

## INTRODUCTION

---

PGG Wrightson Seeds Limited is a key investor in primary sector Research & Development in Aotearoa New Zealand and we see Te Ara Paerangi Future Pathways as an exciting, once-in-a-generation opportunity. PGG Wrightson Seeds believe that what Te Ara Paerangi Future Pathways is seeking to do is create enduring science, to ensure the improvement of our Research, Science and Innovation system so it can support and grow our country's prosperity and position us at the cutting edge of innovation.

For over forty years PGG Wrightson Seeds (and its predecessors) has worked with both Crown Research Institutes (and their predecessors) and Universities. In this time, we have, in conjunction with these entities, successfully funded and implemented this research into valuable commercial products to the benefit of Aotearoa New Zealand. Over this time, it is clear to us that areas of the RSI system need improvement to address issues and ensure the system is suitable for the country's needs for future decades. While several areas need attention, other areas and practices are performing satisfactorily and it is important that where this is the case, these are not lost in the overall changes planned.

We feel it is crucial to involve the relevant industry and stakeholders in the decision-making and priority-setting process. As a key investment partner, PGG Wrightson Seeds Limited is in a unique position to see opportunities at a commercial level. As end-users of science, we implement Research & Development for gains, both for our business and Aotearoa New Zealand's economy.

## EXECUTIVE SUMMARY

---

While we have responded to the questions as set out in the Green paper, some of the key points that PGG Wrightson Seeds see as important for the RSI review to address include:

- That the current RSI system is impacted by systemic underfunding.
- That competition for the small amount of competitive funding is contributing to a fragmented RSI system.
- That there is a need for a more stable funding environment for the RSI system, particularly in supporting pastoral agriculture (which has demonstrated its continued importance to Aotearoa New Zealand through the pandemic).
- That there needs to be better support for applied research, particularly agricultural research, and for adoption of new technologies.
- That PGG Wrightson Seeds has demonstrated several models for successful public-private partnerships and believe we can make a positive contribution to this process and the design of the new RSI system.
- That there needs to be a pathway for existing successful private-public partnerships. For PGG Wrightson Seeds this is around how to maintain its current significant co-investment to bring innovations through for end-users and Aotearoa New Zealand.
- That the national research Priorities need to be developed by the Government in concert with Māori to give effect to Te Tiriti but also include industry/sector stakeholders and end-users (community).
- The key principles around Priority setting must focus on a problem/opportunity, be long-term to encourage investment and have measures for how the impact of the research undertaken will be measured.
- Operationalising the Priorities needs to ensure there is strong and clear strategy, governance and leadership.

- That any future funding model needs to change the incentives attached to the funding, otherwise the same outcomes and issues as currently happening will occur.
- An outcome of this review should be for more collaboration in our science landscapes. The Wageningen University WUR model in the Netherlands could be considered, where Government research entities are either physically or virtually co-hosted, and co-located, into a focused research effort.
- There is an opportunity for better coordination around property and capital investment and this can also be extended to a number of the services, which could equally be shared.
- Making knowledge exchange and impact generation key outcomes for each national research Priority will go some way towards helping improve this area.

## **BACKGROUND**

---

PGG Wrightson Seeds is the largest proprietary seed company in Oceania. We encompass all facets of the forage, grain and turf seed market, from research and development to seed supply and on-farm support.

PGG Wrightson Seeds' objective is to enhance the profitability of farmers and growers by providing them with proprietary grass and forage seeds that deliver high-quality feed for improved animal performance and production. We are a key part of the Arable industry, supplying food-grade cereals to mills and breweries, while also supplying peas to New Zealand and international markets as well as turf seed.

PGG Wrightson Seeds has a strong emphasis on research and development, extensive experience in plant breeding, animal health and nutrition and has developed management practices to ensure the best use of their cultivars (through working research farms, such as Marshdale). To achieve this, PGG Wrightson Seeds has developed relationships with key primary research partners in New Zealand – AgResearch and Plant & Food Research, along with both Lincoln and Massey Universities as well as numerous research organisations internationally. We have also been a partner and/or co-funder in numerous MBIE, MPI, Callaghan Innovation, Sustainable Farming Fund and SFFF programmes.

Formerly part of the PGG Wrightson Group, PGG Wrightson Seeds Holdings Limited is now owned by the Danish farmer co-operative, DLF. We continue to operate the New Zealand business to deliver innovations for New Zealand agriculture.

## **IMPORTANCE OF THE PRIMARY SECTOR**

---

Aotearoa New Zealand's primary sector is forecast to generate over \$50 billion in revenue in the financial year to June 2022, representing 82.4% of merchandise exports. In addition, the sector employs 13.8% of New Zealand's workforce – 367,000 people<sup>1</sup>

Agriculture (including arable) makes up \$31.2 billion of this, a significant and consistent contributor to the economy.

