

# Marsden Fund Council Response to Te Ara Paerangi Future Pathways Green Paper

The Marsden Fund Council (MFC) welcomes the opportunity to comment on the Te Ara Paerangi Future Pathways Green Paper 2021. These comments are from the Council as a whole. Individual Council members may also provide their own commentary separately.

## The Council's Mission Statement

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*To drive world-class research in New Zealand by supporting and incentivising excellent researchers to work on their best and boldest ideas and to connect nationally and internationally, leading to new knowledge and skills with the potential for significant downstream impact for New Zealand*

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The Marsden Fund supports investigator-led, fundamental discovery research in Aotearoa New Zealand across the broadest range of disciplines and is aimed at generating new knowledge, with long-term benefit. The Marsden Fund Council (MFC) oversees the allocation of around \$80 million per annum of Government funding, which is approximately 4.8% of Research, Science and Innovation investment, to these research projects through the operation of the Marsden Fund assessment and allocation process. Each year around 70 Standard grants and 40 Fast-Start grants which are targeted at early career researchers, are awarded. Larger interdisciplinary projects that integrate the natural, social, health science and humanities disciplines are supported through the Marsden Fund Council Awards.

The Marsden Fund Council is responsible for developing the strategic direction of the Fund and for choosing which proposals are to be funded. The Council is made up of eleven eminent researchers spanning a range of disciplines, who are appointed by the Minister of Research, Science and Innovation.

The Council is pleased to see that the Government understands the importance of keeping parts of our research system outside the remit of a priority-driven strategy and that this 'Discovery' part of the research system must be preserved and grown. As described in the associated Cabinet paper<sup>1</sup>, this enables researchers to investigate future opportunities for Aotearoa New Zealand without the constraint of existing conditions or priorities. In a future research system where some parts are governed by a set of transparent national priorities, it is important that a 'bottom-up' part remains where investigators are able to research and suggest new ideas, solutions, opportunities, and eventually new national priorities.

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<sup>1</sup> Cabinet Paper: Future Pathways for the Research, Science and Innovation System; Release of discussion document 28 October 2021. Section 62.

## Key Summary Points

- Knowledge of ourselves, of our world, and of our relationship to the rest of the world provides the basis of an informed, socially cohesive, and culturally confident nation. This objective is fundamental to the Marsden Fund's operation and requires that it supports a research community with a broad focus.
- By supporting a wide range of research activities, the Government can ensure that our research community will be well placed to meet the uncertain demands of the future and to be resilient against any unknown challenges that may be sitting over the horizon.
- Providing support for a diverse range of discovery research through avenues such as the Marsden Fund is an efficient means of linking researchers into wider networks. This connectivity helps Aotearoa New Zealand to be flexible and able to address new challenges outside our current research priorities.
- Many current and previous Marsden funded projects are relevant to several areas of the Government's well-being focus, including cultural identity, environment, health, knowledge and skills, social connections and subjective well-being.
- History shows us that most significant applied outcomes are built on discovery research of the type funded by Marsden.
- The Marsden Fund Council provides a model whereby research priorities are set at a high level, based on fundamental principles, leaving individual entities to set specific goals.
- Increasing the success rate of the Marsden Fund, through increasing the allocation to the Fund, would allow for the support of more excellent proposals, thereby reducing the loss of unique and valuable knowledge, as well as growing research capability and capacity.
- The Council recognises and supports the themes of Vision Mātauranga. The Fund is continually improving its approaches to mātauranga Māori and Western research knowledge spheres, and where it occurs, the opportunity to interweave the two.
- The ability to have a positive and rewarding Te Tiriti partnership with Māori requires a stronger and equitable representation within the sector. Resolving this disparity needs an all-of-government RSI sector approach towards building participation, with the goal of achieving a more genuine Te Tiriti partnership.
- By funding cutting edge projects, the Marsden Fund supports the training of researchers in high quality learning environments in Universities, CRIs and other research contexts. The Marsden Fund also has an important role in the RSI system in terms of capability development through funding early career researchers.

