Hon Dr Megan Woods
Minister of Research, Science and Innovation
Parliament Building
Wellington

Copy:
Mat Bartholomew
Director Aquaculture
Ministry of Primary Industries

By email to FuturePathways@mbie.govt.nz

Dear Ms Woods,

Te Ara Paerangi – Future Pathways – Submission from the Marine Farming Association

Thank you for the opportunity to provide a submission on the Te Ara Paerangi Future Pathways Green Paper 2021[1]. This submission is provided by the Marine Farming Association (MFA).

MFA is an industry representative body for marine farming interests in Te Tau Ihu (top of the South Island). Our members include individual Māori and non- Māori marine farmers, iwi organisations and corporates[2].

This submission is submitted by MFA as a public document.

We are a regional association. The peak industry body for aquaculture in New Zealand is Aquaculture New Zealand (AQNZ)[3]. MFA also supports the AQNZ submission.

The reason why we are making this submission is because we care deeply about publicly funded science for the good of our industry. Impactful scientific research is very important to the future success of our industry and for our ability to contribute to the wealth of our nation and to the well-being of our people.

In New Zealand aquaculture is a $600 million dollar industry[4]. It supplies native green-lipped mussels (Perna canaliculus), one of the least expensive forms of essential protein to supermarkets around the country. We also grow high-value exports such as mussels, oysters and salmon that are sold around the world by New Zealand aquaculture enterprises. The majority of New Zealand aquaculture production occurs in a single region, Te Tau Ihu, where we are the representative aquaculture industry body.

Many of our aquaculture enterprises are expressly Māori in both ownership and culture. The ready availability of our farm-grown produce reduces pressure on natural sources. Our products are being turned into nutraceuticals that directly help New Zealanders suffering from arthritis and other ailments.

Our industry is both a science success story and a science failure. Through the application of science we are developing innovative new products, ranging from growing and commercialising other native species, through to developing new skin treatments from what would otherwise be waste streams.

[1] MBIE, *Te Ara Paerangi Future Pathways Green Paper*.
[2] Further information on the MFA can be found at https://www.marinefarming.co.nz/
[3] Further information on AQNZ can be found at https://www.aquaculture.org.nz/
[4] Ministry of Primary Industries, "Aquaculture Strategy."

At the same time public science is failing our industry. In our view the goal of publicly funded science needs to change as set out below.

1. Our Submission in Summary

In summary our submission is:

1. **A Broken System.** The existing research funding system is fundamentally flawed. Impactful research is very difficult to get funded and industry-led research is regularly passed over. The overall approach to government funded science and innovation is also naïve, leading to vital and impactful research being passed over in favour of novelties.
2. **Prioritise by Impact.** Impactful research needs to be at the heart of design of Te Ara Paerangi/Future Pathways. Business sectors need much more influence on the research conducted in their name to get vital research undertaken that connects better with needs and is more impactful as a result.
3. **Green Paper fails to recognise and address the key issue.** The inward focus of the Green Paper, and lack of recognition of end users as having meaningful inputs, illustrates what is wrong with the system.

We expand on these three points below.

2. A Broken System

As an industry we participate in and try to make best use of the avenues of support for scientific research. This works well where benefits can be captured by the party commissioning the research. An example is the SpatNZ hatchery in Nelson[5], which was funded by both government research and by Sanford. While the single hatchery only provides for a small proportion of the spat supply to the industry at present, SpatNZ provides an alternative source of spat supply and offers superior genetics. This points the way to the future. Representing the industry local to the hatchery, we're grateful for the support of government and for the good work of the science institutes that have supported SpatNZ and other scientific initiatives.

However, many of the issues faced by the aquaculture industry are not amenable to a single party capturing the benefits. For instance, the mussel industry has many issues around wild caught spat, which provide over 80% of export mussels. Questions include:

- Why has the amount wild caught mussel spat in the Pelorus Sounds declined greatly over the years?
- How can we markedly improve spat retention?
- Why do spat die off events occur?