Companies within the primary sector make significant investments into research and development, crucial to its position as a world leader in efficient farming systems. Support from the RSI system in this area is critical to NZ Inc staying ahead of the curve in terms of climate-friendly food and fibre production and income.

---

<sup>1</sup> Situation and Outlook, Primary Industries, December 2021 – Ministry for Primary Industries. Figures as of 2019.

## R & D FOCUS – PARTNERING FOR SUCCESS

---

PGG Wrightson Seeds Limited has a rich history of successful co-investment with the RSI sector through joint ventures with public researchers, through a Primary Growth Partnership and involvement in a wide array of MBIE programmes. Over the last decade, PGG Wrightson Seeds has invested over \$170 million in research and development.

A key philosophy of PGG Wrightson Seeds in undertaking our R&D activities is the view of partnering for success. While this sounds obvious, in reality, it means that our partnerships with Crown Research Institutes (CRI's) or universities are where **all** our funding for these activities are placed. We do not seek to do similar work ourselves or with other parties. To this end, we are a committed partner to the chosen RSI providers. This is not a common practice as many other companies in this field 'hedge their bets', using partnerships as a backup or complement for existing research being carried out internally. PGG Wrightson Seeds partnerships are partnerships in the truest sense of the word – in these projects, there is no separation of people along employer lines – everyone is focused on the success of the project overall. While this approach is a riskier proposition, it has paid off, resulting in success for both the business and for the New Zealand economy. An example of this success for the New Zealand economy can be seen in the [final report into the Primary Growth Partnership](#).

PGG Wrightson Seeds has three major partnerships:

1. Grasslands Innovation Limited – is an incorporated joint venture company owned 70% by PGG Wrightson Seeds Holdings Limited and 30% by Grasslanz Technology Limited (a 100% owned subsidiary of AgResearch Limited). Grasslands Innovation develops and commercialises proprietary forage technologies for pasture-based animal production systems. This includes investment in step-change technologies, new breeding methods and biotechnology to create economic value for farmers.
2. Forage Innovations Limited – is an incorporated joint venture company owned 51% by PGG Wrightson Seeds Holdings Limited and 49% by Plant & Food Research Limited. Forage Innovations is a Research and Development (R&D) company that funds the development of forage brassica and forage cereal technologies to create economic value for farmers.
3. Endophyte Innovation – is an unincorporated joint venture between PGG Wrightson Seeds Holdings Limited and Grasslanz Technology Limited. Endophyte Innovation seeks to discover, categorise, develop and commercialise Epichloë grass endophyte (novel endophytes) in pastoral and turf grasses for the benefit of pastoral farmers and turf users.

Revenue for all these entities is generated from a royalty paid on sales of these products by PGG Wrightson Seeds, with the revenue in the first instance used to fund further R&D, primarily with the relevant CRI and PGG Wrightson Seeds. PGG Wrightson Seeds brings to these collaborations its commercial acumen and a proven ability to implement and commercialise new and valuable technologies. This is shown in how our partnerships set their research priorities, the strategy implemented and the governance structure. Overall, the programmes are well-led (with leaders from both the RSI area and PGG Wrightson Seeds) and governed with Board members from each party. PGG Wrightson Seeds is responsible for commercialising the new technology to the benefit of itself, the collaborating RSI, New Zealand farmers and the wider New Zealand economy and society. An added benefit is that these private-public activities provide a pathway for those scientists interested in commercialising innovation to move into the private sector.

Below is a list of some of our more recent successes from these joint ventures:

- **AR37 endophyte** – Developed through Endophyte Innovations (and its precursors), AR37 endophyte aids persistence of ryegrass, with AR37 reducing the need for insecticide treatments to control insect pests like Black Beetle and Argentine stem Weevil. It also reduces the need to replace ryegrass pastures (reducing cultivation and tractor use). It has been estimated independently that the use of AR37 endophyte has contributed \$3.6 billion to

the NZ economy through the life of its patent<sup>2</sup>. The work in developing AR37 endophyte and the technology itself has been recognised by being nominated for, and winning, a number of awards, including:

- In 2014 a co-recipient of the AgResearch Technology Prize – recognising outstanding achievement in technology transfer for commercialisation of AR37 endophyte
- In 2015 Grasslanz Technology was a finalist in the NZ Hi-Tech award for the AgriTech Category for the AR37 technology.
- In 2018 endophyte team (including Grasslanz) received the NZIAHS AgMARDT Technology Transfer Award
- In 2018 the Royal Society of NZ Pickering Medal went to the endophyte team (including Grasslanz) Making the grass 'greener' by commercialising a novel grass-fungi partnership
- In 2020 the Royal Society NZ Thomson Medal for leadership in the commercial delivery of plant and microbial technologies to farmers from both publicly and privately funded research, and for improving pastoral sector productivity.
- **Ecotain® environmental plantain** – PGG Wrightson Seeds' work and investment turned a common flat weed (plantain) into a valuable pasture forage with benefits of reducing nitrogen leaching (helping improve water quality) as well as reducing nitrous oxide emissions. This technology won:
  - The National Fieldays Innovation Award in 2018 and;
  - The Innovation & Collaboration Award at the Inaugural Primary Industries Awards in July 2019.

