

MWLR early career submission on green paper

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Submitter type: CRI but specific group (ECRs)

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Introduction and methods

All early career researchers at MWLR were invited to take part in this submission. ECRs (early career researchers; we gave Royal Society guidance but allowed staff to self-identify) were encouraged to attend the MBIE consultation events and peruse the consultation materials. We held a meeting to discuss key ECR issues to be incorporated into this submission, and surveyed ECR staff. A working group then put together the four ‘themes’ below, which were then circulated to interested ECRs for comment, and then subsequently revised.

This submission has been entirely ECR-led. Some contributors also took part in the pan-CRI (crown research institute) ECR workshops to contribute to the broader CRI ECR submission.

Alignment with MWLR submission

We generally agree with the broad themes addressed in the MWLR Institutional response to Te Ara Paerangi (TAP). Specifically, we strongly support (1) *prioritising alignment with principles of Te Tiriti*, (2) *clarifying of the ‘mission’ of each CRI*, (3) *a base grant covering 70% of research staff salary that incentivises collaborative, adaptive and agile public service-facing research* and (4) *implementation of common data management practices*. Despite our broad agreement, the MWLR Institutional response is not tasked with addressing the myriad of systematic issues that affect us, the next generation of research workforce. We are the direct beneficiaries of any changes to the Research, Science and Innovation (RSI) sector resulting from the TAP engagement, therefore this ECR-led submission aims to specifically highlight the issues we face and propose solutions we would like to see implemented in the future of our RSI sector.

A note

This submission primarily focusses on opportunities for improvement. We note however the key themes ECRs see as a strength of CRIs: (1) a more collaborative environment than universities and (2) the potential to have a nice mix of fundamental and applied research – i.e. being ‘closer to impact’ than universities.

Theme one: Career pathways

(a) Context

Early career researchers experience challenges to career progression within CRIs in part through the 'leaky pipeline' effect, whereby skilled, talented and expensively trained individuals² leave the research sector due to intense competition for limited career opportunities. Whilst there is significant growth in the number of PhD completions in New Zealand (~1,500 per annum²), there is insufficient growth in the research workforce to maintain employment.

This pipeline is highly inefficient, with high numbers of graduates seeking to enter the research sector but minimal research roles (of approx. 30,000 PhD holders in NZ, only one-third are employed in research²). As such, resources invested in upskilling the researcher will be lost when the researcher seeks opportunities outside of the sector or abroad to obtain greater job security³.

In their responses to our internal survey (see methods), job security was a common concern among ECRs, with relatively few postdoctoral positions available and limited opportunities for progression from short-term contracts to permanent research positions. The strong reliance on competitive external funding to assist this transition creates a high level of uncertainty for ECRs, and can be an additional distraction from producing high-impact research outputs. In addition, the CRI career progression system can appear cryptic and be difficult to navigate for ECRs, particularly when transitioning from graduate school or the broader academic system.

Career progression can also be challenging for ECRs due to structural factors specific to CRIs. For example, CVs of CRI staff may be seen as less competitive than academic staff when competing for funding or career progression opportunities due to the need to focus on commercial work that is not publishable. Further, while CRI staff tend to be highly flexible generalists, working across multiple projects, they may also be spread too thin. Therefore, they are unable to produce targeted work on single large projects that would have high impacts early in career progression. Time available to write up research outputs for publication is limited, with time rarely allocated from project budgets (e.g., SSIF funding) and often occurring in personal time after a fixed-term contract has ended. This negatively impacts ECR career progression, and the scientific reputation of CRIs. Linked to this, the need to strictly account for one's time at most CRIs means that unlike at a university it feels (whether real or imagined) that time is a more precious commodity, and therefore working on writing up projects, collaborating on new projects, or on skills training is inappropriate if unfunded.

(b) Relevant MBIE questions

KEY QUESTION 10: How can institutions be designed or incentivised to better support capability, skills and workforce development?

KEY QUESTION 14: How should we include workforce considerations in the design of research Priorities?

KEY QUESTION 15: What impact would a base grant have on the research workforce?