## Recommendations

The Marsden Fund provides an important foundation for the RSI sector. The significance of this role should be reflected in appropriate funding support from the Government that is set aside for investigator-led discovery research as a means of supporting and growing a broad and resilient research workforce. The Council recommends 30% of government RSI investment is targeted at investigator-led discovery research and 70% towards mission-led research. This provides for adaptability and resilience in the research system, and functions as a pipeline for applied research. It is critical, therefore, that any changes in the RSI sector are made with a view to building capacity in investigator-led discovery research as an important foundation for a healthy and resilient research ecosystem. Furthermore, the importance of discovery research to the overall RSI system should be clearly articulated in the next stage of the Te Ara Paerangi process, as it was in the accompanying cabinet paper<sup>2</sup>.

## The Marsden Fund Council thematic responses to Te Ara Paerangi

### Research priorities

The MFC acknowledges the importance of focussing a portion of RSI funding into particular research priorities. At the same time, however, the investigator-led discovery research that the Marsden Fund underpins must be well-supported and allowed to be wide-ranging. There are several reasons for this:

1. Having a good understanding of ourselves as inhabitants of Aotearoa New Zealand, of our world, and of our relationship to the rest of the world provides the basis of an informed, socially cohesive, and culturally confident nation. This objective is fundamental to the Marsden Fund's operation and requires that it supports a research community with a broad focus.
2. Although there are several challenges ahead for Aotearoa New Zealand that can be clearly predicted and that should be prioritised (climate change, workforce, housing, mental wellness and equity issues being examples), it is also important that Aotearoa New Zealand has a research system that is broad-based to provide resilience against challenges that are less predictable. As an example, the government's response to COVID-19 has generally been lauded by the rest of the world. This response has been built on evidence-based decisions that have been guided by experts, who understand the research and knowledge accumulation process, and who know how to interpret research outcomes. What is interesting is that this expertise has come from several fields, many of which are outside the obvious disease specialities. There has been input from the fields of Science Communication, Psychology, Sociology, Economics, Marketing, Management, Engineering, Information Science, Mathematics, Statistics, Physics and Chemistry. The fact that there was expertise available in these areas, is in part a result of previous sustained support for a broad range of research, and researchers, through funding mechanisms like the Marsden Fund. For the future, having a rich diversity of research activity ensures that there is a breadth of capability and expertise in a wide variety of fields so that when the unexpected occurs, we have

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<sup>2</sup> Cabinet Paper: Future Pathways for the Research, Science and Innovation System; Release of discussion document 28 October 2021. Section 62.

the resources available to address these challenges and/or leverage them to our advantage. Therefore, by supporting a wide range of research activities, the Government can ensure that our research community will be best placed to meet the uncertain demands of the future and will be resilient against any unknown challenges that may be sitting over the horizon.

Although there is broad understanding of, and support for, the value of research from both the public and policy makers, the argument is sometimes raised that research should be targeted because the Aotearoa New Zealand research sector can't be the best at everything. In response, while investing in the specific research priorities and challenges we face both as a nation and globally, is important, we can only target specific research areas that seem highly relevant now. The Marsden Fund Council believes that alongside any specific targets there is a need to maintain and fund research outside immediate priorities as a tightly constrained research system is inherently vulnerable. We must be diverse to have resilience, because we can't predict the future. In fiscal terms, the current support going into maintaining this diversity is relatively low (currently at \$80 million per annum, which is approximately 4.8% of the \$1,659 million from Vote Business, Science and Innovation, page 17, Nov 2020 BIM)<sup>3</sup>. Despite this, the Marsden Fund continues to enhance our diverse knowledge base and specifically encourages small pockets of discovery research that help to maintain some level of 'immunity' against future challenges. Furthermore, our own data shows that one outcome of Marsden Funding is increased connectivity, both national and international. For example, a high proportion (62%) of the projects we have funded over the last ten years involve a collaboration between researchers from at least two different research institutions and 53% involve a collaboration with a researcher from outside Aotearoa New Zealand. By the time they complete, the vast majority of projects (90% of those finishing in the last decade) report significant linkages with researchers based outside Aotearoa New Zealand. These data are consistent with the findings of Davies et al. (2022)<sup>4</sup> who report that even engaging in the Marsden funding round is a catalyst for increased collaboration. Thus, providing support for a diverse range of discovery research through avenues such as the Marsden Fund is an effective means to link researchers into wider networks. This connectivity provides access to a broad range of expertise that extends well beyond any individual investigators. It also allows for rapid access to knowledge exchange and transfer, helping Aotearoa New Zealand to be flexible and address new challenges outside our current research priorities.