Plantain is part of the Grassland Innovation sphere of work and Ecotain was developed in partnership with Massey and Lincoln Universities and Plant & Food Research.

- **Pallaton raphanobrassica** – Developed with Forage Innovations and within the PGG Wrightson Seeds/Grasslanz Technology Primary Growth Partnership programme with co-funding from MPI, Pallaton raphanobrassica is the first new forage brassica species released in over 30 years. Pallaton has improved disease and insect tolerance and greater water use efficiency over other forage brassicas.
- **Cleancrop™ brassica system** – Developed within the Forage Innovations joint venture, the Cleancrop™ brassica system is a natural herbicide-tolerant forage brassica system which reduces the need for herbicide applications reducing chemical and tractor passes.
- **Relish red clover** – Developed by the Grasslands Innovation, Relish red clover won the AgResearch Technology Award in 2018. Red clover is an important legume in pastures with the ability to fix atmospheric nitrogen helping to reduce demand for nitrogen fertiliser.

---

<sup>2</sup> "It has been estimated that in New Zealand the use of AR37 endophyte has contributed NZ\$3.6 billion to the economy through the life of its patent." ACIL Allen Consulting (2017). New Zealand's Science System: Case Studies. Report to the Ministry of Business, Innovation and Employment. Sydney, Australia

## RESPONSES

---

Following are PGG Wrightson Seeds' responses to the questions asked in the Te Ara Paerangi Future Pathways green paper. As we are involved in the food and fibre sector, our responses are focused on the primary industries and related parts of the RSI system.

### **QUESTION 1: Priorities Design**

---

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

PGG Wrightson Seeds believe that, in essence, Te Ara Paerangi Future Pathways is seeking to create enduring science. History shows that Priorities shift with the Government of the day and are tied to election cycles and, as such, few policies and priorities endure into the following Government's science agenda. Therefore, what we see are regular changes in science policies or priorities with each successive Government's agenda. The outcome of this includes wastage of time and effort and, as the underlying issues are not corrected, any new funding gets syphoned away into new structures. The result is a system that is highly fragmented and drives the creation of silos that begin competing with each other. Our view is that bi-partisan support (with other political parties) is critical to the success of national research Priorities.

With the previous paragraph in mind, PGG Wrightson Seeds believes national research Priorities should be important and undisputable areas requiring RSI solutions for the good of Aotearoa New Zealand and the world (ideally there would be an element of obviousness in them). For example, areas like climate change, environmental sustainability/nature positive (not just stopping degradation but improving the physical environment), feeding growing populations and biosecurity (including protection and management of pandemics) are all areas that could be Priorities. It is important that the Priorities not just address the social and environmental issues but also have a clear economic focus (value to New Zealand). It is also clear that more support is required on research that supports our major economic engines, such as agriculture, given their importance to New Zealand's recovery from the current pandemic.

The Priorities need to be developed by the Government in concert with Māori to give effect to Te Tiriti but also include industry/sector stakeholders. However, a clear framework on how Māori and Industry engagement can be achieved in a coordinated manner is needed

Those Priorities should be broad and ambitious, with stretch elements while being flexible enough to cope with changing conditions and external factors. Broad and ambitious Priorities allow scope for several activities (some unthought of today) to fall under the Priority and avoids Priorities being too prescriptive, limiting the RSI system and its ability to succeed and to pivot within Priorities when needed.

We see the Priorities having a dedicated and specific amount of guaranteed funding allocated to each Priority for a long period of time (at least seven years) to help avoid the issue of wastage as outlined in the opening paragraph to this question.

### **QUESTION 2: Priority-setting process**

---

#### **What principles should guide a national research Priority-setting process?**

As acknowledged in Te Ara Paerangi Future Pathways, the setting of Priorities for the RSI system is crucial to its success and long-term impact. It is also critically important for Aotearoa New Zealand that this process is clear and well understood.