KEY QUESTION 16: How do we design new funding mechanisms that strongly focus on workforce outcomes?

(c) Proposed/preferred solutions

We suggest:

1) Develop dedicated pan-CRI ECR integration and mentorship programme

This will support ECRs in understanding and progressing through the career development pathways specific to CRIs, thus increasing retention of early-career staff through to permanent research positions⁴. Such mentorship schemes can also include targeted mentoring of under-represented or under-valued groups, supporting a more diverse research sector, and transitioning to greater diversity in senior leadership roles^{5,6}.

One key desire of MWLR early-career staff was for mentoring schemes to include networking opportunities across CRIs to facilitate a sense of community. This is particularly important given the current disruption to regular gatherings due to the pandemic.

2) Improve recognition of the value of commercial research outputs and other impact-driven research contributions in career evaluations.

This could be implemented through adjusting criteria around CVs associated with grant applications (e.g., a recent publication in Nature⁷); and creating ways for commercial work to be recognised while maintaining its confidential nature (e.g., Publons mechanism for anonymous reviews, or peer-reviewed CRI research reports). However, we encourage MBIE to explore credit for work done on non-publishable commercial work, as this work increases the expertise and knowledge of the ECRs (and other researchers) involved, as well as creating pathways to research impacts.

3) Increase funding for fundamental and/or applied (and highly collaborative) ECR-led research.

Specifically, funding for research that employs ECRs and provides excellent opportunities for researcher training, career development, and relationship building. In this regard, we note there are opportunities for this if a base rate funding level is increased.

4) Base rate funding to cover technician positions

Technical research positions (e.g., lab technicians, bioinformaticians, statisticians) are essential: they support both early career and more senior staff in completing research and enhance the quality and quantity of research outputs by harnessing technical skill and knowledge⁸. We support the MWLR submission and proposal to

provide a base grant to 70% of these staff to increase their career stability and maximise value.

5) MBIE should incentivise CRIs to provide more career-development opportunities that could be funded through commercial work.

This would encourage CRIs to demonstrate a willingness to reinvest in their researchers. One method of delivery could be through mandated minimum career development hours per year for all research and technical staff, including those primarily involved with commercial work. Such opportunities could enhance researcher knowledge, result in improved research outcomes, and enhance the research workforce's flexibility. Career development hours could also be used for writing up research outputs for publication. We would also encourage more support (via dedicated time) for ECRs to participate in service activities such as peer-reviewing, professional societies and supervision of students. These hours would need to be prioritised in such a way that they are not lost when commercial work puts pressure on ECR time.

We also encourage MBIE to support this by providing funding to host pan-CRI networking events for ECRs to facilitate cross-CRI collaboration. With a common issue that ECRs find themselves 'time-poor', such sessions will be useful to brainstorm and develop research questions that may then progress into competitive research proposals.

6) Publicly available annual reporting of ECR opportunities and overall career progression statistics by CRIs, including remuneration.

This will ensure ECRs are aware of the career landscape, particularly when transitioning from academia to CRIs. We note that CRIs have a reputation of paying less than universities, central government, local government, consultancies and private science sector. If CRIs seek to recruit *and retain* excellent scientists, CRIs should remunerate in accordance with similar industries.

We note that it is not unusual for CRI staff to shift to universities; the converse is highly unusual however. This suggests both salary and perhaps status are inadequate to facilitate a symmetrical rate of shifts between CRIs and universities. As MBIE seeks to improve the ability of researchers to move within the system, we suggest that remuneration equity be a priority to address across the RSI sector.

CRIs should report on retention of postdoctoral researchers and the proportion of short-term fixed-contract positions compared with permanent research positions. Reporting should include salary information with appropriate anonymisations to protect privacy.

7) Increase the potential for part-time positions, flexible working or job sharing.

These roles may suit ECRs who need flexible working conditions, such as those with cultural or family commitments. Flexible working conditions demonstrably help

retain highly trained staff, address gender inequities and support a more diverse research sector¹².