3. History shows us that most significant applied outcomes are built on discovery research<sup>5</sup>. There are countless examples, but applications in the areas of computing, electronics, mobile phones and the internet are obvious ones. Thus, we see investigator-led research as the seedbed of ideas that feed Aotearoa New Zealand's innovation pipelines. The Marsden Fund's terms of reference (2017) state that '<Marsden funded> research is not subject to government's socio-economic priorities.' This does not mean that research funded by the Marsden Fund cannot support these priorities, but rather that there is no requirement that it does, which is an

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<sup>3</sup> <https://www.beehive.govt.nz/sites/default/files/2020-12/RSI.pdf>

<sup>4</sup> <https://doi.org/10.1016/j.respol.2021.104421>

<sup>5</sup> Jaffe, A. B. (1998), The importance of 'Spillovers' in the policy mission of the advanced technology program. *Journal of Technology Transfer*, 23(2), 11–19.

important distinction. As an example, without explicit directives to do so, current Marsden funded projects are relevant to many areas of the Government's focus, including cultural identity, environment, knowledge and skills, social connections, health, well-being, and unlocking the science and innovation potential of Māori knowledge, people and resources.

Thus the Council believes that, as research priorities are developed, a proportion of funding should be set aside for investigator-led discovery research as a means of supporting a broad and resilient research workforce that provides for adaptability and resilience in the research system. Data from other advanced economies indicates that we should move towards targeting 30% of government RSI investment at investigator-led discovery research and 70% towards mission-led research<sup>6</sup>. The importance of discovery research to the overall RSI system should be clearly articulated in the next stage of the Te Ara Paerangi process, as it was in the accompanying cabinet paper.

Finally, it is worth considering how the Marsden Fund Council provides a model whereby research priorities are set at a high level, based on fundamental principles, leaving individual entities to set specific goals. These principles demonstrate the ability of independent appointees, in this case a diverse group of Councillors and the various panels they convene, to support a number of areas that the Te Ara Paerangi paper looks to explore.

- i. **Te Tiriti:** A current focus for a meaningful partnership and co-production of knowledge sits within the Marsden Fund through its support of mātauranga Māori (it was reported that over 75% of the investment in Mātauranga Māori research is underpinned by the Marsden Fund in the 2016 System Performance Report<sup>7</sup>). This would latterly be encompassed with a Te Tiriti-led approach as anticipated through the framing in Te Ara Paerangi.
- ii. **Priorities:** The Fund is agile in its support of projects and allows diverse new areas of knowledge to flourish as they arise. The setting of a research priority that is investigator-led, allows for the creation of new and unbounded knowledge. The areas of investigation are wide ranging and often support key elements of Treasury's Living Standards Framework<sup>8</sup>. The three-year funding framework provides for flexibility and agility with the possibility of funding for projects that are developing exceptionally well.
- iii. **Workforce:** The support of early career researchers – through the Fast-Start scheme and postdoctoral fellows – helps encourage successful workforce development.
- iv. **Funding:** The Council Awards are for larger grants designed to explore and promote cross-institutional, international and interdisciplinary work.
- v. **Value of publicly funded research:** The Council explores ways to lift public engagement, community interest and encouragement through outreach activities (e.g., Mātariki publication with Professor Rangī Mātāmua 2017, and subsequent public lecture series Ko Matariki e ārau ana | The gathering of Matariki 2019).

