



New Zealand Association of Scientists: Te Ara Paerangi Future Pathways submission

Who We Are

This submission to the Green Paper (GP) consultation associated with Te Ara Paerangi Future Pathways is from the **New Zealand Association of Scientists**. We are an independent body that stands for and advocates for science and scientists in New Zealand, made up of a wide cross-section of the New Zealand science community, including physical, natural, mathematical and social scientists as well as members with an interest in science education, policy, communication and the social impact of science and technology.

Development & Consultation

The NZAS has developed this submission as a result of input solicited from our wider membership at our annual conference (in November 2021), following our '[Renewing the Science System](#)' workstream in 2020. Through a cooperative development process, we [corresponded with other groups writing submissions](#), many of which we cite in the rest of this submission. Our leadership has taken a combined interest with Te Pūnaha Matatini to prepare short working papers, [archived online](#), which we draw on to support the high-level recommendations we present. We feel it is of the utmost importance that reform of our research, science, and innovation (RSI) system be grounded in both the needs of our research community and the history of prior reform - including good suggestions which were not implemented at previous opportunities. In that light, we have also worked to create a publicly-accessible record of discussion (linked above), and we urge MBIE to support this through their processes as well.

As background, we confirm that we consider Aotearoa's research system to be globally unique, performing adequately in many areas, and under clear stress. The most profound effects are on Early Career Researchers (ECRs) but continue throughout research careers, particularly for those supporting connectivity, infrastructure, and cross-sectoral or cross-disciplinary links. Te Ara Paerangi Future Pathways represents a once in 30 year opportunity for transformation, to make institutions, structures and funding more compatible with today's workforce, our national directions including embrace Te Tiriti o Waitangi, and the many challenges requiring the best research available.

We are convinced that deep analysis of our research system, and comparison to other, better functioning national systems is needed. We have made a serious effort, jointly with Te Pūnaha Matatini to undertake such an analysis represented by the [working paper briefs](#). We focus on

targets with transformation potential, ways of sequencing self-organising transformational change, and frameworks of principles that can guide success. Our effort has provided a significant beginning for understanding how to transform the system, and where to begin, leading to recommendations representing NZAS Council's view.

Main Points

We thank the Ministers and MBIE for launching Te Ara Paerangi and support its intent. We encourage steadfast pursuit through this process of the RSI system Aotearoa deserves. Within the process, major innovations can be found including our uniquely attractive people-centred base funding proposal,¹ which avoids the pitfalls of full tenure and full contestability system.

Our primary recommendations emphasise rebuilding the well-being and capacity of the research workforce, and trust between researchers, research institutions, and our society. Our submission focuses on the following overarching three points which we believe could provide the first steps for transformative change:

1. Rebalance hypercompetition² and contestability through base funding directly linked to researchers, enabling self-organising transformation.
2. Repair workforce stress³ by supporting fellowships⁴ and disincentivising the over-production of PhDs^{5,6} not well-matched to workforce needs.
3. Reforge a compact⁷ between the RSI system and society that amplifies trust and reciprocity within Pākehā and Māori foundations of our multicultural society, building responsiveness toward important missions, from climate change to Te Tiriti.

Underneath the overarching recommendations, we further define key steps to transform the RSI system from its current state to the level of performance that Aotearoa New Zealand and its research workforce deserves.

1) Rebalance hypercompetition and contestability through base funding directly linked to researchers, enabling self-organising transformation.

- A. Use base funding valuing people in a direct way (20-50% of experience-adjusted salaries) as the keystone stabilising the long-standing problems in the RSI sector, by focussing on the workforce, and specific needs such as infrastructure, collections and databases, and Te Tiriti obligations¹ (**Urgent**).
- B. Design base funding which focuses on recreating a level playing field across providers,^{2,8} including independent and Māori research organisations, with permeable boundaries that enable mobility and collaboration (**Urgent**).
- C. Apply the Nobel-prize winning principles defined by Elinor Ostrom^{9,10} to solve current dilemmas and rebuild trust, including a renewed compact between 'science and society' – enabling collective management of common research resources and collaboration.

- D. Phase out hypercompetitive funding structures² and replace them with mechanisms that direct investigators toward common collaborative goals and missions that also attract and support postdoctoral fellows.
- E. Monitor desired outcomes including improved researcher mobility and connectivity across research institutions, society and business,¹¹ and incentivised sharing and cataloging of research outputs to populate the national Research Information System (NZRIS).¹

2) Repair workforce stress by supporting fellowships and disincentivising the over-production of PhDs not well-matched to workforce needs.