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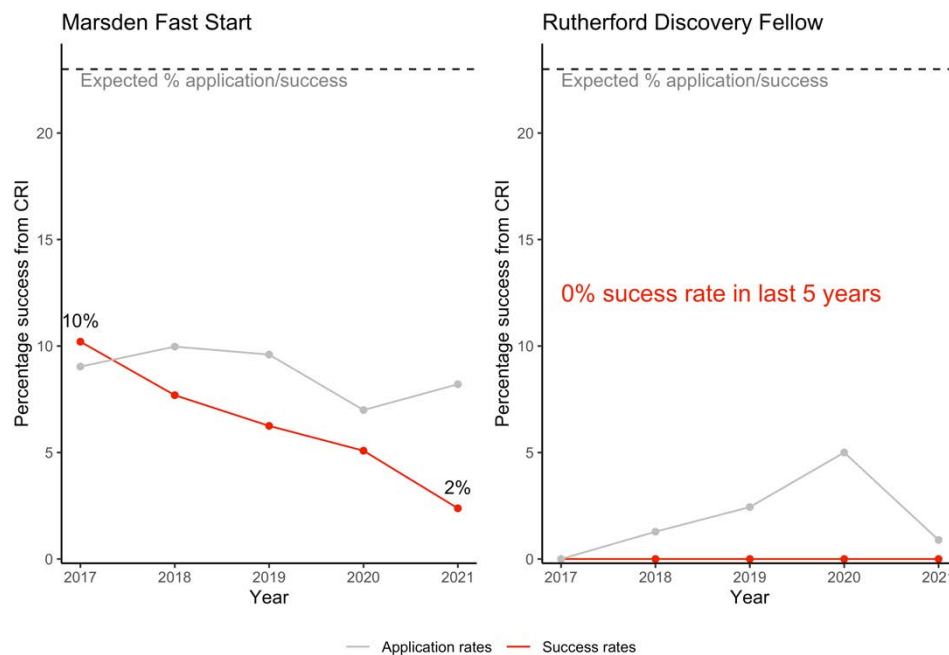
Theme two: External Funding

Early career researchers are more likely to shift between institutions, and as such we believe parity in external funding success (a key career metric) should be equivalent between CRIs and universities, *for this career stage*.

(a) Context

Currently, CRI early career staff are under-represented in application and success rates for early- and mid-career grants compared to university staff. CRI ECRs are estimated to make up to 23% of the combined CRI + university ECR population. Marsden Fast Start application rates sit around half the expected rate (~10%). Marsden Fast Start *success* rates have been consistently declining from 10% in 2017 to 2% in 2021, while application rates remained

relatively constant. Marsden, according to the Royal Society website, is considered to be ‘the hallmark of excellence for research in New Zealand’. And yet success rates for ECRs are an order of magnitude less than expected. We highlight that for mid-career staff, the Rutherford Discovery Fellow scheme ‘supports New Zealand’s most talented early- to mid-career researchers for a five-year term’. Application rates are even lower than Marsden Fast Starts and in the past five years, never exceeded 7%. Success rates are also poorer than Marsden Fast Starts: there have been no successful CRI applicants (from any CRI) in the past five years.



CRI success rates for Marsden Fast Start and Rutherford Discovery Fellow, compared to the total university and CRI population. The expected success rate would be 23% (indicated by the dashed line), that is, the approximate size of the CRI workforce relative to the total CRI and university workforce.

We note that part of the reason for having lower success rates may be due to the “CRI penalty” of higher overheads. This means less work can be proposed for the same amount of money. For a post-doc on an \$80K salary, a university overhead (multiplier) might be 1.2. At a CRI, the overhead (on the same salary) might be 2.2. These numbers are based on factual examples. When calculated as 0.2 FTE (the minimum for Marsden Fast Start), this equates to a \$11,600 ‘CRI penalty’, or ~10% of the total annual award ceiling. When calculated as 0.3 FTE, there is a \$17,400 ‘CRI penalty’, or ~15% of the total annual award ceiling. As such, dollar for dollar, CRI ECRs can do less with the same money, and have less money left over for operating (and PhD support!). We have also been discouraged or forbidden by management from applying for Fast Starts or Rutherfords, due to the disproportionately high cost to the institution. ECRs report being told small grants like a Marsden Fast Start (\$300,000) aren’t really worth applying for due to our overheads, and it has been quoted to us that a Rutherford would cost a CRI ~\$800,000 per year in lost income. Such calculations start to unveil some of the institutional drivers of low application rates among CRI ECRs. Yet for future jobs, and future larger grants, it is necessary for ECRs to win these smaller competitive grants.