PGG Wrightson Seeds believes that Priorities need to be co-designed by Government (public sector), Māori, research institutions, industry-good organisations and the private sector (stakeholders)

including end-users). These Priorities can be seen as overarching missions for the improvement of society and business. Mission economics is a methodology used by the European Union in developing its Green Deal. Missions are determined by consensus i.e. sector and Government input. Missions are built and solved through collaboration, on a large scale, between public and private sectors. From the Missions, the science projects are created, and funding allocated - this is where the private sector and research institutions participate.

The National Science Challenges (NSCs) were intended to be mission-led and these guided the other research activities. Mission-led Priorities have the benefits of being interdisciplinary, working together under one umbrella, which can reduce a siloed and hyper-competitive environment, while working with longer time horizons and committed funding (basically providing enough time to figure things out). While not perfect, there are elements of the NSCs that should be retained and used in the priority setting process.

The key principles around Priority setting must:

- Focus on a problem, or opportunity, (a mission) under which will then come areas such as a field of research or technology
- Consider both current and future needs
- Be long-term to encourage investment and not just follow the latest fad
- Be set in a non-partisan/inclusive way.
- Be set in consultation, especially with stakeholders
- Use information, analysis and experts (including stakeholders) in independent panels around approving activities and funding
- Consider and have measures for what success will look like – how will the impact of the research undertaken be measured?

The green paper features a lot of discussion on inputs but far less on outputs and impact, which we believe should be a key measure of success and part of the principles around the setting of Priorities.

As end-users of science, implementing the results of the RSI system, PGG Wrightson Seeds is well-placed and willing to contribute to this process.

### **How can the process best give effect to Te Tiriti?**

Te Tiriti is best understood as a partnership, not all or nothing and not one in favour of the other. For example, the long-time horizons associated with Māori business is a compelling reason to build relationships with Māori. Many businesses and parts of the science sector have lost the long-term view. Māori businesses have never lost their long-term and often intergenerational horizons, and this gives them a unique opportunity to scale enduring businesses and even become New Zealand's next multinationals. Long-term research and development programmes appear well-aligned with Māori businesses.

### **QUESTION 3: Operationalising Priorities**

---

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

Setting the strategy for the national research Priorities and how they are operationalised is currently made more challenging by the number of Ministries and Ministers who oversee, or have a role in, delivering science in Aotearoa New Zealand from a social and economic perspective. Both MBIE and MPI are large Ministries and the collaboration between these two Ministries would need to be improved if either one of these was given responsibilities in operationalising the Priorities.

A further issue is that over the years the expert capability inside Government has been continually stretched to a point where at times expert capability is limited.

PGG Wrightson Seeds believes that to operationalise these Priorities the following areas of strategy, governance and leadership need to be addressed.

Strategy setting should involve industry stakeholders to ensure there is a clear fit to the industry. The setting of the strategy should be separated from the Priority setting process and should ensure relevant information about the work, the opportunities, costs and deliverables are considered.

Governance is critical to the success of the new RSI approach. A strong governance structure that includes scientists (experts), Government, Māori and industry will be required. We believe that there should be clear separation between governance oversight and the operational roles, though note it is important for governance to have access to the science leaders and also have subject matter experts in the governance team. This is because strong governance is best delivered when there is an understanding of the work (including the challenges and opportunities).

Leadership is around providing the day to day direction and creating the correct working environment for the Priority. This may primarily be someone from within the RSI structure but can also include stakeholders.

The current joint venture entities PGG Wrightson Seeds are involved in have a clear focus on these three areas and as such have been successful in delivering innovative science that has benefitted all those involved and Aotearoa New Zealand.

## **QUESTIONS 4-6:**

---

### **Māori engagement, protecting mātauranga Māori in research systems and thoughts on regionally-based Māori knowledge hubs**

PGG Wrightson Seeds have sought to provide an overarching response to questions 4 – 6 in relation to Māori engagement.

We see a collaborative (co-design) of Priorities with Māori as the perfect merging of perspectives and values.

PGG Wrightson Seeds take a long-term view to our business and investment into science with our strategy of “playing the long game” ensuring we are not solely focussed on the short-term but that we are doing the right things in order to be around in the future. This approach fits comfortably into the long-term, intergenerational approach that Māori operate under.

It is important that Māori engagement is not superficial or a box-ticking exercise. This is why co-design from the outset will be critical if the Government is serious about bringing Mātauranga Māori into mainstream science. However, it is not as simple as Government just decreeing this to happen, researchers and businesses will need to see the value proposition.

## **QUESTION 7: Core Functions**

---

### **How should we decide what constitutes a core function and how do we fund them?**

We agree that areas like high-priority services are a core function, and this has been highlighted by the current pandemic. It is important to ensure there is a dedicated funding stream for maintaining those. If, as we assert previously, the Priorities are obvious, then core functions are fundamentals.