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<sup>6</sup> Congressional Research Service (2021). <https://sgp.fas.org/crs/misc/R44307.pdf>

<sup>7</sup> <https://www.mbie.govt.nz/assets/5794b50a6f/2016-science-and-innovation-system-performance-report.pdf>

<sup>8</sup> <https://www.treasury.govt.nz/information-and-services/nz-economy/higher-living-standards/our-living-standards-framework>

Thus, the Marsden Fund Council offers an example of a viable principles-based approach that could be used by other entities to set their own mechanisms and processes to target priorities and achieve goals that are responsive to the nation. For the Marsden Fund these principles are highlighted in the Council's Investment Plan<sup>9</sup>:

1. Ka tautoko i te rangahau pakari, auaha hoki e whai āheinga nui ki te mātauranga whakaaweawe  
Support bold, innovative research with high potential for scholarly impact
2. Ka whakahihiko, ka tautoko i te auaha o ngā kairangahau  
Stimulate and support creativity and innovation among researchers
3. Ka pūmau tonu te hapori mātanga i te katoa me te whānuitanga o ngā kaupeka rangahau  
Maintain a New Zealand community of experts in the full, and expanding, range of research fields
4. Ka whāngai i te hunga kaiārahi rangahau o āpōpō  
Feed the pipeline of future New Zealand research leaders
5. Ka tautoko i te whakawhitinga o te Mātauranga me ngā pūkenga o tāwāhi  
Support the flow of international knowledge and expertise
6. Ka āwhina ki te whakapuaki i te kaha o te mātauranga, ngā tāngata me ngā rauemi Māori  
Help unlock the potential of Māori knowledge, people and resources
7. Ka hāpai i te hira o te rangahau me te Mātauranga  
Champion excellence in research and scholarship

### Funding

Success rates for the Marsden Fund currently sit at around 10%, with projections that these will gradually decrease at current levels of Government funding. Current caps on funding for individual projects were set some time ago and have been eaten into by inflation, wage increases and increased costs of advancing techniques. As a result, the ability of researchers to support personnel and working expenses on a Marsden-funded grant have been reducing year on year. Assuming that the number of applications will continue at current levels, without increasing levels of support from Government the Marsden Fund will be forced to reduce these success rates further to allow for reasonable levels of support for individual projects.

It is important to note that the current ~10% success rate is a result of funding limits, rather than a lack of quality in the research applications that sit below this funding cut-off (Gush et al 2017)<sup>10</sup>. The top twenty percent of applications to the Fund are peer reviewed by both international experts and the national expert panels. One half of these applications are declined funding. A large proportion of these declined applications have, however, been judged worthy of funding by experts and often are only minimally below the threshold that demarcates funded from non-funded proposals (highlighted over a significant number of years of data collection with referee scoring indicating that up to 25-40% of unfunded full proposals still achieve “excellent” to “outstanding” scores but are unable to be supported due to funding constraints)<sup>11</sup>. There is significant opportunity being lost here, with several negative consequences. In particular, the failure to fund all excellent proposals loses the opportunity to generate unique and valuable knowledge, and to grow research capability and capacity. This creates frustration within the research community which ultimately can lead to retention issues for our brightest investigators. While Marsden Fund Fast-Start grants have allowed for the growth, support, attraction, and retention of the

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<sup>9</sup> [https://www.royalsociety.org.nz/assets/Uploads/Marsden-Fund-Investment-Plan-May-2021\\_Updated-Govt-Logo.pdf](https://www.royalsociety.org.nz/assets/Uploads/Marsden-Fund-Investment-Plan-May-2021_Updated-Govt-Logo.pdf)

<sup>10</sup> <https://doi.org/10.1080/00779954.2017.1325921>

<sup>11</sup> <https://www.royalsociety.org.nz/who-we-are/our-reports/evaluation-reports/>

best early career talent in our research and innovation systems, it is clear that the limitations on funding are stifling research opportunities and career development. Although the Council has recently begun to address part of this problem by increasing the level of scholarship support for Masters and PhD students and by increasing the cap on Fast-Start funding, without an increase in overall support for the Fund, these changes will decrease overall success rates.

