical

Ireland

Combined research and extension into single organisation (Teagasc) approximately three decades years ago. Research could not be impactful without the organisation having been combined in that way. Extension is publicly funded work 1:1 with 40,000 farmers.

Ireland uses Subject Matter experts as translators. Teagasc also has 35 subject matter specialists who are the translators and brokers between science and extension. They turn the research outputs into key messages for farmers. It is important that researchers and subject matter specialists work together more closely.

Canada

Canada's Network of Centres of Excellence had a Proof-of-Concept Fund as industry wanted ideas proven. Strategic Translation of Applied Research (STAR) had up to $500m to do this translation. The results spun out nine companies and three still exist 10 years later. The Intellectual Property (IP) resided with the researcher.

Other elements of success included:

- Strong communication strategy
- Research exchange and sabbaticals – funded internships with company/industry
- Funds for graduate students and post-doctorate travel
- Co-funding of graduate/post-doctoral fellow visits, e.g. Canada's undergraduate students spend a 4-month period with a company or industry as part of their degree. Students usually get hired once they've finished their qualification.
- Research tax credits for companies, shared IP, funds to facilitate commercialisation, professional development and engaging regulators early.

Government also had key role. Canadian NCEs used their trade commission offices which provided links to big, international, Fortune 500 companies. Initially they set industry leverage at 25% but reduced it to 10% as it was too high for many companies to want to invest.

Workforce and infrastructure

Workforce considerations

France has standardised conditions

All the research organisations have the same status across roles, which allows free movement of staff without losing any privileges, salary etc. The same criteria for performance assessment are used within and between institutes. Part of the organisational budget is set aside to allow for these movements, one- or two-year secondments. The benefits of facilitating movement are that it enables people to change topic and partners, and allows them to be exposed to different parts of the research landscape. The ability to adapt and be flexible is a characteristic required in today's research environment to respond to the different challenges and impactful ways of working.

Ireland

While the diversity of non-Irish PhDs predominating in Teagasc gives vitality there is a real concern about the lack of Irish students wanting to do PhDs.

There are artificial barriers in place that reduces Ireland's ability to attract PhD students, as the starting salary for researchers is tightly controlled in the public sector and so post-doctorate staff may have to reduce their salary to get started. This puts people off.

Infrastructure

Canada

The NCE supported Research and infrastructure repository: In Canada, universities don't really communicate so they found a lot of duplication when they became part of a network. They have put together research and infrastructure repositories to make clear who is doing what and who has what.

Infrastructure

This is always a barrier. Options are lease agreement or demonstration, getting manufacturers to loan and service equipment. It is hoped that this will allow industry to come in and use it.

Appendix 1

AgResearch Science Advisory Panel

Emily Parker (Chair)

Victoria University Wellington New Zealand
Privacy - 9(2)(a)

Emily completed her undergraduate degree in Organic Chemistry at the University of Canterbury, New Zealand, and her PhD in Bio-organic Chemistry at the University of Cambridge. Following a postdoctoral fellow at the University of Cambridge, she returned to New Zealand to Massey University initially, and moved to the University of Canterbury in 2006. In 2017 she moved to Victoria University of Wellington to take up a position as Professor of Chemical Biology within the Ferrier Research Institute.

In 2005 she was awarded the New Zealand Institute of Chemistry Easterfield medal. In 2006 She was awarded the Applied Biosystems Award by the New Zealand Society for Biochemistry and Molecular Biology in 2008, and in 2010 Emily received a National Teaching Award for Sustained Excellence in Tertiary Teaching. She is a Principal Investigator of the Maurice Wilkins Centre for Molecular Biodiscovery. She was Director of the Biomolecular Interaction Centre at the University of Canterbury. Emily is a Director on Manaaki Whenua (Landcare Research) Board and sits on the Governance Group of New Zealand's Biological Heritage National Science Challenge. She acts in an editorial role for several international journals.

Emily's research area spans the areas of Chemistry and Biology, and involves a range of research techniques including natural product synthesis, protein evolution and engineering, and molecular and structural biology. More recently her research group has focused on exploring molecular communication processes and using synthetic biology approaches to manufacture bioactive compounds.