Funding of core functions is impacted by the fact that the RSI system operates on what has been a diminishing source of funding. The core functions in the current CRI model are long-established, however, their ability to carry them out was less about capability and more about funding. The ability of the CRIs to carry out their scientific programmes has been diminished because of this reduced funding.

## ***QUESTION 8: Establishing a base grant and base grant design***

---

### **Do you think a base grant funding model will improve stability and resilience for research organisations, and how should we go about designing and implementing such a funding model?**

It is unclear whether a base grant funding model will improve stability and resilience for research organisations. What is recognised is that funding is a critical issue with uncertainty about future funding complicating medium/long term planning and reducing the scope to commit to long-term partnerships. The overall amount spent on the RSI system is also crucial to the discussion with more investment required overall.

Another challenge around funding is the shorter-term nature of funding. This increased focus on short-term outcomes has shifted businesses to quarterly, half-yearly and annual reporting cycles and strategies are cached in these cycles. Few companies invest in projects that won't deliver strong earnings quickly. The focus on the short-term reduces the ability of the business to adapt. Science, likewise, has incentive structures that channel thinking towards short-term deliverables. Grants expire meaning the projects are often shortened to meet the funding duration. Enduring science programmes are an exception rather than the norm.

PGG Wrightson Seeds believes that regardless of how the RSI system is funded, the incentives attached to funding need to change, or the same outcomes will occur.

The current competitive funding models drive behaviours that reward overly theoretical science. This can be seen by the narrow range of academic disciplines represented on the funding review panels. Further to this, the sector is becoming more reliant on MBIE funding (which is increasingly difficult to get) thus the standards for science impact (publication) are being applied ever more. The test for getting money from the funds is the publishing record - this is the influence of the universities. As a result, scientists chase projects that get published in higher-ranked journals meaning what isn't done is the 'everything else', including most of the applied science. The incentives that drive science for publishing impact, also create a disconnected science ecosystem. As a country, we are investing heavily in the invention aspect of science. This is the deep science, blue sky research and the creation of new knowledge, that gets published in journals. In 2020, this accounted for approximately 70% of the total amount invested<sup>2</sup>. What creates new opportunities and value for New Zealand is the innovation aspect, which includes the repurposing of old science and technologies into new solutions. New Zealand has historically been very good at applied science, but because the incentives are misaligned, it lacks focus in the current science framework.

This current approach has seen many long-term programmes in some of the CRIs abandoned as financial imperatives shifted their focus to short-term, project-based research with higher chances of publications. Funding mechanisms have also shortened the time horizons for New Zealand science in general with funds allocated on a project-by-project basis and few enduring more than five years. It should be noted that differing leadership in the CRIs have also led to very different outcomes, with some embracing the change in direction in the last round of reforms and worked closely with industry to add value and are thriving as a result, with financial rewards for the organisations and broader impact for Aotearoa New Zealand. Others have taken a different approach and have not experienced the same levels of success and impact generation.

Another area for any new funding model to recognise is that the strength of scientists is in doing science and as such, it would ideally ensure that scientists are not spending a large proportion of their time chasing funding. Instead, the focus should be on delivery of science and uptake of research as well as efficiency of spend.

It is also important that any new funding system ensure that private sector engagement can occur, and the costs are not too prohibitive.

The consequences of New Zealand's current science funding model are that the sector is highly fragmented, siloed, time horizons have shortened, and there needs to be a high likelihood of success



before embarking on the research. There is little or no support of applied work, and in particular, work to improve adoption into New Zealand farming systems. Long term research projects i.e. ones that require multidisciplinary approaches and those that require expertise from different research institutes have become the exception, rather than the rule. Some of the biggest advancements made in pastoral agriculture research, such as novel endophyte technologies – a decades-long project – would almost certainly not happen in our current environment.

Another aspect of funding is the role of Private-Public Partnerships. As mentioned previously, PGG Wrightson Seeds has experienced success through co-investment with Crown Research Institutes AgResearch and Plant & Food Research and these are an example of a Private-Public Partnership being very successful for both parties and the country. While there is often wariness of the Private-Public model, in the right circumstances, it benefits all involved parties, not just the commercial interests. In these partnerships, organisations like PGG Wrightson Seeds often act as a bridge for the so-called ‘valley of death’ between research and commercial reality. This is often a difficult stage of technology development, but the delivery of new agricultural forage cultivars has been a success story for those researchers and organisations involved. These demonstrate the ability of the private sector to partner with the RSI system to assist in research outcomes being applied and translating into economic impacts across the board. In these partnerships, the value of the IP generated is captured in royalties on the products developed and those royalties are reinvested back into that area of research. The value for Aotearoa New Zealand is returned through the supply chain from; increased on-farm profitability, more employment, through to increasing income and tax from exports.