- F. Disincentivise the overproduction of PhDs^{5,6} through living stipend/wage expectations, and the rebalancing of internationally anomalous overheads (in excess of 100%)¹² on the PhD-qualified workforce participating in government-funded research (**Urgent**).
- G. Reduce the extreme pressure on the workforce with a mixture of base funding and targeted fellowships, with competitive grants to fill gaps, reducing issues induced by hypercompetitive funding systems² (**Urgent**).
- H. Develop anticipatory innovation governance to ensure career pathways and training match policy targets such as R&D reaching 2% of GDP and do not reproduce the current PhD-qualified Business R&D skills gap (4300 FTE)¹¹, and permeate the science-policy interface.
- I. Target the connectivity and skills gap between business and research institutions with funding and fellowships for early career pathways and labour mobility, including mid/late career knowledge sharing and mentoring.

3) Reforge a compact between the RSI system and society that amplifies trust and reciprocity within Pākehā and Māori foundations of our multicultural society, building responsiveness toward important missions, from climate change to Te Tiriti.

- J. Recognition of shared values underpinning well-being should be a first step in developing collaborations and research missions.
- K. Develop and support an RSI commission or process to produce and implement a national framework of ethics for building trust and capacity in RSI, as part of a Compact between RSI and society fit for the challenges of the 21st century.
- L. Establish cultural competency for the RSI workforce to engage appropriately with Māori culture, institutions, Te Tiriti and other cultures (most importantly Pacific cultures), to fuel a positive spiral from cycles of trust, reciprocity, and reputation building.¹³
- M. Design a system that allows self-organisation and trust to actively solve problems of prioritisation, Te Tiriti and wider diversity issues through shared values and mission, across a series of nodes and tiers that are responsive to the types of major shocks Aotearoa has experienced in recent years, and will experience in the future.^{8,9}
- N. Establish sufficient independent science policy capacity and system data to better monitor and shape the RSI system to optimise returns on R&D and RSI expenditure, both in business and for society as a whole.

What to avoid: Before briefly highlighting our analysis and evidence, its scope, and replies to specific consultation questions, we emphasise what we hope the Future Pathways process does not add/allow to remain in the RSI:

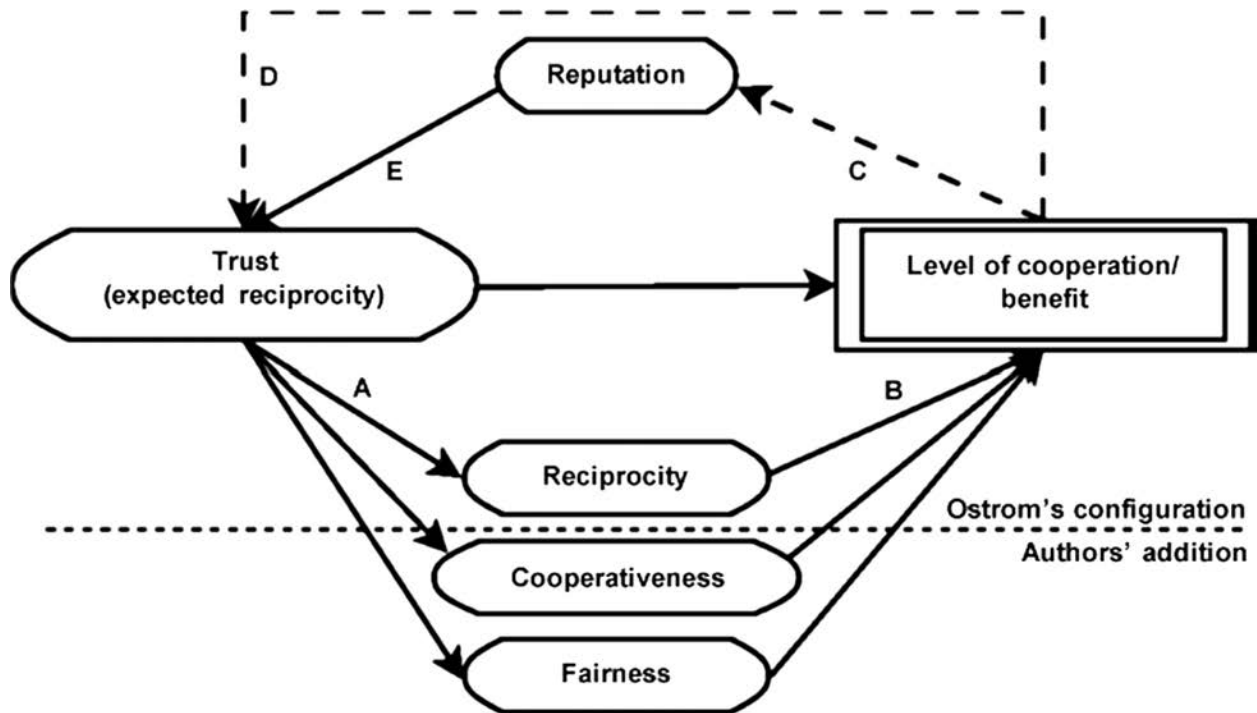
- Proposals for new power structures or immediate restructurings of institutions and governance that do not change the underlying incentives for competition rather than collaboration between institutions.
- Proposals for hierarchical systems which interfere with the ability of researchers to self-organise for common good or enterprise, following examples in democracies or te Ao Māori, where a diversity of approaches often proves most resilient and adaptive.
- Panaceas that ignore, blur or oversimplify the multiple tiers and nodes of our Earth - our cultures, our regions, the different disciplines and missions of research - as well as the connections and intermediaries that link them across barriers and scales.
- Solutions which fail to prioritise the wellbeing of early career researchers, who represent the future diversity we need to see in our RSI system but are currently filtered out by >100% overheads¹² and hypercompetition.²

