

Te Ara Paerangi - Future Pathways Submission

Submitter Contact Information

This submission is from Dr Nicky Solomon and John Morgan. Both are happy to be contacted by MBIE about this submission, which reflects the personal views of the submitters and should not be attributed to any other party or institution.

Nicky holds a PhD in Food Science from the University of Otago and a BSc Honours in Chemistry from the University of Canterbury. She is currently working in the innovation part of the RSI system, both as a Business Development Manager with the New Zealand Food Innovation Network and running the regional food and beverage economic development programme in Hawke's Bay, on behalf of the region's five councils. Both roles bring her into contact with numerous SMEs seeking to innovate in the food and beverage space. She has previously worked for a range of large and small businesses including Fonterra, where she was part of a team managing large innovation projects. Nicky is based in Hawke's Bay.

Contact details: Privacy - 9(2)(a)

John Morgan is the Chief Executive Officer of FoodSouth, part of the NZ Food Innovation Network (NZFIN). He has been in a leadership role in NZFIN since its inception in 2010. From 2005 to 2010 John ran a start-up venture spun out of Plant and Food, commercialising a functional food ingredient from barley grain. Prior to this he was Director of Research and Enterprise at The University of Otago. Also of relevance is that whilst in Australia (prior to 2003) John worked on building business cases for centres of research excellence and undertaking commercialisation activity.

Contact details: Privacy - 9(2)(a)

Below we have aligned our submission with the sections and specific questions in the Green Paper. Additionally, we would make the following overarching comments:

1. Aotearoa is blessed with abundant fertile land and water, and a temperate climate. This is the natural advantage that we must protect and leverage in the face of the big challenges such as climate change, pollution and environmental degradation, and global population growth. Our country's wellbeing, past and future, is built upon a food production system that has delivered massive benefit – most recently seen during the challenges created by the Covid pandemic. It is crucial that our food system is identified as a research priority – food production touches all the huge challenges of our time – resilience to climate change, feeding a burgeoning global population and an increasingly insecure local population, improving the health of our soils and waterways, increasing the circularity of our economy – the list of big issues related to and addressed by food is long. We need to do more with less impact, and this provides abundant challenge and opportunity to be addressed as a key research priority. Mana whenua are seeking opportunities to grow value from iwi and hapū-owned land, and these opportunities are often food and beverage related. Equally, mātauranga Māori holds deep and broad knowledge of the food ecosystem, with abundant opportunities to be considered through application of traditional knowledge to the development of products, systems, and processes.
2. It is important to consider the entire system from fundamental research, through application of that research, development of products/processes/services/IP through to scale-up and commercialisation. There is little point investing in one part of the system without a clear line of sight through to how that investment will be realised as benefit to the country. A

more integrated RSI system needs to be more well connected vertically (from fundamental research to commercial application) as well as horizontally via the research priorities, and the funding model should support that integration, ensuring less 'wasted' research – great ideas that are never implemented or commercialised. Public funding should enable research to progress to the point where the intellectual property generated is ready to be commercialised, at which point it can be licensed or sold, rather than the current system where often co-investment in the development of intellectual property means that the IP is never publicly available, and commonly remains unutilised, if the co-funder chooses not to commercialise it.

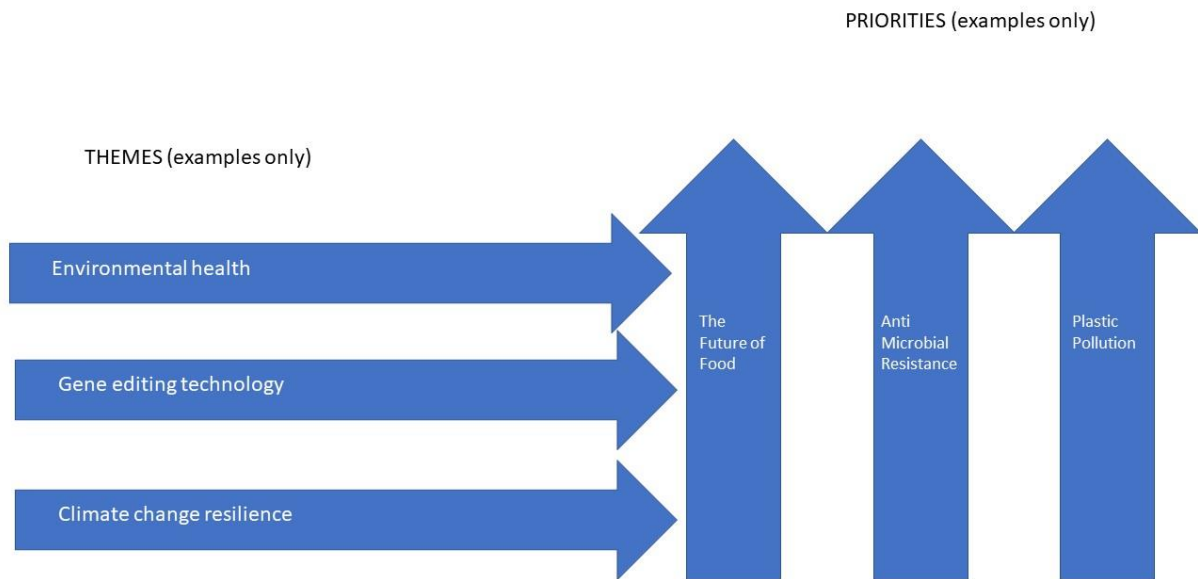
3. The regions tend to be under-served by the RSI system, which could be addressed through a hub-and-spoke model, with 'connectors' in the regions working to bring together centralised RSI providers and regional users of RSI services. This could help support Māori initiatives and aspirations, and support integration of mātauranga Māori into the RSI system. Iwi and hapū are seeking opportunities to generate more value from their land, which is commonly located in the regions, far from the centres where the RSI institutions are located.
4. The future model must ensure less duplication and fragmentation of effort and rationalise governance. There must be separation of granting of funding from delivery of services to avoid the risk of 'cross-selling'.
5. A coherent approach to RSI requires transparency and collaboration within and between the relevant ministries, specifically MBIE and MPI in the food and fibre context. The research priorities should inform relevant activities within these ministries.