These are hard questions. One of the problems is that we don't know how much research is needed to answer them. We doubt that the answers to any of these questions will lead to patentable inventions or to intellectual property that can be capitalised onto the balance sheet or a crown research institute. In the face of such uncertainties, no individual party will capture enough of the benefits to be worthwhile funding it themselves, so it is not funded as a private research project.

Yet these fundamental questions need to be answered for the good of our industry. If we could answer these questions, we could increase productivity from the same footprint. That would generate a win-win for both our industry directly and for New Zealand overall through more jobs, wages, taxes and economic activity.

[5] http://www.spatnz.co.nz/#our-story-1

We consider the current funding model to be naïve. It assumes that any applied research will be captured by the party commissioning the research, so they should pay the bulk of it. That assumption fails to recognise the need for *industry good* research – which addresses questions such as those posed above.

Recognising this, our industry has pulled together and applied for research funding. We have set our MFA research priorities and co-ordinated with AQNZ so that they align and shared them with research agencies. When no suitable research materialised, then with our CRI research providers and other research agencies, we crafted detailed proposals to MBIE for government funding.

"Not enough science challenge" we were told when our proposal was rejected the first time. Meanwhile vastly expensive projects of great novelty (and therefore "excellence") were funded with little or no connection to our industry's vital science research objectives.

So, we reformulated our funding proposal and resubmitted in the following year. This time we passed the "excellence" test, but still were not funded. "We've already over-allocated in this sector" we were told. How galling!

So, our vital industry good scientific research still isn't getting done because the system has chosen to fund novelties instead. That's a broken science funding system, if ever there was one.

We're all for pursuing novel ideas. As an industry we do it all the time. But pursuit of novelties can't come at the expense of meeting the vital research needs of our industry.

It is government policy to grow the aquaculture industry in NZ to be a powerhouse of the national economy, generating $3 billion in annual sales by 2035[6]. We can do it, but we need the support of impactful research funded by government that meets the real needs of our industry.

The public science funding system needs to meet the vital needs of the industry that it serves. Otherwise the government's $3 billion revenue goal is just a dream.

MFA members want to be successful and want to contribute more to the prosperity of New Zealand and to the well-being of our people, both Māori and non-Māori. 95% of aquaculture produce is exported and those export revenues help to pay for the medicines, vaccines and other imports that are vital to our wellbeing as a nation.

We emphasise that our issue is not with our research providers. They are capable, competent and engaged. Our problem is with the broken science system. Misallocation of funding towards novelties framed as 'scientific stretch' in the pursuit of "excellence" is a major part of the problem.

It's not just the funding, but also the other incentives. We're told that the research to meet our needs is unlikely to generate many papers in leading scientific journals. In a system that rewards pursuit of "excellence" alone, research meeting our needs may not meet the excellence goals that are demanded by MBIE and by internal governors, who crave and reward novelty. So, research institutes largely do not pursue the well-communicated vital goals of industry, as the system drives them to pursue novelties – so as to achieve one-dimensional metrics of excellence.

It's not just corporate and pakeha marine farmers who are losing out by this misallocation of publicly funded science effort. Iwi, pan-iwi enterprises, and individual Māori marine farmers are losing out too. They are not earning returns as they should from their investments and are creating fewer meaningful jobs for their peoples.

[6] Ministry of Primary Industries, "Aquaculture Strategy."

3. Need to Prioritise Research by Impact

Productivity New Zealand describes New Zealand as a small advanced economy (SAE). Other SAE include Ireland, Singapore, Israel, Denmark, Sweden and Finland. SAE are not just a medium sized advanced economy scaled down, but are qualitatively different[7].