Responses to the Consultation Questions

Ngā Whakaarotau Rangahau | Research Priorities

1. What principles could be used to determine the scope and focus of national research Priorities?

We suggest based on analysis and joint observations from MBIE's consultations, that prioritisation is best solved by research communities with improved principles for cooperation with wider stakeholders and government. keystones of success are likely to include treating the nation's research system as a common resource aiming to amplify a positive loop of trust, reciprocity and reputation. This implies the application of Ostrom's eight principles observed to achieve this purpose, while considering how to reforge a compact between 'science and society'. To achieve this, we argue that better supporting the well being of the research workforce comes first. A research workforce that is representative of and better connected to our society, through many communities, and is able to voice how research relates to shared values. We warn that making structural changes prior to taking these steps could risk repeating cycles of reorganisation without improving confidence of Ministers, Government, or the public in the research system's ability to respond to major challenges. New Zealand's history of science applications contains a minefield of examples to learn from, of the sort Ostrom used to understand how to overcome dilemmas in common resource problems. We suggest that the history of contestability and institutional arrangements has undermined trust and reputation in the system shown below from Ostrom (2009)¹⁴, causing the exchange that should result in prioritisation between business, government and the RSI system to go poorly. Building trust in the RSI system that enable prioritisation won't be achieved by taking shortcuts around Ostrom eight principles (or a very similar framework) and taking particular recognition of shared values and Te Tiriti.



2. What principles should guide a national research Priority-setting process and how can the process best give effect to Te Tiriti?

A first step in enabling a process we envision is using Ostrom's principles to set up safe and effective spaces for Māori participation within both national institutions and in spaces that are kaupapa Māori. Māori must be able to set priorities, which must also be allowed to differ across iwi and hapū thus reflecting regional aspirations.

3. How should the strategy for each national research Priority be set and how do we operationalise them?

The process outlined above (1) creates a self-organisation to build an RSI system that is responsive, trusted and effective. There are no shortcuts.

Te Tiriti, Mātauranga Māori Me Ngā Wawata O Te Māori |
Te Tiriti, Mātauranga Māori, Aspirations

4. How would you like to be engaged?

As a representative organisation for New Zealand scientists, our membership includes Māori researchers. We will continue to represent the views of Māori in our organisation through-out the ongoing Te Ara Paerangi process. We believe we can offer support on developing cultural competency for non-Māori researchers,¹³ which we see as badly needed (see recommendation L), which will help communicate Māori aspirations to our non-Māori membership. In addition, we again note the clarity of our analysis that there is no one-size-fits-all panacea to collaboration and inclusion. We aim to support Māori engagement, as a trusted intermediary working across disciplines and the policy interface where possible. We encourage approaches that provide support for multiple compartments, permeable boundaries and sharing of toolkits.