Emily Parker

Henning Steinfeld

Henning Steinfeld

Food and Agriculture Organization (FAO)
Privacy - 9(2)(a)

How to feed a growing and increasingly affluent world population in a way that does not compromise future generations?

Trained as an agricultural economist at the Technical University of Berlin. Visiting scholar at Stanford, and honorary veterinary doctor, Uppsala. Lived and worked in Africa (Ghana, Ethiopia, Zimbabwe, Rwanda).

Long term staff of the Food and Agriculture Organization (FAO). Since 2000, Chief of Livestock Information, Sector Analysis and Policy Branch.

As such, enabled FAO and other stakeholders to be active partners in the policy discourse around livestock, to signal attention to emerging issues and to develop solutions.

Areas covered:

- Approaches to Sustainable Food and Agriculture (Integrated Approaches to Sustainable Food and Agriculture, 2018)
- Environmental issues and in particular climate change (Livestock's Long Shadow, 2006; Tackling Climate Change through Livestock, 2013)
- Emerging diseases and zoonoses (Changing Disease Landscapes, 2013)
- Integrated assessments (Livestock in a Changing Landscape, 2010) and policy making (Livestock in the Balance, 2010)
- Pro-poor livestock policies (Pro-Poor Livestock Policy Initiative, 2000-2012)
- Sector growth and impacts (The Livestock Revolution, 1999)

Methods used:

- Agri-food systems and sustainability
- Spatial and life-cycle analysis (Global Livestock Environment Assessment Model, GLEAM, 2012-)
- Systems analysis (World Livestock Productions Systems, 1996)

Continuous innovation in process management, in the context of institutional change. Also supported intergovernmental processes (FAO's Committee on Agriculture and regional livestock commissions).

Partnerships built:

- The multi-stakeholder Global Agenda for Sustainable Livestock (2011-)
- The multi-stakeholder Livestock Environment Assessment Partnership (LEAP, 2012-)
- Livestock, Environment and Development Initiative (LEAD 1994 to 2008)

Confident presenter and panelist. Conversant in German, English and Italian. Progressing with French and Spanish.

Rickey Y. Yada

University of British Columbia
Privacy - 9(2)

In 2014, Professor Rickey Yada was appointed Dean of the Faculty of Land and Food Systems at the University of British Columbia. Prior to UBC, Dr. Yada was at the University of Guelph where he held numerous leadership roles, including Chair, Department of Food Science, Assistant Vice President Research, Canada Research Chair in Food Protein Structure, and Scientific Director of the Advanced Foods and Materials Network (Networks of Centres of Excellence).

He is, currently, one of the co- editors in chief of Trends in Food Science and Technology as well as serving on the editorial board of several journals.

Dr. Yada serves on several research and industry organisations, some of which include Board of Bioenterprise Inc.; Board of Trustees of the Institute for the Advancement of Food and Nutrition; External Advisory Committee Member – Arrell Food Institute; Member of the Scientific Advisory Panels – Riddet Institute (New Zealand) and AgResearch (New Zealand).

Presently, he serves as the President of the Deans Council of the Faculties of Agriculture, Food and Veterinary Medicine in Canada; is also a Past President and Fellow of the Canadian Institute of Food Science and Technology and the International Academy of the International Union of Food Science and Technology, as well as a Fellow of the Institute of Food Technologists.

Dr. Yada has an honorary DSc from the University of Guelph and was the 2019 Harraways 1867 Visiting Professor, University of Otago, New Zealand.

Rickey Y. Yada

Bronwyn Harch

University of Queensland
Privacy - 9(2)(a)

As Deputy Vice-Chancellor (Research) and Vice-President (Research), Professor Harch is responsible for enhancing the University of Queensland's performance and reputation in research, research training, and research collaboration with external stakeholders, nationally and internationally.

Professor Bronwyn Harch is an applied statistician with 22 years' experience leading and undertaking research focused at the nexus of agricultural and environmental systems. She is passionate about making an impact by generating knowledge, technology and practices that make our world more sustainable, secure and resilient.