To summarise, we hope that MBIE will not underestimate the degree to which CRI ECRs are disadvantaged by the current system:

- We are discouraged or forbidden from applying for certain grants, leading to lower application rates
- Potentially due to lesser time available than universities, we have lower success rates, when we do apply
- When we win grants, we can do less for the same amount of money
- But our CVs will be judged on the same playing field as our university colleagues

We implore the MBIE working group that CRIs should not provide a second-class career pathway for ECRs; that external funding should be equally available to university and CRI applicants and not subject to institutional barriers such as disproportionate overheads.

(b) Relevant MBIE questions

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

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

(c) Proposed/preferred solutions

We suggest:

- (1) A base-funding grant that 'evens the playing field' between CRI and university applicants, equalising the 'cost' to institutions at minimum, and at best, offering full cost-recovery. Such a grant is likely to enhance employment stability, benefitting researcher welfare and as such likely to lead to increased productivity and quality of research.
- (2) A review of the implications of under-funding external funds. For example, the value of Marsden Fast Starts has declined over time and at full overheads, it is near-impossible to include a university supervisor (as CRI staff can't be sole supervisor of a student), a PhD student stipend + fees, and the ECR applicant at 0.2 FTE, without reducing operating costs to zero. When applicants have to find a way to 'top up' this under-funding, it is likely to result in inequity and we invite the government to reassess this approach. We include a quote from our ECR survey verbatim:

This budget is too small and the expectation are too big. NZ current funding for ECRs demands science to be novel, innovative, the best of the best, but the funding doesn't support this. Also our facilities are often not adequate for this. There is a big disparity from MBIE messaging - when it comes to funding we want to be the best in the world, but when it comes to building a new lab that can enable this amazing science the response is: NZ is too small and we can't have a lab at every research institute. If we are too small, then expectations for funding proposals should lower as well.

- (3) An early career grant more aimed at 'applied' work. We have heard some comments from 'established' researchers that Marsdens are not 'for' CRI ECRs. We disagree, but we do agree that the applied, impact-focussed work that is often the domain of CRIs is not well-catered for by existing early career grants. We further note our staff

highlight that existing ECR grants are quite ‘individual-focussed’ which makes it difficult to make ECR projects where the lead is highly collaborative. Existing ceilings on ECR grants (such as Marsden Fast Start) accentuate this problem.

- (4) A workforce model that builds in time for career development grant writing as a default. We have heard there is inequality of *opportunity* to be ‘granted’ time to apply for external bids for ECRs at CRIs. We suggest clear expectations for CRIs about support for ECR staff to apply for external awards.
- (5) We highlight institutional inequity in terms of application and success rates for external grants, which will disrupt the ambition for flows of researchers to- and from- universities and CRIs, as CRI staff will continue to be perceived, at the population level, as less able to secure funding.
- (6) We note there are opportunities to reduce the burden (on all career levels) of applying for external grants, such as grants with a ‘expression of interest’ stage, like Marsden.

Theme three: Equity & Diversity

(a) Context

Lack of equity by gender and diversity* plague our society and our RSI system¹. This inequity manifests itself both as lower representation of female and minority groups across our workforce, but also as inequities in remuneration for like-for-like roles²⁻⁴. These issues are exacerbated by the inequities in the lived-in experiences of female and minority groups, who often also face discrimination, racism, bias, bullying and harassment.