Research Priorities

KEY QUESTION 1: What principles could be used to determine the scope and focus of research priorities?

Overarching imperatives such as climate change or environmental health should not be considered research priorities, as these challenges are so all-encompassing that they do not allow meaningful prioritisation. Rather, a set of such imperatives should be articulated and considered as key themes to be addressed within each of the research priorities – this could be described by a matrix with priorities running perpendicular to themes, although not every research priority will intersect each theme. An attempt at illustrating this idea is below.

In terms of scope and focus, research priorities should be large enough in scope that they are likely to have significant impact and benefit, while being specific enough that it is clear to all stakeholders what the priority area actually is. To use examples from the Green Paper, a field of research is probably not specific enough to give the required focus – addressing a problem or capitalising on an opportunity would seem to be more fertile ground as priority-setting principles. Similarly, a specific technology itself probably is not an ideal priority area, but development of a technology or application of a technology to capitalise on an opportunity or to solve a problem would be.



KEY QUESTION 2: A) What principles should guide a national research priority-setting process? B) How can this process best give effect to Te Tiriti?

Research priorities should be determined by assessing the relative benefit to the future health and wealth of Aotearoa of the investment in the priority area. This assessment must include an evaluation of the likelihood that the research can be utilised – that is, research is of most value to the country when it is able to be commercialised or applied. We acknowledge the value and importance of fundamental or blue-sky research and support a portfolio approach where there is investment in fundamental research but aligned with a clear pathway to application or commercialisation for the benefit of the country.

Alignment with our country's strengths should also be an important principle. Resources are limited and should be invested where there will be most impact. We need to align our priorities with our natural advantages, and seek to actively collaborate internationally where appropriate, rather than attempting to do everything.

Priorities should be determined by an expert panel which would include the Prime Minister's Chief Science Advisor plus a range of independent experts with deep knowledge and experience in the RSI sector. The panel should comprise equal representation of Māori and non-Māori, plus one overseas expert. The panel would convene a process enabling input from a cross-section of experts from appropriate industries, sectors, and disciplines, with the panel having ultimate responsibility for decision-making.

Priorities should be reviewed every five to seven years, with an ability to create a new priority should an unexpected crisis or opportunity arise.

KEY QUESTION 3: How should the strategy for each research priority be set and how do we operationalise and implement them?

It is crucial that cumbersome layers of bureaucracy and duplication are avoided. Strategy and governance should be provided primarily by the same expert panel that sets priorities, or if

necessary, with sub-groups of that expert panel that then co-opt on subject-matter experts and stakeholders aligned with the specific priority. Leadership should be independent from strategy-setting and governance and should be provided by the appropriate staff of the core research provider for a particular priority. Maintaining the strategy-setting and governance function for all priorities with one core panel ensures coherence across priorities, and allows for easy identification of synergies, opportunities for collaboration, and potential duplication of effort.

The use of limited liability company structures should be questioned, as directors are required to focus on the best interests of that specific entity rather than the system as a whole. This has likely contributed to creep/overlap as organisations seek to thrive.

Funding

KEY QUESTION 7: How should we determine what constitutes a core function and how should core functions be funded?

There could be a reasonably clear distinction made between research activities and core functions such as maintaining databases, laboratories and other scientific services that are essential but not part of the research system. Essential core functions should receive dedicated funding distinct from the funding to the rest of the RSI system. Effectiveness should be systematically reported on against relevant KPIs and funding levels adapted as our national needs shift.

