

## General response to the Te Ara Paerangi Future Pathways green paper.

This submission is prepared by research scientists at the Plant and Food (PFR) research site in Motueka. This response is a collection of individual opinions, not necessarily held by the wider PFR organisation. The scientists involved in this submission include researchers from New Zealand, USA, Europe and Great Britain. Within this group there is a considerable knowledge of different funding systems and experience of what works and what does not work with respect to public sector funded R&D across the world. We feel the green paper questions are quite specific and so have occasionally broadened the scope in our responses.

The Motueka research site is Māori owned and leased by PFR. It is primarily a breeding site, breeding kiwiberries, blueberries, raspberries, black currents, hops and pears. The breeding is supported by teams in plant physiology, chemistry, entomology, pathology, genetics and molecular biology. It has close ties with Māori groups and industry growers, providing new cultivars, and science support for local growers with respect to growing systems, diagnostics, pests and disease control.

While we acknowledge the current CRI structure could be improved on a number of fronts, we would like to note that generally the current CRI structure works for this site. We feel that the balance of institute size, regional location and funding mechanisms are generally successful for the research and development that we undertake. PFR royalty returns on developed cultivars has resulted in less reliance on government funding, for germplasm maintenance and breeding, although a significant portion of more basic research is covered under different government grants. The researcher group in Motueka is cohesive, interactive and there is considerable collaboration, within the PFR family, with other CRIs, Universities and worldwide research groups.

### 1. Research priorities

Our perceived challenge with the current setting of research priorities is borne from the small size of New Zealand. Priority settings with the national science challenges were developed and strongly influenced by working groups with members that had considerable opportunity to gain from the outcomes. Creating an unbiased set of priorities needs to be done independently from those that are to gain from it and then sense checked in consultation with the researchers.

Research priorities need to have a long term vision and therefore be locked in for a reasonable time frame. Science benefits from stability in funding. World leaders in science only come about by researchers that are able to access funds over multiple cycles in a similar topic. These should be scrutinised, selected and allowed to develop, with successful endeavours not being penalised and cut by lack of a “New” direction, or a change in government priorities.

As New Zealand excels at high value primary production, we hope there is the will to maintain some research priorities directed at continuing to support New Zealand's agriculture and horticulture. PFR has been highly successful in growing the economy in the food and horticulture sector and it would be a loss for the country to stop this momentum. However, it is a concern that in recent years PFR has moved its focus toward commercial outcomes for PFR, making it harder to undertake research for the public good. We would like to see this readdressed as there is still a strong need for research support for growers and distributors outside this commercial "for-profit" lens.

Finally, when setting priorities there should also be considerations that science is not predictable. Indeed some of the biggest breakthroughs in science have occurred by a chance discovery. While priorities can set a direction, allowing scientist enough free-rein to explore these unexpected paths would create a richer and possibly more impactful research environment.

## 2. Treaty obligations

We strongly support the Māori engagement initiatives. However, from our experience, VM is sometimes a challenge. We feel that this is not through lack of interest, but through lack of time and stretching our already busy Māori partners with another topic to engage with. We would like to see funding directed to Iwi to hire science liaisons that can act as science ambassadors to represent their interest and engage with researchers. These dedicated science liaison people would then have time to work with us to co-develop the research New Zealand needs.

We feel that the regional hub concept would work well. Indeed our Māori owned site is a good exemplar for such an establishment. We provide world class research as well as supporting the local community. We interact with both growers and education establishments, with many of us presenting to local school groups and the local technology institute (NMIT). Having one central research hub would lose this local engagement.

## 3. Funding

The CRIs have suffered a lack of funding for buildings and infrastructure for the last 30 years. PFR has mitigated some of this due to royalty returns, but to have a fully costed grant model makes our science comparatively very expensive. We support the proposal that buildings, rent, maintenance and salaried staff should be covered by another fund, independent of science grants. This mechanism of funding is more like the publically funded USDA and EU approach, and works well in these countries. The final advantage would be that it puts us on a level playing field with Universities applications.

NZ is a plant based economy, we rely completely on plants for milk production, horticulture, and forestry. Currently there is little funded work of basic understanding of plant science, and world-class plant scientists struggle to get their research funded. Time, and time again we see talented plant scientists come to NZ and leave a few years later due to not being able to secure funding. This lack of funding of basic plant science ultimately stops true innovation in this field. To address this we see an opportunity for a dedicated NZ Plant Research Grant that funds understanding the basic biology of plants (akin to the Health Research Council, that just funds research on human health). There also needs to be funds available to support research that industry cannot (or will not) afford. Often with research for industry, the industry will fund research for an answer, but not to understand the underlying biology of the issue. There should be research money available to match funds to support research in the underlying industry issues (maybe without VM requirements).

The current CAPEX system needs an overhaul. The \$2K limit has not increased for over 20 years making now small bits of equipment a CAPEX purchase. CAPEX hinders planning, especially where requests for equipment to do an experiment comes from a different place from the experimental funding. If a new grant is awarded and requires essential CAPEX, the equipment will be bought at the expense of another planned purchase. CAPEX spend is also used as a finance buffer from year to year, delaying purchases when finances are low. This results in equipment being promised and not bought postponing cutting edge science. Science is often time bound, "cutting-edge" one year is "normal" the next so these delays can severely restrict our ability to stay ahead. As well as increasing CAPEX to at least \$5K, there needs to be a CAPEX opportunity embedded in grants that is independent to the finances of the individual institutes.

## 4. Research Institutes

Generally, scientists love to collaborate. Pushing us into a company structure has reduced this ability, but whenever possible there are good collaborations. Now in a digital age, physical location is less important than a fast, stable internet connection. However, there should be opportunities and funds for face to face meetings as these are often the beginning of new opportunities.

The development of a single large institute has its merits, on balance we do not feel that having one large institution would facilitate more collaboration, while maybe altering the structure to have less institute restrictions, making our time less expensive and less tightly aligned to projects would promote more collaborative science. We see the challenges of one large institute reducing agility and potentially becoming more cumbersome. Indeed we feel that the size of the original HortResearch ~500 staff allowed more science agility and less bureaucracy than our current size of 1000 staff.

If mergers are promoted, then addressing some natural discrepancies which were made with the creation of the CRIs could be addressed. Plant based partners such as Scion, AgResearch (Grasslands) and PFR maybe a natural fit, as would combining the fish research at PFR with the fish

research of AgResearch. The chances of reducing site redundancies could be explored with merging institute buildings in Lincoln, Palmerston North and Ruakura could be beneficial.

We strongly advocate the role of science publication as a way to disseminate publically funded research, as this is peer reviewed and measurable.

## 5. Workforce

We applaud the proposal to create job security and pay that is internationally competitive, however a major missing element of NZ science are funds for postdoctoral researchers (postdocs). Postdocs allow focussed short term science to be done and creates a dynamic, international community. Postdocs come for a fixed term and bring experience and linkages from other labs to New Zealand. This missing element is especially important for NZ given its geographic remoteness.

## 6. Infrastructure

While building maintenance is important, world class research facilities are more important. The lack of infrastructure funding is exemplified by our current lack of containment growth facilities and glasshouses. This is mirrored NZ wide with the lack of plant quarantine facilities. There should be a commitment to provide and keep up-to-date science facilities to allow researchers access to undertake world class science.

For very large research infrastructure expenses there should be funded in a contestable manner with more weight being given to consortiums of researchers. There should be provisions for annual upgrades and maintenance of these facilities.