Manaaki Whenua Technicians response to Te Ara Paerangi - Future Pathways Green Paper

This submission has been collated by staff members in, or associated with, technical science roles at Manaaki Whenua – Landcare Research in response to MBIE's Te Ara Paerangi - Future Pathways Green Paper. The intent is to provide visibility of the experience of an important component of the MWLR workforce. However, this submission should be considered as independent to Manaaki Whenua's organisational submission.

In general, it is widely felt that the technical workforce are undervalued and that a review of the New Zealand Research Science and Innovation system provides an opportunity to address these concerns. Structural change can be made which will bring positive change both for the workforce and for research outcomes.

Research Priorities

National research priorities should be set for the medium -long term (5 to 10 years respectively) to provide some stability, as seen with the National Science Challenges. Intermediate goals should be set in consultation with the affected communities and the research community.

Te Tiriti, Mātauranga Māori, and Supporting Māori Aspirations

Across the research sector in general there is a lack of diversity including very few Māori staff[1]. This trend is also seen in the technical workforce, where only 2.9% of technicians at MWLR identify as Māori. There needs to be a concerted effort focussing on remediating this across the sector as a whole. As a starting point there should be a requirement for all organisations to collect ethnicity data using a standardised method. These data are not currently available and make it impossible to know the true level of underrepresentation, let alone track progress within an organisation or to compare between organisations.

Research organisations should uphold the principles of Te Tiriti and value mātauranga Māori as a knowledge system. The development of joint research initiatives is key as they have multiple benefits for both research outcomes and the affected communities. Internships/partnerships/jobs for nature style programs may help Crown Research Institutes recruit more Māori staff into technical roles. Once employed we need to ensure that mentoring and supportive environments for Māori staff are provided. We also advocate for targeted employment of Māori and Pacific staff into NSDCs to enhance connection with collections from their whenua.

We have kept our response to this section brief as due to the lack of Māori staff we do not feel we currently have the expertise, nor perspective to address the questions raised.

1. McAllister, T. G., Naepi, S., Wilson, E., Hikuroa, D., & Walker, L. A. (2022). Under-represented and overlooked: Māori and Pasifika scientists in Aotearoa New Zealand's universities and crown-research institutes. *Journal of the Royal Society of New Zealand*, *52*(1), 38-53. DOI:10.1080/03036758.2020.1796103

Core Functions

Core functions are those where the cost of providing a service cannot efficiently be attributed to individual projects or clients. This includes laboratories where considerable periodic investment is required to maintain a level of service, or infrastructure and the associated maintenance such as collections and databases where there is not always an immediate need for use, but these resources are invaluable as long-term data sources. In addition to this, databases are dynamic systems and would benefit from core funding to integrate data into existing or new data repositories. This would lead to vastly improved access to data. Data storage and accessibility is often ad hoc, and the research system as a whole would benefit from improved, future-proofed data repositories and the ability to access datasets.

Funding

We generally feel that a well-designed system should improve science sector stability and resilience, for both organisations and staff. The current competitive model has unintended negative outcomes for the science which is carried out and the morale of the workforce, resulting in inefficiencies due to substantive efforts being spent on bidding for funding rather than carrying out research. This is relevant to both external competition for funding and internal competition for base grant funding (currently Strategic Science Investment Funding).

We suggest the most effective strategy for base grant funding should cover the salaries of technical staff. Those technical staff who have little or no power to influence funding decisions currently experience high levels of stress and job insecurity which would be greatly reduced if technical staff salaries were covered by some form of base funding. While there were a range of views on the level of base funding it was generally agreed that it would be helpful for the majority (70 – 90%) of the employment costs of technicians be covered by a base grant. Base funding needs to account for total remuneration of staff (salaries, leave, kiwisaver contributions etc) as well as non-chargeable time used for organisational administration, professional development and non-commercial research.

Whilst base funding could have many benefits, we need to ensure there is still flexibility in the system. Flexibility, including the ability to hire new staff, allows agility and the ability to respond to changing research priorities. Currently it is often difficult to redirect funding to emerging areas of urgent research, for example the arrival of Myrtle Rust or COVID-19, and there is a significant lag time before researchers and resources can be redeployed. It is important that it does not become a 'one out, one in' model as this would severely limit the ability to respond to emerging research needs. A combination of base-funding and a smaller component of competitive funding should ensure this flexibility is retained.