The Council is gratified to see that Te Ara Paerangi describes the increased funding required to meet the 'R&D two-per cent of GDP' goal as a bare minimum. It is critical that the appropriate proportion of this funding is directed to supporting investigator-led research, as these projects will underpin more applied and focused work and this funding will be critical in providing for resilience, diversity and succession in our research infrastructure as we have described elsewhere. Setting the proportion of government funding for discovery research at 30% of the total research budget would help achieve this aim.

Section 4.6 of Te Ara Paerangi discusses impact delivery and knowledge exchange. Here it refers to MBIE's 'Impact of Research' Position Paper<sup>12</sup>. That document made the important point that research needs to maintain its social license and credibility with the public, particularly with the recent rise of disinformation. The Council believes that this is an important aspect of knowledge exchange that is not addressed in Te Ara Paerangi. It is critically important for the long-term success of any RSI strategy that there is public buy-in. The community should know that government funds are being well spent in developing economic advantage, and also that discovery research in a wide variety of disciplines can underlie government decision-making, can form the basis for informed personal decision-making, can be relevant to their own experiences and can be valued for its own sake and for its role in enriching our own understandings of the world. A key component is that the public needs to know where to go for information they can trust. This is not something that can be bought through a few social media messages but requires the long-term development of relationships between researchers and the wider community. It is important, therefore, that a proportion of funding for RSI is available to highlight the value of research, for example, by supporting outreach and citizen science projects.

With regard to any shift from the current overhead-based system, the Council acknowledges the pros and cons of a shift to base funding, but in particular notes the possibility that a shift to base funding might discourage innovation in the sector by making it more difficult for new R&D entities to emerge. Without a more evidence-based approach to projecting the effects of moving to a base fund system (and the mechanism for distribution) there may be wide-ranging unintended consequences to such a shift.

### Te Tiriti o Waitangi

The Marsden Fund acknowledges mana whenua, hapu, iwi and Te Tiriti, and the implications of operating in the unique environment of Aotearoa New Zealand. The Council also recognises the importance and distinctiveness of mātauranga Māori and its inherent value to discovery research.

Given the strong connection between local mātauranga (for example of natural resources and biodiversity) and kaitiaki obligations of hapū and iwi to protect and support that mātauranga, regional hubs are a viable proposition. Furthermore, the Council recognises that hapū and iwi do have huge

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<sup>12</sup> <https://www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/national-statement-of-science-investment/impact-of-science/>

capacity issues, so resourcing for regional hubs would be critical. More can be done to connect existing academic institutions (including universities) with hapū and iwi in mutually beneficial relationships. Consideration of who benefits in research partnerships is a key framing for the future. Guidance might be sought from the Mataatua Declaration that the “first beneficiaries of indigenous knowledge (cultural and intellectual property rights) must be the direct indigenous descendants of such knowledge”<sup>13</sup>.

The Council will recognise and support the themes of Vision Mātauranga. The Fund is continually improving its approaches to mātauranga Māori and Western knowledge spheres, and where it occurs, the opportunity to interweave the two. With a model of partnership, the Council will look to consider how this will operate in the future.

The wider RSI system needs to consider effective, or new, ways of managing meaningful partnerships and engagements with Māori. One possibility is ‘rangatiratanga’ or ‘mana motuhake’: meaning Māori would need to lead the mātauranga Māori governance. It will be important to work through how this might operate. A principle of ‘partnership’ would be key - between the mātauranga Māori sphere and western knowledge sphere, in terms of both decision-making from a governance level right down to the panel level. It is important to recognise that resources are shared in a way that is demonstrably fair and impartial between and across the spheres of mātauranga Māori and western research.