5. What are your thoughts on how to enable and protect mātauranga Māori in the research system?

For mātauranga Māori to be properly enabled and protected, Māori researchers and research must be normalised as part of the science system. More Māori need to be intentionally resourced into the science system. Passive approaches to increasing the size of the Māori research workforce have not significantly grown the number of Māori active in the science system for multiple decades. The number of Māori experts in both science and Mātauranga Māori needs to be significantly increased. However, it should not be expected that a single individual has capability in both areas, roles for each must be independently created and filled.

Oversight entities, such as a commissioners office and 'Chief Mātauranga advisors', could be considered to act as the kaitiaki of mātauranga Māori in the science system. This role would also provide an ideal vehicle to better guide the implementation of policy such as Vision Mātauranga. Such entities would have dual responsibilities to Māori and the science system, but should be Māori controlled. And, again enhancing cultural competency for non-Māori researchers plays an important role.¹³

6. What are your thoughts on regionally based Māori knowledge hubs?

Regional Māori knowledge hubs are potentially an excellent idea, but would need to be given the mandate to operate according to Te Ao Māori in order to work properly (for Māori). Doing so appears consistent with our recommendation to use Ostrom's principles. Such hubs could be a critical avenue to protect and champion regional Mātauranga, and also provide a venue to lead regionally important research collaborations. Such a vehicle for collaboration could significantly streamline collaboration between the traditional science system and Te Ao Maori.

We believe funding to regions will enhance stability and also offer options to Māori ECRs who wish to work in their home regions or are looking for affordable housing - part of addressing workforce wellbeing. We also note that US economic literature found that agricultural research within university campuses dispersed into rural areas had social rates of return on the order of 60%. Similar or greater benefits are plausible for the Māori economy.

Te Tuku Pūtea | Funding

7. How should we decide what constitutes a core function and how do we fund them?

All researchers do or should perform some core functions, but some such as natural hazard monitoring and response are mission critical for our nation. Achieving fair and equitable support should be possible in a democracy, and our recommendations provide a self-organising pathway to achieve far more reliably than the present system. Critical in applying Ostrom's principles, for example, are the requirements that researchers must have access to decision-making processes regarding funding, and be able to seek resolution if they disagree with decisions.

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?

In short, yes. Please see our recommendations A-G.¹

Ngā Hinonga | Institutions

9. How do we design collaborative, adaptive and agile research institutions that will serve current and future needs?

We believe the RSI system should use Ostrom's 8 principles to redesign the purpose, governance and management of institutions so they can be vibrant and collaborative internally and externally, by valuing and building their workforce.^{8,9} A people-focused base funding system¹ would allow much of institutional redesign to self-organise over time, although some initial consideration of scales of interactivity and appropriability of commercial or confidential information will be beneficial. Ultimately, stability is key to agility, as institutions and individuals who do not have to fight to survive have the capacity to change course. See recommendations A-E.

10. How can institutions be designed to better support capability, skills and workforce development?

We believe the solutions for this are:

- Make base grants fund people directly to achieve this at 20-50% of experience adjusted salaries.^{1,12}
- Reduce inefficient contracting that cripples connectivity.⁸
- Require annual or real time activity updates that populate NZRIS and provide social incentives.

Above all, current levels of hypercompetitiveness² should be avoided, as should the overproduction of PhDs who have no path to future research (vs. the employment of people in the research system at all levels). All our recommendations ultimately support these goals.

11. How should we make decisions on large property and capital investments under a more coordinated approach?

We believe the RSI system should take a collaborative, national approach to supporting infrastructure and its people. This should emerge from both national priorities and self-organisation of the research system by researchers, guiding prioritisation at lower levels. Additionally, independent science policy capacity and better RSI system data will help target investment. See recommendations C, M and N.

12. How do we design Te Tiriti-enabled institutions?

We believe base funding would allow Māori researchers to be funded directly at the scale that is needed, so they can be mobile to work within (or with) iwi/hapū organisations, wānanga, etc as well as the research system (see recommendations A and B). We also believe there is a strong need for cultural competency training for non-Māori researchers (recommendation L, and [attached brief](#)).

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

We believe the greatest source of knowledge exchange and impact generation is labour mobility between the different parts of the research sector. This should be supported through anticipatory innovation governments, disincentivisation of use of PhDs as a transitory workforce, and cultural competency. See recommendations F, H, I, and L.