Finally, the current approach to co-investment within the RSI system is only allowed if there is more than one commercial entity. While this is intended to discourage anti-competitive behaviour, it also has the unintended consequence of excluding Crown Research Institutes from early-stage, exciting research. This is because, due to the commercially sensitive nature of the intellectual property involved, private companies will seek to undertake the activity themselves or not at all.

## ***QUESTION 9: Institution Design***

---

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

Greater clarity of purpose is required. Universities have as their core function the teaching of students (capability building) and undertaking more theoretical research. Therefore, the measurements for success of Universities should be around publication (scientific research), student numbers and performance in delivering skilled people to the New Zealand workforce.

The current CRI's should have a focus more around working with stakeholders/industry on undertaking innovative and world-leading science which is delivered to the industry for the betterment of New Zealand (economic growth balanced with environmental and social benefits). The measures of success of CRI's (under the current structure) should therefore be around stakeholder feedback and actual delivery of meaningful science.

There is a significant risk that by not reviewing all parts of the RSI system (noting that CRIs and Callaghan Innovation are in the review but other research entities, the funds, the universities, and the Government departments that run the sector are ‘out of scope’), the review will not deliver the best RSI option for Aotearoa New Zealand.

One of the major limitations in the RSI system in New Zealand is the small amount of work in applied research. Applied research in the science sector was the biggest casualty of the 1990's reforms, then in the early 2000's the Performance Based Research Fund (PBRF) was introduced and further disincentivised applied research. As mentioned previously a new model would need to change the incentives, to make publishing for impact a consequence of good science, not the driver.

Any redesign of the RSI system should seek to avoid an approach that results in an unwieldy organisation, that is top-heavy with management and complicated by internal politics. Funding in this system may be more of an internal activity but would still present significant challenges. Such an organisation would also make it more challenging for the private sector to engage with it.

Ideally, PGG Wrightson Seeds would like to see as an outcome of this review more collaboration in our science landscapes. Collaboration needs two elements to work effectively; good relationships between scientists from different organisations and dedicated funding that means no organisation is sacrificing their funding to aid the other group(s). There is an international model which may offer some options for a possible way forward, which is Wageningen University WUR in the Netherlands. In this model, Government research entities are co-hosted and co-located, into a singularly focused research entity. Through this model, the CRIs could retain their independence but be represented by an over-arching umbrella. Under this scenario, there is no need to compete with each other as there is a greater good.

Therefore, the concept in New Zealand would be to bring together, either physically or virtually (through co-hosting and/or co-locating) Government research entities, businesses involved in R&D, levy-paying organisations and incubation hubs into a focused research entity. As an example, a New Zealand version of Wageningen University could see the CRIs associated with the land-based industries i.e. Plant & Food Research, AgResearch, Manaaki Whenua - Landcare Research, and Scion brought together, at one site, or virtually, to become the leading food and agricultural research entity, creating the reputation that NZ agricultural science is world-leading. Each entity would keep its independence International businesses, universities and researchers will want to partner with NZ scientists and businesses, with the scientific 'horsepower,' such an entity would create. It would attract world-class researchers to NZ, leading to world-class research.

#### ***QUESTION 10: Role of Institutions in workforce development***

---

##### **How can institutions be designed to better support capability, skills and workforce development?**

The way we have structured the science sector where senior scientists are spending proportionally more time on funding applications than research means the 'heavy lifting' in terms of experimentation falls onto the post-doc students or technical staff. This and the focus on short term project success means it is increasingly difficult for people to be innovative when they are worried about their job security. Essentially, we have created an environment where a scientist's career success is tied to project success, with an unfortunate outcome being less risk taking, as a failed project could be terminal for a career. If a scientist didn't have a funded project, then there was no job.

Another area around workforce development is that it needs to be easier for PhD students and post-docs to continue their research in private sector organisations. Too many post-doc positions are for two or three years and at the end of this time, many are lost overseas. If post-docs could be co-funded and supervised in the private sector, they would have a pathway to employment and a potential career. Retaining them in NZ through private sector pathways will improve NZs overall science capability.

#### ***QUESTION 11: Better coordinated property and capital investment***

---

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

PGG Wrightson Seeds believes there is an opportunity for better coordination around property and capital investment. This can also be extended to a number of the services, which could equally be shared.

The concept of co-located facilities as per the Wageningen University model (cited in question 9) is appealing, in that it can build stronger connections between researchers across the RSI system while also allowing more efficient use of resources (such as expensive laboratory equipment). It can also build stronger ties with industry, creating precincts where related work happens. Wageningen University (including its Seed Valley and Food Valley) is a model for co-investment in innovation. The Valleys act as hubs for multiple partners to receive the latest science ideas and then co-invest to bring them through to industry outcomes.