One important issue to address is that Māori participation in the wider RSI system is critically low. The Te Ara Paerangi report states “We want a system where decisions on research projects are reflective of Māori needs and give effect to Te Tiriti” (p. 31). Te Ara Paerangi further states “There is strong evidence that women, Māori and Pacific peoples experience greater barriers to participation and progression in the RSI workforce than male European colleagues. This is particularly clear for senior roles and leadership positions” (p. 68). The Marsden Fund Council acknowledges that this is an issue and fully supports efforts to address it, however, we note that leaving this to individual parties within the RSI sector has not led to improvements in recent years. This is exemplified with Statistics New Zealand (2021) reporting the Māori population at 17.1 percent<sup>14</sup> while the Māori academic population in the university system is 4.8 percent (McAllister, Kidman, Rowley, & Theodore, 2019; with an awareness this may differ in Wānanga and other research institutions)<sup>15</sup>. The ability to have a positive and rewarding Te Tiriti partnership with Māori surely requires a stronger and equitable representation within the sector. Resolving this disparity needs an all of government approach towards building participation with the goal of achieving a more genuine Te Tiriti partnership.

*He aha te mea hui o te ao?*

*He tāngata, he tāngata, he tāngata.*

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<sup>13</sup> [https://www.wipo.int/export/sites/www/tk/en/databases/creative\\_heritage/docs/mataatua.pdf](https://www.wipo.int/export/sites/www/tk/en/databases/creative_heritage/docs/mataatua.pdf)

<sup>14</sup> Statistics New Zealand (2021). Māori population estimates: At 30 June 2021. Retrieved 17 February 2022 at: <https://www.stats.govt.nz/information-releases/maori-population-estimates-at-30-june-2021>

<sup>15</sup> McAllister, T. G., Kidman, J., Rowley, O., & Theodore, R. F. (2019). Why isn't my professor Māori? A snapshot of the academic workforce in New Zealand universities. *Mai Journal*, 8, 235-249.



## Workforce

Ka whāngai i te hunga kaiārahi rangahau o āpōpō Feed the pipeline of future New Zealand research leaders

A key pathway for the Fund to impact is ensuring Aotearoa New Zealand has excellent research capability and capacity in the future. The Council wants the Fund to allow for the development of research careers and expertise in Aotearoa New Zealand and to attract and retain the brightest researchers.

The Marsden Fund has an important role in the RSI system in terms of capability development. Marsden funding supports students and postdoctoral fellows who are associated with projects, and also specifically targets early career researchers through Fast-Start funding. Furthermore, by targeting funding for projects that are at the leading edge of research endeavours, it supports the training of researchers in high quality learning environments in Universities, CRIs and other research contexts. The breadth of this experience underlies the resilience of the research sector as outlined above. The Council also encourages interdisciplinary research to build well-rounded researchers.

At the present time however, Marsden-funded support for researchers prior to the Fast-Start stage is driven by individual researchers who make decisions around their own goals and project funding. That is, PhD and postdoctoral fellow support depends on individual senior researcher choices. Strategic direction, using a principle-based approach to planning, is needed. Such a workforce development approach would provide an overview for the needs of the *whole* sector.

Additionally providing an early start to capability development is critical, beginning at an early level (even starting at primary school). In this vein, the Marsden Fund Council supports research and science education in schools and outreach in the community. This is all about training the next generation of science citizens and teachers. More work and recognition for the value of outreach feeds into the public understanding of science and the value of science<sup>16</sup>.

## Infrastructure

The Marsden Fund Council recognises that cutting-edge research requires access to modern world-class facilities and equipment. Funding must be available to build and maintain this infrastructure. Furthermore, there is a need to ensure that support is available to enable and encourage access to these facilities both locally and internationally. Gains for the sector can be made by introducing a shared model which centralises the costs to support equipment and facilities along with ensuring access to them. Any such centralised model for infrastructure needs to be fit for purpose and efficient in its use of the available resources.

## Further engagement

The Marsden Fund Council welcomes further interaction with the Ministry of Business, Innovation and Employment Te Ara Paerangi team in future conversations and development of the ideas within this submission.

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<sup>16</sup> <https://royalsociety.org/topics-policy/publications/2006/science-communication/>