KEY QUESTION 8: Do you think a base grant funding model will improve stability and resilience for research organisations, and how should we go about designing and implementing such a funding model?

A base funding model has substantial merit, particularly if there is rationalisation within the system, resulting in less duplication and sustainable funding of a finite number of institutions.

One option could be to rationalise research effort in a finite number of large institutions that are well resourced (creating a degree of critical mass) to deliver against the research priorities and have secure base funding for seven to ten years, reviewed periodically according to an activity-based system. There must be an ability to review the impact of the activity regularly, with the development of a culture of moving on quickly if impact cannot be demonstrated. This doesn't mean throwing the baby out with the bathwater but creating a culture that genuinely accepts that moving on quickly is a positive outcome, if there is no traction or the end-use case becomes weak.

The funding model must address the requirement to support the integrated RSI system from discovery through to application and commercialisation and consider sustainable funding models for the parts of the system closer to industry, as well as the research system.

The current model creates an unhealthy competitive situation and a great deal of waste and burden through administrative costs, short-term funding models that require constant applications for funding and requirements to report to multiple masters.

There still needs to be room and capacity for mission-led initiatives to operate which are often cross disciplinary and multi-agency. An example is the New Zealand Food Innovation Network initiative with a value-added, volume to value food and beverage export mission. This type of initiative can be

short or long term and needs capable leadership, resourcing, KPIs (accountability) and room and support to deliver.

Institutions

KEY QUESTION 9: How do we design collaborative, adaptive and agile research institutions that will serve our current and future needs?

The current model is not optimised for national benefit and creates a high administrative burden with multiple governance structures. Commercial imperatives result in the same or very similar pieces of research being carried out by multiple players (both CRIs and universities) with very limited collaboration. It makes sense to consolidate CRIs and to bring expertise together by discipline.

One possible model is that multidisciplinary teams are formed aligned with research priorities and the projects that are undertaken according to those priorities, with the teams selected across the various (rationalised) CRIs for the course of the project. As projects finish and new projects begin teams can be reshaped which will result in cross-fertilisation of ideas and provide opportunities for talent development.

The operational form of our research institutions should place the good of Aotearoa-Inc front and centre, ahead of the good of any specific industry, discipline, or organisation. Open-access infrastructure and public good IP creation are crucial.

KEY QUESTION 13: How do we better support knowledge exchange and impact generation? What should be the role of research institutions in transferring knowledge to operational environments and technologies?

The traditional pipeline model, as mentioned in the Green Paper, involves idea generation within a research organisation, research and development activity, and then scale-up and commercialisation – assuming that an end-user can be found and that the requisite infrastructure and support are in place to enable that. This linear model has its flaws, as identified in the Green Paper. Impactful research also requires strong links to the end-user, with the system being able to respond to challenges and opportunities identified at that end of the pipeline. The current system is confusing and cumbersome for end-users to navigate, with multiple CRIs and universities playing in the same space and often ‘selling’ their services or expertise, rather than responding to the need. Ultimately, a healthy RSI system will have space for blue-sky research on ideas generated by researchers but will be strongly and unambiguously connected to identified needs and end-users. Investments in blue-sky research should be accompanied by considerations of what will be required downstream to implement/commercialise the research should it be fruitful. Requirements could include infrastructure investment, regulatory change or addressing other barriers to commercialisation.

There are always practical barriers to commercialising or implementing the outcomes of research and development, and overcoming these barriers is often outside the scope of a research provider. It is important that the scale-up and commercialisation segment of the system is appropriately resourced and supported to enable implementation and achieve impact.

Intellectual property capture, management, sharing, and commercialisation needs to be more coordinated and coherent. Within the existing system there are smart people, systems, and processes, but this part of the system also suffers from fragmentation and competitive imperatives. For the good of the country, bringing together the IP management and sharing function to achieve

critical mass and reduce the detrimental consequences of competition would be beneficial. This could be in a stand-alone agency that sits across all IP-generating institutions.

Infrastructure

KEY QUESTION 17: How do we support sustainable, efficient, and enabling investment in research infrastructure?

Given New Zealand's size and limitations of resource, designing a system to eliminate duplication of infrastructure is crucial. Creating critical mass and designing in collaboration will be essential to efficient and sustainable infrastructure investment. There currently seems to be little in the way of NZ-wide oversight of infrastructure investment in the RSI system, which is obviously required.

Infrastructure investments should be aligned to research priorities, and infrastructure considerations should include requirement to scale-up and implement research outcomes. Funding should ensure that infrastructure can be updated, upgraded and adapted to respond to strategic requirements. Open-access facilities with part-payment by users for scale-up and commercialisation activities, such as those currently forming the NZ Food Innovation Network, are extremely valuable.