PGG Wrightson Seeds made the conscious decision to move our head office to Lincoln, Canterbury in 2020 to maximise opportunities with key RSI partners; Lincoln University, Plant & Food Research, AgResearch and the growing number of Agri-tech firms in the area. As these organisations finish their new facilities, opportunities for collaboration and co-investment will continue to grow, strengthening ties between the public and private sectors.

### ***QUESTION 12 Institution design and Te Tiriti***

---

#### **How do we design Tiriti-enabled institutions?**

PGG Wrightson Seeds do not have any specific comments to make in relation to this question, other than to say the involvement of Māori, and a clear process/framework for how this can be done, is an important part of any future RSI system.

### ***QUESTION 13: Knowledge Exchange***

---

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

This is a far-reaching question which can be looked at as knowledge exchange between those in the RSI system as well as knowledge exchange from the RSI system to external parties, be they public, private, local or international.

In general, engaging all stakeholders from the outset will be critical to the success of any work undertaken towards the national research Priorities. End-user stakeholders will be a helpful addition to this process because they will seek to ensure research outcomes are taken up.

While there has been historic distrust of the private sector/industry, which relates to the perception of industry as solely profit-focused, our joint ventures show that co-investment can and does provide mutual benefit and social and economic impact for Aotearoa New Zealand.

Making knowledge exchange and impact generation key outcomes for each national research Priority, managed through strong governance and leadership will go some way towards helping improve this area.

When looking at knowledge exchange from the RSI system to industry and public, the RSI system is no longer able to benefit from the Government supported extension activities of the past (e.g. MAF advisors disseminating information). This role now rests with industry-paid advisors and industry players. This makes technology transfer more challenging as there is less of an interface between the scientists and those working at the grassroots.

Often from an industry point of view, there are no clear incentives to adopt new knowledge/practices/technology. This leads to a slower/lower than expected level of impact. This can sometimes be caused by industry concerns around regulations and penalties and needs to be taken into consideration when setting Priorities and measures of success. This is why engagement with end-users right from the start is so important – it can lead to high levels of uptake and application, faster, leading to more impact for the RSI system.

Our experience co-investing through our joint ventures Grasslands Innovation Limited, Forage Innovations Limited and Endophyte Innovations has shown strong success in knowledge sharing and uptake of technology, delivering economic impact for the parties as well as Aotearoa New Zealand. These ventures have allowed scientists to practice in their field, have access to those at the grassroots level and solve real-world problems and allowing New Zealand Inc to benefit.

The uptake of novel endophyte technology in pastoral farming is a good example where knowledge sharing has occurred, with most New Zealand pastoral farmers now using ryegrasses with novel endophyte technology in them.

Licensing of intellectual property, either from the RSI system or a public-private partnership, is one way of ensuring impact generation. If the RSI system return is reinvested into the Priority area, then this will support further research and drive further knowledge exchange.

#### ***QUESTION 14: Workforce and research priorities***

---

##### **How should we include workforce considerations in the design of national research Priorities?**

The workforce needs to be able to be 'retooled' – upskilled and assisted to grow in a system that will be carrying out science in the future that hasn't yet been thought of.

PGG Wrightson Seeds' view is that it is best to consider the setting of national research Priorities first, then establish the workforce requirements to fit the Priorities.

#### ***QUESTION 15: Base grant and workforce***

---

##### **What impact would a base grant have on the research workforce?**

A base grant could potentially allow funds to retool and grow the workforce into Priorities or new areas of research.

The current Crown Research Institutes are systemically underfunded and have generally been shrinking, at a time when the importance of science and research has been widely acknowledged as being more important than ever. Presently, the Core funding is increasingly going to support science staff who have lost funding in the contestable rounds, often not due to their performance or skills, but to well-written proposals that don't always translate into quality outcomes.

#### ***QUESTION 16: Better designed funding mechanisms***

---

##### **How do we design new funding mechanisms that strongly focus on workforce outcomes?**

Funding must reflect the goal of the entity – for example, in a University, the funding should be tied to publication of research, number of students enrolled (EFTS) and development of capability for industry. In the case of the current Crown Research Institutes, the funding should be tied to delivery of science that can be commercialised or add value to specific industry or society or the economy in general.

New funding mechanisms must be robust and have multi-interest panels and processes for awarding funding, including experts with deep knowledge of the area to assess the potential for economic or social impact from funding applications. Research has shown that there is no correlation between the ability of someone who writes a proposal and their ability to deliver results/impact, so there must be a focus on separating a "great proposal" from viable research with high potential for impact and robust outcomes.

As mentioned previously, scientists should be able to focus on science, not an endless succession of funding applications. If they were partnered with industry (where appropriate), scientists wouldn't have

to worry about commercialisation, leaving that to commercial entities, and ensuring R&D uptake is encouraged through extension activities.