In our view, the New Zealand government should prioritise research along the lines of the Irish model, with a New Zealand twist that gives effect to Te Tiriti. The Irish model, published by the Irish public science funding body, Science Foundation Ireland (SFI) in 2013 was called *Agenda 2020 Excellence and Impact*[8]. It is easy to understand:

> *Agenda 2020 begins by setting out our vision of a 'preferred future', in which Ireland in 2020 is the best country in the world for scientific research excellence and impact. By this we mean that the scientific research carried out here:*
>
> - *powers an innovative and enterprising economy;*
> - *creates high-value jobs;*
> - *attracts, develops and nurtures businesses, scientists and talented people; and is connected and respected internationally.*
>
> *In this vision, Ireland is the best country in which to develop effective partnerships between academia, business, philanthropy and government. It is a country in which the public is engaged with scientific enterprise, and educated and equipped to debate and evaluate the issues that will increasingly arise with scientific advances.*

What's different about Agenda 2020 is that partnerships with business and other end users are at the core of it. In contrast the Green Paper fails to even identify business as being relevant in its research model (Figure 1).

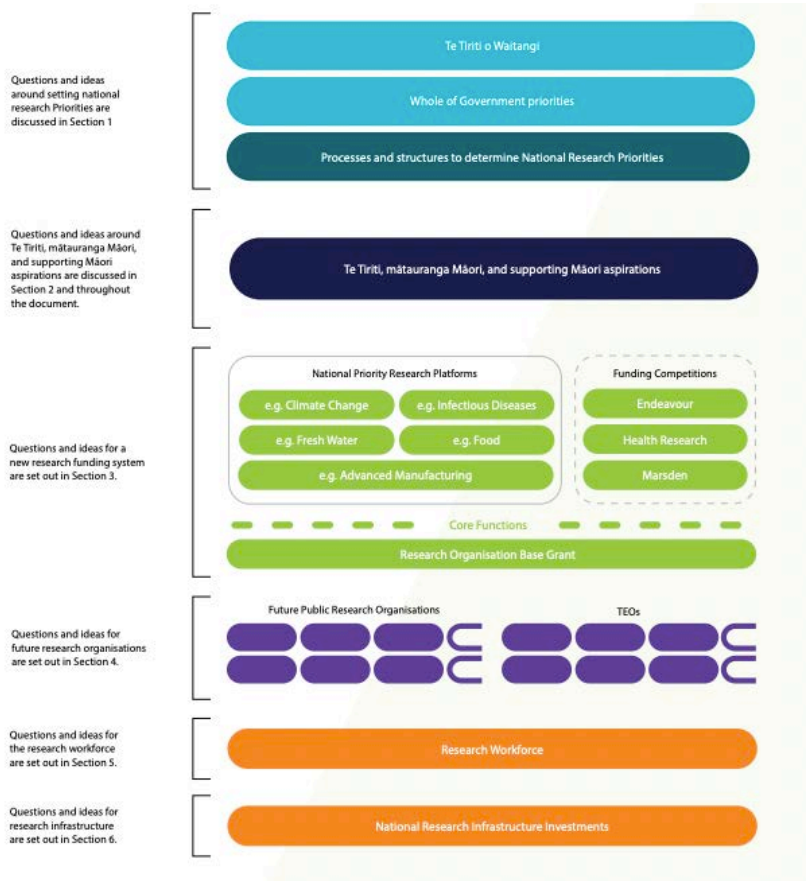

Figure 1 - Research System Model Presented in Green Paper[9]

[7] New Zealand Productivity Commission, *New Zealand Firms: Reaching for the Frontier*.
[8] Science Foundation Ireland, "Agenda 2020: Excellence and Impact."
[9] MBIE, *Te Ara Paerangi Future Pathways Green Paper*.

Meanwhile, in Ireland, the focus on impactful science research continues. The SFI mission, as set out in the 2025 SFI strategy is:

> *Science Foundation Ireland funds excellent and impactful research and talent, and shapes the future of Ireland through anticipating what's next and widening engagement and collaboration.*[10]

Focussing on impact is not a novel idea. A position paper prepared by MBIE in 2019[11] advocated that more attention is paid to research impact. However, we believe that the New Zealand Government needs to go much further than the MBIE paper, and to put impact and relationships with end users at the core of scientific research prioritisation, as the Irish have been doing for the last decade.

4. Green Paper fails to recognise the key issues.

The Green Paper is out of touch with how wealth and wellbeing are created. The paper has been prepared assuming a provider-centric system rather than one that collaborates with the community of users. This illustrates a fundamental problem with the current system.