Before joining UQ in July 2018, Professor Harch was Executive Director of the Institute for Future Environments at Queensland University of Technology (QUT). She was also the establishment Research Director of the Australian Government Cooperative Research Centre on 'Food Agility' – a transdisciplinary partnership with industry aimed at growing the agrifood sector's comparative advantage through digital transformation. Prior to joining QUT in 2014, Professor Harch worked for 18 years as a researcher and research strategist at the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Professor Harch's own research has focused on the statistical design of landscape-scale sampling protocols and monitoring programs, as well as the statistical modelling of complex systems, particularly agri-environmental systems. She has developed transdisciplinary research; engagement and commercialisation strategies; and partnerships with state and federal governments and their agencies, Australian and multinational companies, and other research organisations.

Professor Harch is a member of Innovation Science Australia (ISA), The Great Barrier Reef Independent Science Panel (ISP), the Australian Plant Phenomics Facility (APPF) Advisory Board, and the Plant Phenotyping and Imaging Research Centre (University of Saskatchewan) International Scientific Advisory Committee (ISAC).

Bronwyn Harch

Dione Payne

Lincoln University
Privacy - 9(2)(a)

For the past fifteen years, Dione has been involved in the research and development of Māori land blocks, particularly in the North Island with a focus on Waikato, Ngāti Tuwharetoa, Ngāti Maniapoto, Te Aupōuri, Ngāti Whatua and Te Atihaunui a Pāpārangi. My areas of interest are Māori land history, Māori productive landscapes, Mahika kai, Mātauraka Māori, and the Māori economy. I am particularly interested in supporting whanau, hapū and iwi to utilise their land and commercial resources. As Assistant Vice-Chancellor (Māori and Pasifika), I host the Mātauraka Māori Theme for redesigning Māori productive landscapes, oversee Vision Mātauranga at Lincoln University and actively support Kaupapa Māori driven rangahau with whānau, hapū and iwi.

Bernard Hubert

French Académie d'Agriculture

Bernard Hubert is a member of the French Académie d'Agriculture, is Emeritus Senior scientist at INRAE and Professor at EHESS. Originally trained as an ecologist, Bernard's work has broadened to focus on the contribution of social sciences to issues relating to the life sciences. He has published 80 papers in Scientific Journals and written 100 book chapters, and has (co-)edited 25 books and supervised 26 PhD theses. He was also the lead author for the "natural resources use regimes" chapter of the "global" report of IAASTD and since 2010 he has chaired the French Commission for International Agricultural Research.

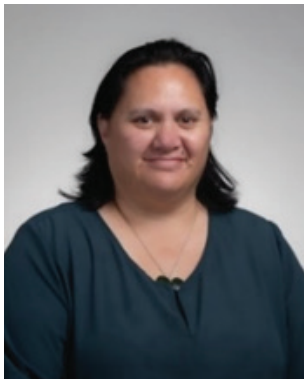
Frank O'Mara

Teagasc

Professor O'Mara is an agricultural scientist and sustainable livestock systems specialist, with over 30 years' experience in technical and senior managerial capacities in Agri-Food research, education and development institutions.

Since 2009, Professor O'Mara has been the Director of Research in Teagasc, leading the Research Directorate. Under his leadership, the number of peer-reviewed publications has increased from 258 in 2008 to 726 in 2020. This has ensured that Teagasc Research has had a major impact on the agri-food sector and government policy over the last decade, supported by national and EU funding, and has facilitated the growth in the Walsh Scholarship programme.

He qualified with a first class honours B.Agr.Sc from University College Dublin in 1987, winning the McGuickian medal, and the Hussey Prize for agricultural economics in his final year. He went on to obtain a PhD from UCD in 1993, completing his doctorate research at Teagasc Moorepark. In his early career, he was a senior lecturer, Associate Professor and researcher in UCD for ten years, specialising in animal nutrition and animal production.



Dione Payne

Bernard Hubert

Frank O'Mara