A revised funding model could address some of the issues and inequities currently seen across CRIs. However, a base grant funding model would operate effectively only if strong policy controlled the distribution of funding within organisations. A well-designed system would set target values for overhead to staff ratios both in FTE and salaries across the sector. High overhead costs need to be addressed, they are detrimental to attaining commercial funding as CRIs cannot compete with universities and consultants. The imbalance in funding models between CRIS, Universities, and consultancies leads to an imbalance in bidding for public good research with national government Departments, Ministries and Agencies and with territorial authorities. Research organisations may operate much more collaboratively if there is no requirement to recover overhead costs.

We submit that a revised funding system would best serve the investment needs of the science sector if it split the cost of administration and management entirely from the funding of research activities. Funding of science staff should be the core measure of science investment, and researchers of all levels should be funded by the science system. Being able to utilise technical staff for what they actually cost would make the system more efficient and permit higher productivity in the implementation of research activities. Currently technical staff can be charged out at a rate set to recover overhead costs which is more than double their direct employment cost. Technical staff often work with consultants or staff from other agencies doing the same level of task but being paid significantly more. Charging of clients through this revised system should seek only to recover employment costs plus the material costs of research work. At present our clients, many with restricted budgets such as territorial authorities, government agencies and community organisations are often unable to afford to contract CRIs to carry out research, predominantly due to CRIs needing to recover high overhead costs. The 'EnviroLink' fund was set up to allow a sub-set of less well-resourced councils to access CRI knowledge in recognition of this. Other groups with vested interests in financial return may better fund the science system through stronger linkages between, for example, environmental performance and levies. In addition to this cross-CRI efficiencies could be found for administrative staff and processes, for example software solutions, financial systems and employment agreements could be standardised.

In the broad context of operationalising and implementing national research priorities we feel that it is important to include technical expertise at this level as it helps to ground ideas and give a realistic view of what is actually feasible given current technology and the size of funding to be allocated. Any panels or working groups set up to set priorities should include members with technical expertise. Technicians feel that the design of a funding system should reflect the core nature of this research role. Technical staff are fundamental to a system that requires broad areas of expertise and years of experience to reliably and accurately develop and transfer experimental methodologies into repeatable science. Research proposals should include early input from staff with technical expertise to ensure a realistic proposal which takes advantage of the latest techniques and equipment. Field staff are often the face of research for stakeholders, this relationship building is important and should also be acknowledged as part of the research process as it enables research of value to end-users to be developed. One way to ensure this happens is for MBIE to require technical CVs as part of the contestable funding process.

Institutions

Capability, skills and workforce development

Career development opportunities and progression pathways for technical staff are not clearly defined. While time for career development may be available within a technical role, this time is limited and often under-prioritised in comparison to completing tasks within commercial projects, or the pressure of accumulating too much administration/unfunded time. Acknowledgement of the importance of ongoing professional development and training by prioritising these activities is essential for career development and the retention of skilled staff. There are few training opportunities within New Zealand for technician-specific development, outside of mentorship or "on the job" training, with such options dependent on available time and resources. Undertaking training to develop skills beyond a purely technical scope is possible, such as data analysis or bioinformatics, but these newly acquired skills then need to be employed within projects with ongoing mentoring and support to ensure that the skills are used, maintained and built upon.

While there may be defined measures in place within an institution for progressing and developing a given role and/or moving beyond its scope, these may be unattainable for all science roles, and/or include measures for progressing that are not relevant to a technical career track. It may also be that this progression pathway only defines progression as a move from technician to researcher (for example) and/or undertaking more management-based roles, with few, if any, means to measure or actively progress and reward career development in terms of growing experience in breadth or depth, expansion of skill set and competency, and general recognition of technical expertise. For technical-specific development, such as from technician to senior technician, many of the required metrics may be that of progressing toward a researcher, rather than a clear pathway of progression through a truly technical trajectory, hinging on technical development and objectives. Career progression pathways within a CRI may then be set in two pathways, researcher and technician, but much of the requirements to progress are not uniformly applicable to both pathways, such as increasing qualifications, first author publications, managing projects growing in scope or bringing in revenue of certain thresholds. These example qualifiers may be unattainable (and undesirable) to develop toward when within a technician role, with very few technician-specific measures included to signify technical skill development and growing expertise to counteract this imbalance in progression milestones. Where there is overlap between technical and research roles those who start in a technical role find it very difficult to progress and are made to feel inferior to their colleagues who are recognised as researchers. Therefore, while career development pathways may exist in theory for technical staff, many of the required metrics are unattainable and/or do not reflect desired technical career growth, which culminates in a reality that technical roles often hit a glass ceiling, rather than providing genuine career paths.