Where both New Zealand researchers and New Zealand industry are exceptional is in their failure to connect with each other (Figure 2). We don't blame the people: they are all trying to do their best within the system and are similar to researchers found anywhere. In fact, most researchers either come from overseas or have worked there. What's different is that our funding system that sets the wrong incentives, pursuing novelties in the name of excellence, rather than being impactful.

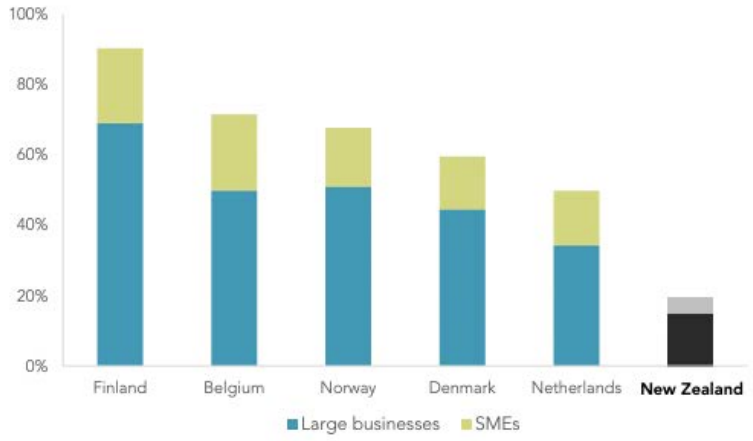

Figure 2 Percentage of innovating business collaborating with researchers 2012-14[12]

The Green Paper perpetuates this state of affairs by failing to even recognise business as end-users who turn research into innovation (Figure 1).

The majority of the Green Paper is devoted to the structure and base-grant funding of the research institutions. In our view this is an order of magnitude less important than how research providers are directed, funded and rewarded. Consequently, the Green Paper has a largely inward focus – academics talking to academics about how to fund academic research.

This provider-centric focus is a microcosm of what's wrong with the system. It's looking at the problem from the wrong end of the microscope. The starting point for any review of publicly funded research should be to ask those who use the research about what they need. That is - to be user-led.

[10] Science Foundation Ireland, "Shaping Our Future: Science Foundation Ireland Strategy 2025." p.16.
[11] MBIE, "The Impact of Reseach Position Paper."
[12] Source: New Zealand Productivity Commission, *New Zealand Firms: Reaching for the Frontier*. Figure 6.6.

Research by the New Zealand Productivity Commission has found that Māori firms are more likely to be "frontier firms" – export oriented with exceptional levels of performance. The Commission's report *New Zealand firms: Reaching for the Frontier"* (Final report April 2021), comments that:

> *…. there is a pressing need for the Government to test whether its policies and rules are holding back the development and growth of innovative Māori firms. These kaupapa Māori firms are distinctive for having long-term horizons and managing multiple stakeholders and objectives, and offer valuable lessons for other New Zealand businesses*[13]

We agree. Our Māori members are amongst our most far-sighted, innovative and export-oriented aquaculture enterprises. Public policy that fails to deliver vital industry-good research for the aquaculture industry is also stunting Māori aquaculture.

5. Conclusion

In conclusion, the New Zealand system of public research funding focuses on novelty in the name of excellence and consequently is wasteful, generating little impact. Meanwhile industries that are crying out for *industry good* research are ignored.

The review is timely. This dysfunctional science funding system needs reform. However, the Green Paper, with its focus on base funding and CRI structure misses the main point. The Green Paper illustrates that a science research funding review that is led from within the existing provider-centric system will inevitably end up focussing on the wrong things. Reform and governance of public science research needs to be user-led, and business sectors ought to have a strong say in that through iwi, regional and national industry associations.

Thank you for the opportunity to make this submission. If you have any queries, please contact Kevin Oldham (Privacy - 9(2)(a)).

Yours faithfully
Marine Farming Association



Jono Large	Kevin Oldham	Ned Wells
President	*Chair – Research Development and Technology Subcommittee*	*General Manager*

References

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[13] New Zealand Productivity Commission.