Ultimately, good science comes out of strong and stable teams, often best seen in 'Centres of Excellence' where there is core capability and long-term, high-performing teams that are built and nurtured. Teams of this nature aren't built overnight but can be destroyed in a short time, particularly where there isn't a long-term approach to funding.

An example of this is the endophyte research team in AgResearch, which has been the world leader in this area for decades. This team is made up of several science disciplines which work together to provide a coordinated approach to research and product delivery. However, the overall impact of this "team" can be undone if one part of it (one of the science disciplines) loses funding and capability.

### **QUESTION 17: Funding research infrastructure**

#### **How do we support sustainable efficient and enabling investment in research infrastructure?**

We see the most important factors to consider in supporting sustainable, efficient and enabling investment in research infrastructure are:

- The strategic priority and importance of the research. This encompasses the capability and services that it supports, taking into account the national research Priorities;
- Efficiency and the potential to make better use of capital by coordinating and sharing research infrastructure, rather than duplicating investment.

Co-location or close proximity of entities would make it easier to support investment in research infrastructure. The ability for more than one entity to share research equipment would reduce wastage caused by duplication and ensure money is used more efficiently.

### **CONTACT INFORMATION**

If you have any queries on this submission or would like to speak to those responsible for providing it, please contact Eryn Breeding, [Privacy - 9\(2\)\(a\)](#)

## **CONTRIBUTORS:**

---

### **John McKenzie, Chief Executive – Oceania, PGG Wrightson Seeds**

John has been a successful businessman in the herbage seeds industry, in Canterbury farming and in supporting pasture science and technology.

John graduated BAgSci from Lincoln College and worked as a farm management consultant for four years.

Since 1980, John has farmed a mixed cropping unit which has grown to 980 hectares with 750 ha in arable and the balance in livestock.

John was the founding partner of Agricom (New Zealand) Ltd, which was a start-up company in 1985. John closely managed all R&D investments since its inception. In 2005, he took on the management of PGG Wrightson Seeds when Agricom and Pyne Gould Guinness merged with Wrightson Seeds Ltd.

The PGG Wrightson Seeds business was sold by PGG Wrightson in 2019 to DLF, a Danish Seed Grower Cooperation and John has continued to have responsibility for DLF's New Zealand and Australian business, as CEO of Oceania he also sits on the Global Executive Management Board of DLF.

John is Chair of the PGG Wrightson Seeds breeding Joint Ventures with AgResearch 'Grasslands Innovation Limited' and with Plant & Food Research 'Forage Innovations Limited'.

John was a member CRI Task Force Review in 2010 whose purpose was to examine the purpose, governance and funding of New Zealand Crown Research Institutes. He was also a member of the Ministry of Science and Innovation Advisory Group in 2011 and he has chaired FRST funding rounds and Biotech Reviews for MBIE.

John's integrity is well known and respected throughout the herbage seed industry and within New Zealand's pastoral research community.

### **Dr Derek Woodfield, General Manager – Research & Development, PGG Wrightson Seeds**

Derek has a BAgSci (Hons) from Lincoln University and a PhD from the University of Wisconsin-Madison. He worked for DSIR and AgResearch for 33 years. He is internationally recognised for clover breeding and genetics with 2 patents and more than 20 varieties released in New Zealand, Australia, USA, South America and Europe.

The research team he leads at PGG Wrightson Seeds is responsible for developing a range of forages with environmental benefits, including Ecotain® environmental plantain to reduce N-leaching and nitrous oxide emissions from grazed pastoral systems, and Pallaton raphanobrassica which has 40% better water-use efficiency than other brassicas.

Derek has worked closely with different industry sectors including leading the NZ Dairy Industry feed portfolio from 2003-2008, and the Pasture 21 feed programme from 2007-2011. He has considerable experience in managing cross-organisation programmes such as Pasture 21, and a range of MBIE-funded research programmes. The most recent of these is the Primary Growth Partnership programme that was led by PGG Wrightson Seeds and ran from 2013-January 2020. Derek was also a Board member of Pastoral Genomics.

Derek is General Manager of Grasslands Innovation Ltd, a joint venture company between PGG Wrightson Seeds and AgResearch as well as Chair of a joint venture with INIA (Uruguay) and the ALBA joint venture with the University of Western Australia. He also leads research collaborations with Texas A&M University, the University of Georgia and the University of Wisconsin-Madison.

Derek has published more than 150 refereed journal and conference papers, has been an editor for the NZ Journal of Agricultural Research, Euphytica and Crop Science. He has also carried out a range of science and plant breeding reviews in the pastoral, horticultural and arable sectors over the past decade.