Institutions need to recognise, build, and reward a boarder range of skill sets than is done currently. By clearly defining multiple career pathways (e.g., researcher, technician, manager, communicator/engagement), and enabling progression. Recognising and rewarding expertise for each of these career paths would help build and retain workforce capability, in particular pay scales should reflect the level of expertise and experience required.

Workload and knowledge transfer

Many CRI technicians are on open term or permanent contracts and are not under direct pressure to actively bid for research funding to support the continuation of their role. Despite this, technician roles can feel insecure and are often highly stressful. Technical workloads can cause stress in various ways, several of which are described below. Firstly, the pressure to ensure that the majority of hours per year, every year, are furnished by funded and/or commercial projects, with a set minimal amount available for administrative or internal company tasks, including professional development. The stress of accumulating these hours is often compounded by the fact that due to the current need to cover overheads, technical charge out rates continue to grow each year (of note, not in-line with salary) meaning the same technical support becomes increasingly expensive which can translate to fewer hours being allocated. Secondly, perhaps as a by-product of competitive bidding, the technical hours pitched for a project are often lean and may not truly represent the hours required to achieve that aspect of the project. Yet there is the overarching pressure that this work must be completed within the hours assigned. A secondary component to this aspect is that a technical voice and viewpoint may not have been involved in project design and bidding, which can further negatively impact a technician's yearly workload and time management.

There is a lack of capacity and very little overlap of key technical skills in many areas. This results in technicians that are continuously overwhelmed and at real risk of burning out. While this may not be true of all CRIs, the experience of “one-out, one-in" in terms of recruitment feeds this cycle, as additional staff are not recruited where the funded hours are not seen as available (i.e., perceived budget constraints). This often translates to existing staff needing to be significantly overwhelmed such that funded hours approach one full time equivalent are evidenced to support a business case for hiring additional staff. This reality means that future proofing technical skillsets and gaining more depth in skill capability is difficult, and with existing staff at full capacity, does not result in an agile workforce that can take on new work nor prioritise their own career development. A base funding system which provides stability for technical staff whilst still providing the ability to respond to changing research needs would go some way to addressing these issues.

Providing and encouraging inter-institutional workshops and training opportunities for research, technical and managerial skills would grow capability, allow better exchange of skills and ideas, and build relationships between institutions. This may include secondments, exchanges or sabbaticals both nationally and internationally.

Creating an inclusive environment that works to retain staff so that institutional knowledge is maintained and enhanced, but that encourages succession planning and capability overlaps is vital. Many technicians have reached the ‘glass ceiling’ of their career and are at the top of their expertise level. Almost all technicians are frustrated with the current lack of options for career progression. To address this there needs to be the ability for succession through more robust recruitment and training so skills and expertise is not lost when a senior member of staff leaves. Actively managing the workforce so that there is a mix of levels (e.g., new recruits and experienced staff) allows knowledge to be passed along, and new skill sets incorporated into the team.

Workforce

Technicians are highly skilled employees with expertise that often takes many years or even decades to obtain. These skillsets enable research to be completed, including the collection of high-quality data and resulting analyses. Technicians have a wide range of skillsets, often not only doing technical tasks in the lab or field, but also researching the most suitable methodology for a given project, analysing results, and writing sections for publications. These technical skills are often not recognised which results in technicians being seen as interchangeable and thus, in theory, replaceable. However, as practice has shown, finding a replacement for a good technician is often extremely challenging, as the level of expertise amassed is broad and requires a high level of knowledge and skills. To recruit and retain these highly skilled staff we need to ensure vacancies are advertised as permanent roles, precarious contracts are unhelpful for building a research career and can result in higher turnover and increased costs for the organisation. One of the strengths of the CRI system at present is that technicians are mostly employed by the organization to complete several projects. This is significantly better in terms of job security than being employed on short contracts to carry out work for (one) specific project.