Crown Research Institutes (CRIs) presently are not required to report diversity, equity and inclusion (DEI) statistics. This creates a substantial limitation on conversations around addressing DEI issues, as well as limiting the accountability towards these issues across the RSI system⁵. Generally speaking, representation of Māori and Pasifika across a number of CRIs is low, and is often lower still in leadership roles⁵⁻⁸. At MWLR, women hold fewer than a quarter of management or leadership roles, despite near par in other career stages. This representation declines further for ethnic and other minorities⁷. This disproportionate representation directly contributes to the gender pay gap within the RSI system. MWLR’s self-reported gender pay gap sits at 14.8% (median) and 18.3% (mean)⁷, well below the National Pay Gap of 9.15%⁶, MBIE pay gap (11.5%)⁸ and the public service pay gap (8.6%)⁹. The ethnic pay gap (Māori 11.6% median at MWLR)⁷ continues to persist despite noted increasing representation of Kairangahau Māori across the organisation, and is especially striking for female Māori & Pasifika (MWLR: 23%), Asian (13%), Middle Eastern/Latin/African (17%)⁷ against their male colleagues of similar heritage.

New Zealand RSI system relies heavily on the unique and specialist skillsets that accompany highly skilled migrants. However, little accountability for career progression, wellbeing and

**Diversity* - We apply a broad definition of diversity, race & ethnicity, religious, gender identity, sexual orientation, neurological & physical ability as well as social class. We apply this definition in the sense that an inclusive organization promotes and sustains a sense of belonging for all employees.

pay equity is applied to those same skilled employees. While data remains sparse, over half of the international graduates persist within unreliable short-term contracts or other precarious work within New Zealand academic sector¹⁰. These conditions continue to worsen due to covid-related uncertainty, general rise in racist rhetoric as well lack of support for ethnic minorities that often have fewer familial support structures. These indicators suggest a lack of a serious approach to talent development, contrary to the research priority identified by TAP.

(b) Relevant MBIE questions

Key questions 14: How should we include workforce considerations in the design of research Priorities?

Key question 16: How do we design new funding mechanisms that strongly focus on workforce outcomes?

(c) Proposed/preferred solutions

Despite the marked long-term discrepancy in the retention, inclusion and equity of female, gender-diverse, and ethnic minorities (Māori, Pasifika and others), New Zealand government policy has traditionally shied from bold attempts at addressing these inequities.

In a step change, we propose the following ambitious solutions, to:

Invest into DEI directives for talent development & retention

- (1) Equity, Diversity and Inclusion Capability Fund: Restructure the EDI Capability fund to remove barriers for capability development funding, expand the investment into funding for projects led by teams of researchers comprising female, ethnic minorities and underrepresented communities. The existing EDI Capability fund provides an appropriate vehicle for this investment; however, the size of the investment needs to increase and application and selection process needs to be simplified and made transparent.
- (2) Prioritising candidate selection by ballot for a set number of fellowships (Rutherford Discovery and postdoctoral fellowships etc) for female, ethnic minorities and underrepresented communities, as was recently undertaken for the MBIE Whitinga Fellowships.
- (3) Increases investment in the Vision Mātauranga Capability Fund and strengthening of eligibility requirements to mandate the research programmes include minimum FTE for Māori/Pasifika researchers.
- (4) Instigate new opportunities across CRIs for capability development and talent retention for diverse ethnic minorities, and underrepresented communities. Focused initiatives at improving representation of diverse candidates in leadership roles is urgently needed.

Increase visibility & accountability of DEI directives across the RSI system

- (5) Uphold the gender pay gap principle of transparency and accessibility across CRIs. This includes CRI mandatory reporting requirements on representation, gender pay

gap, and DEI pay gap and efforts undertaken to reduce this, *i.e.* Pay Gap Action plan that is publicly accessible. MBIE and Public service strongly advocate for DEI accountability internally and have reported some of the lowest pay gaps nationally. The RSI system needs to implement similar efforts.

- (6) Where CRIs are failing to pay salary market rate for certain groups (e.g. ECRs), require investigation on what effect this has on the gender gap (and others where appropriate) and identify methods to address this. MBIE needs to provide comprehensive financial and policy support to the CRIs so that their DEI ambitions are supported, and not penalised. Salary scales need to be brought in line with market rate for scientists, or risk losing talent to Universities, overseas institutions or away from science. We would support a pan-CRI standardised pay-scale that would enhance transparency as well as enable movement of science staff across CRIs.
- (7) Continue to reserve MBIE appointed CRI-board positions for DEI candidates.