Te Hunga Mahi Rangahau | Workforce

14. How should we include workforce considerations in the design of national research Priorities?

Priorities cannot be carried out without a workforce to support them, and must acknowledge the workforce we have - researchers are not quickly replaceable widgets. National research priorities should be designed in ways that support stable careers and long-term projects, with separation between ongoing/long-term priorities and short-term needs. They should also be based on shared values and allow for a strong degree of self-organisation and trust. See recommendations D, F, H, J, and M.

15. What impact would a base grant have on the research workforce?

We strongly believe base funding of individual researchers¹ would directly support and empower the workforce to do good work and show it – by populating NZRIS with useful information, and connecting people and knowledge so 'NZ inc' can nationally maximise its appropriation of its own RS&T activity (see recommendations A-E, and G). Social/community mana- based incentives should be used to incentivise good science culture that maintains the attractiveness of careers.

16. How do we design new funding mechanisms that strongly focus on workforce outcomes?

New funding mechanisms should look to phase out hypercompetitive funding structures (recommendation D) and use base funding to promote collaboration and a degree of career stability (recommendations A, B, and C).

Te Hanganga Rangahau | Infrastructure

17. How do we support sustainable, efficient and enabling investment in research infrastructure?

Research infrastructure can best be supported by:

- funding good people who form a community around shared infrastructure (see recommendations M, J, and C),
- funding infrastructure in the national interest so institutions can not act as gatekeepers (see recommendations C, D, and E), and
- funding infrastructure into regions and future focused locations where young scientists can afford to live.

We note that 'infrastructure' in our view includes tools and systems that support collaboration and cooperation, as well as physical equipment, collections, and databases.

References

1. Baisden. 3. Designing a Base Funding to Support the Research Workforce. Published online March 2022. doi:10.5281/zenodo.6324721
2. Patel S, Baisden T, Stewart L, Yee G. 5. *Hypercompetition: Observations and Remedies*. Zenodo; 2022. doi:10.5281/zenodo.6354888
3. Lee KL. Precarity in academia is tied to the contestable funding model. Published online March 13, 2022. doi:10.5281/zenodo.6350640
4. Truax O. Proposal to develop a government postdoctoral scheme in Aotearoa New Zealand. Published online March 8, 2022. doi:10.5281/zenodo.6336190
5. Patel S, Yee G, Baisden WT. *The Grim Realities of a Doctoral Student in Aotearoa*. Zenodo; 2022. doi:10.5281/zenodo.6348121
6. Stewart LC, Baisden WT. *Postgraduate Students and the Aotearoa New Zealand Research Workforce*. Zenodo; 2022. doi:10.5281/zenodo.6342486
7. Baisden T. *Understanding and Reforging the “Compact Between Science and Society.”* Zenodo; 2022. doi:10.5281/zenodo.6354908
8. Baisden WT. 4. *Building Responsive Science and Innovation*. Zenodo; 2022. doi:10.5281/zenodo.6354852
9. Baisden WT. 2. A New Paradigm to Deliver Prioritisation: Towards Collaboration. Published online February 2022. doi:10.5281/zenodo.6300595
10. Baisden WT, Stewart L, Stevens C, Wehi P, McDonald F. Lead Brief: Addressing Te Ara Paerangi Future Pathways to Deliver Transformation. Published online February 2022. doi:10.5281/zenodo.5952846
11. Baisden WT. 8. Training-Workforce Mismatch for New Zealand Doctorates. Published online March 15, 2022. doi:10.5281/zenodo.6354873
12. Baisden T, Patel S. New Zealand’s High Research Overheads: An International Anomaly. Published online March 2022. doi:10.5281/zenodo.6360794
13. Carson G. Proposal for formal Te Tiriti and mātauranga Māori curriculum for researchers. Published online March 15, 2022. doi:10.5281/zenodo.6355132
14. Ostrom E. Building Trust to Solve Commons Dilemmas: Taking Small Steps to Test an Evolving Theory of Collective Action. In: Levin SA, ed. *Games, Groups, and the Global Good*. Springer Berlin Heidelberg; 2009:207-228. doi:10.1007/978-3-540-85436-4_13

All references can be found in the **NZAS/TPM Community Collection: Te Ara Paerangi Future Pathways Responses** | Zenodo: <https://zenodo.org/communities/tearapaerangi/>

See also:

The NZAS ‘Renewing the Science System’ workstream:
<https://scientists.org.nz/news/10483047>

The Te Ara Paerangi Community Hub:
<https://te-ara-paerangi.community/>