Many technical roles today differ from what they used to be just a decade ago and need to be reviewed. The traditional technician would have typically performed a few clearly defined repeated tasks, that did not require a university degree. Today’s typical technical workforce are university graduates (including Masters and PhDs), performing multiple, very complex tasks, including project planning and management, research, budgeting, facility maintenance, staff training and supervision,

equipment procurement, ordering, analysis of results, writing for publications - all this on top of their technical tasks, that increasingly become more complex and varied, making this role stressful.

Science technicians are highly skilled employees and technical roles should be recognised as essential and valuable. Technical positions should be permanent roles with clear position descriptions and career progression with fair remuneration and training opportunities. The experience and level of technical skills should be used as a main measure for salary (just as publications and funding success for scientists) and any increase in experience and skills appropriately rewarded. Special technician-specific metrics could be designed, for evaluation of technical expertise - e.g., years of experience, mastery and kinds/number of techniques, proficient use of highly specialised equipment complex health and safety and field team management etc. Considering more appealing titles that fully reflect person's education and experience would enhance the appeal of these roles.

Due to the high charge out rates of technical staff it is often cheaper to get postgraduate students to complete the technical parts of a research project. Using students / post-doctoral fellows as cheap labour both undermines the expertise of technical staff and undervalues early career researchers. It is often time consuming to train and manage students with few long-term benefits as they are only around for a short period of time. Where work is carried out as part of training for Early Career Researchers this responsibility and associated workload needs to be acknowledged, but these researchers should not be used to undercut the cost of experienced technicians because a project has insufficient funding.

Diversity within the technical workforce is an urgent issue that needs to be addressed. Technical roles at MWLR are filled by predominantly women (58%), which is likely to contribute to the pay equity issues seen across the sector. Most concerning is the lack of ethnic diversity - technical staff at MWLR are overwhelmingly Pākehā (86.9%), with only 8.7% identifying as Asian, 2.9% Māori and 1.5% Middle Eastern, Latin American or African. This requires structural change across the sector as a whole. At a minimum institutions need to be required to annually report on workforce statistics using standardised metrics. The current lack of reporting makes it difficult to make comparisons over time as well as between institutions and sectors. Gender and ethnic disparities should also be addressed through transparent reporting of pay, pay scales and a clear action plan to address these outstanding issues.

Transparency and standardisation across the science sector in regard to remuneration for similar roles between different organisations is lacking. An improved system to better reward the skillsets and expertise of our technical staff needs to be in place, beyond the currently implemented career development system that is not tailored to technical roles (discussed above). Improving the remuneration situation for technicians may be tied into having clearly defined career pathways, such as with job descriptions of prescribed progressive hierarchy, accompanying skill set and responsibilities, with an associated salary bracket, for example: technician, senior technician, research associate, principal technician etc.

A base funding system must be implemented in conjunction with the more important need to standardise the employment practices and conditions across the science sector. This revised employment model will abandon the unjustified secrecy and categorisation of the current system with an open and transparent reviewable system that rewards staff in an unbiased manner.

Research Infrastructure

Sharing facilities such as labs, especially those with ISO/HSNO etc requirements, is likely to be problematic and logistically challenging. Sharing of spaces has potential contamination issues e.g., molecular work requires specialist spaces and cannot be done anywhere, and it is not suitable for other work to be undertaken in specialist labs. Currently most labs are already at capacity so there is little to be gained from having more institutions trying to access limited spaces. However, there is sense in sharing individual pieces of expensive kit which may otherwise be underutilised or unaffordable, although this process would need to be carefully managed. Co-location of organisations on a site can result in increased collaboration and is seen as favourable from those staff currently co-located on a university site. However, the imbalance of power between organisations also needs to be carefully managed to ensure the needs of smaller organisations are not overruled by the host organisation.

Labs and other research facilities should be regularly updated and future proofed. Outdated or poorly maintained facilities become a burden to the whole organisation. To function efficiently labs and facilities need to be managed by knowledgeable people (i.e., skilled technicians).

Databases and collections are a core part of research infrastructure. The oversight, management and maintenance of these need to be recognised as a specialist technical skillset. There needs to be stable (inflation adjusted) long term base grants to fund non-research functions of the organisation such as maintenance and infrastructure costs of collections and databases, which should be separate from funding for research associated with the databases and collections. This would enable long-term planning, greater efficiency and stability for technical staff.