Innovate to reduce long-term/intergenerational disadvantages and inequities

- (8) Innovative efforts to reduce motherhood penalty on female researchers, including per diem costs for the parent researcher, or dependent/caregiver to be mandated/supported via overheads or appropriate future funding mechanism.
- (9) Movement towards 'flexible by default' working to include consideration of explicitly listing CRI-based positions as being negotiable to be full/part-time. More opportunities for job-sharing and secondments between CRIs should be normalised.

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Theme four: Miscellaneous

(a) Context

Research infrastructure, such as laboratory equipment and services (for example, DNA/RNA sequencing, microscopy, mass spectrometry), as well as data infrastructure, is currently funded without a clear overarching strategy. The challenges are to maintain current infrastructure and invest in new future-proofing infrastructure, while increasing access for researchers and using resources efficiently. System-wide infrastructure must be balanced with the need for institutions to individually invest in infrastructure that suits their needs without delaying or complicating purchases.

ECRs often find themselves 'time-poor' and having to quickly understand and use new methods to progress their research under time and resource pressure. ECRs can be heavy users of laboratory facilities, undertaking practical lab work and writing up research for reporting among other responsibilities. ECRs may also bring new specialised and novel laboratory and/or data analytical skills in more emergent technologies and methods, bolstering the capability of an institute. Along with providing mentorship to students related to projects at hand, ECRs may also be the only source of specific technical expertise available to train institute staff and students. Where institutes may be falling behind on maintenance and development of their infrastructure in keeping with current methods, this can have a negative impact on the ability of ECRs to continue their tract of research. While shared infrastructure may help bridge this gap, there are disadvantages such as a need for scheduled access and maintenance. Overall, decisions that relate to research infrastructure are likely to have major impacts on ECRs, positively or negatively.

(b) Key Questions

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

(c) Proposed solution/s or preferred solutions/etc

We suggest two key considerations for infrastructure:

- (1)** The green paper consultation document alludes to an increase in shared infrastructure. This can be a sensible strategy for efficient use of resources. However, we emphasise that shared infrastructure requires adequate, stable funding of technical science staff, to allow effective access to, and use of, research infrastructure by ECRs. Highly skilled research technicians are essential to the smooth running and maintenance of shared infrastructure, such as laboratory equipment or computational systems. Ensuring infrastructure, namely lab equipment, has sufficient personnel support has a number of benefits:
 - Equipment is maintained and has good longevity, rather than falling into disrepair or disuse.
 - Researchers can access a broader range of methods to answer research questions, improving efficiency and flexibility of the workforce. Research outputs produced can be more robust, as research/experimental design is guided by experienced technical staff. This is an important consideration given the increasing complexity and specialisation of some scientific methods.
 - Technical staff can facilitate use of equipment by external users, which encourages collaboration between CRIs. At their best, shared resources can create productive connections between researchers in different fields.
 - Increased provision of stable, long-term funded roles in research. Alongside full-time technical staff, there could be provision for ECRs to act as highly skilled consultants for methods they are experts in, combining this with answering research questions of their own.

- A major barrier to shared lab resource use is a lack of clear information about equipment, including capabilities, training requirements, building access and so on. Again this highlights the importance of technical staff to provide and update this information, ideally in a central website similar to University of Auckland's [ResearchHub](#).
- (2)** Improved focus on high-quality data management systems and support as integral infrastructure for CRIs. Research data management needs to be encouraged, resourced and maintained, without added burden on researchers. An increased focus internationally on open, transparent research increases the need for researchers to store their data in ways that allow access and use by other researchers, where possible. Relying on publications is not sufficient, as much research remains unpublished due to time constraints. As this is a highly complex issue, any research data management system or policy would need to be highly flexible, fit for purpose, and development driven by a team of researchers and data management experts. This ties back to Suggestion 1, as research data management needs ongoing support and curation, with stable funding allocated for people to undertake maintenance and development.