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Paul Stocks
Deputy Chief Executive; Labour, Science and Enterprise
Ministry of Business, Innovation and Employment
PO Box 1473
WELLINGTON 6140

By email: paul.stocks@mbie.govt.nz

Tēnā koe Paul

Te Ara Paerangi/Future Pathways – Perspectives from the *Better Border Biosecurity (B3)* Collaboration

The parties involved in the Better Border Biosecurity (B3) collaboration believe their experience over more than 15 years includes perspectives and insights that MBIE find useful as you further consider future pathways for New Zealand's science system.

In particular, B3 has endured over an extended period (ca. 18 years) and across different policy settings for science investment. Over this time, core and valued features have become clearer to all involved. We believe such features could exemplify some of the outcomes being sought through *Te Ara Paerangi/Future Pathways*. We have prepared a brief commentary setting out such features, as well some broader and contextual features of the B3 collaboration.

We would welcome an opportunity to discuss our perspectives and insights with you directly. Please contact me if you are interested in such a follow-up discussion.

Ngā mihi

A handwritten signature in blue ink, appearing to read 'Buwalda'.

James Buwalda
Chair, Collaboration Council

cc: Prue Williams
prue.williams@mbie.govt.nz

Iain Cossar
iain.cossar@mbie.govt.nz



Te Ara Paerangi/Future Pathways:

Perspectives and Insights from the *Better Border Biosecurity* (B3) Collaboration

B3 – Background

The *Better Border Biosecurity* (B3) collaboration was established in 2004, and has been operating continuously since then, albeit under evolving investment, governance and operational arrangements. Many of the features that have enabled B3 to endure through changing operating contexts, over nearly 20 years, are relevant as changes to the research, science and innovation system are being considered through the *Te Ara Paerangi/Future Pathways* process. This paper outlines some of these features, in relation to key areas of focus in the current consultation on the *Te Ara Paerangi/Future Pathways* discussion paper.

The purpose of the B3 collaboration is to provide science-based solutions for border biosecurity, for plant-based sectors in New Zealand. Organisations involved include research providers, government agencies, industry associations, and iwi representatives.

In this paper, we set out some general features of the B3 collaboration within the overall context of biosecurity as a national priority for New Zealand, and then related B3 experience more specifically to the key consultation questions.

Biosecurity - A national priority

The B3 collaboration sits squarely within an area recognised implicitly as a national priority.

Biosecurity includes preventing incursion and/or managing long-term impacts of exotic pests, diseases and weeds. Such impacts – for our pastoral agriculture, horticulture and viticulture, forestry and indigenous landscape sectors – can be particularly devastating, as such sectors contribute significantly to our national economy and are vulnerable to damage from exotic pests, diseases and weeds.

Biosecurity risks are constantly increasing (and will continue to do so), due to both changing trade and tourism dynamics, and changing climate. New and significant biosecurity incursions over the last decade have included Psa (affecting kiwifruit) and Myrtle Rust (affecting a wide range of Myrtaceae species). Continuous innovation is needed to provide options and solutions for managing biosecurity threats and risks. This depends on active investment in biosecurity research, technology development, social science, Mātauranga Māori, and knowledge transfer. This investment needs to

span the full breadth of the biosecurity 'system' – risk assessment, pathway risk management, diagnostics, surveillance and eradication.

The sectors most exposed to biosecurity risk (including horticulture, forestry, pastoral agriculture) generally understand the importance of biosecurity. For example, the annual 'Agribusiness Agenda' published by KPMG¹, consistently ranks biosecurity as the most important issue/risk facing the agribusiness sector. Some industry sectors have significantly increased their investment in biosecurity over recent years; for example, the kiwifruit sector has established a dedicated entity – Kiwifruit Vine Health (KVH)² was established in 2010 to lead the industry response to the Psa incursion. Many primary industry sectors have established Government Industry Agreements (GIAs) to collaboratively manage pests and diseases, especially through readiness and response processes.

Treaty partners also understand the importance of the biosecurity system to protect environmental resources of cultural, spiritual and economic value to Māori.

B3 – a model of an enduring collaboration in a national priority area

Inception – as an 'Outcome Based Investment' (OBI)

The B3 collaboration was established in 2004, initially as an 'Outcome Based Investment' (OBI) funded by the Foundation for Research, Science and Technology (FRST). The OBI programme funded several mission-led collaborations, between 2003 and 2011, but B3 is the only such collaboration to have endured.

Enduring mutual commitment from CRI partners

At the heart of the enduring character of B3 is a mutual commitment from 4 CRIs and a University, to invest collectively in an area of mutual and overlapping interest. While the OBI mechanism contractually bound these research providers, they have voluntarily sustained the collaboration and collective investment since 2011. This voluntary investment has been via CRI 'core funding' (2011-2017) and Strategic Science Investment Funding (SSIF) since 2017. Significant 'aligned' (cash and in-kind) investment has also been contributed through non-research partners.

Focused on stakeholder/end-user needs

As a mission-led collaboration, the B3 collaboration serves the needs of end-users and stakeholders. Initially, there was a primary focus on government agencies (MPI and DoC), but over time the interest of industry sector groups has grown. Now governance of the collaboration includes representatives from plant-based sectors (forestry, pastoral agriculture, horticulture) as well as the science provider organisations and government agencies.

B3 provides a focal point, to enable efficient access to multi-disciplinary biosecurity capability spanning multiple institutions and working across multiple stakeholder sectors.

Committed research teams

Research teams involved in the B3 collaboration have shown a high degree of commitment to the mission and enthusiasm for the collaborative approach. As most researchers are involved in programmes beyond those funded directly by the B3 collaboration, they bring a wide range of experience, skills and networks to their B3 projects.

B3 researchers are connected strongly to international teams and networks, further extending access to capability and resources for the benefit of New Zealand. B3 has established formal

¹ <https://home.kpmg/nz/en/home/industries/agribusiness/agribusiness-agenda.html>

² <https://kvh.org.nz>

linkages with government agencies in the European Union, USA and Australia. These are in addition to formal linkages established by individual parties to the Collaboration (which are also leveraged for the benefit of the B3 programme). Over the years, B3 research teams have attracted and sustained significant in-kind support from government scientists (MPI, DOC and MfE), with a view to increase and maximise research uptake.

Strategy, planning and reporting

The research portfolio is planned and managed by B3 managers, and is overseen by the Collaboration Council. The strategy is refreshed regularly (at least every 5 years, and project planning is managed annually; this involves significant input from government, industry and iwi through a process of co-innovation. The B3 strategy is built on, and brings together important aspects of MPI, DOC and EPA strategies and productive sector environment roadmaps.

The Collaboration reports formally to the parties involved, through an annual report. The 'Annual Meeting' of the collaborating parties seeks their feedback on performance for the previous year and an indication of their investment intention for the future year.

Some recent science highlights

Each year, B3 has been able to demonstrate its science excellence through a very respectable list of peer-reviewed research publications. It has also been able to demonstrate successful development of new knowledge, tools and technologies relevant to current and emerging biosecurity challenges.

Some recent science highlights include:

- Co-developing new risk assessment tools with industry and government
- Assessing insect vectors for *Xylella fastidiosa*
- Leading an international working group exploring biosafety for pre-emptive biocontrol of key insect pests
- Science underpinning the establishment of a new biosensing spin-out company.

Knowledge exchange and Impact

The B3 collaboration is a recognised 'point of entry' for end-users/stakeholders and national and international collaborators for biosecurity research capability. This increases the strategic and operational efficiency for science-stakeholder engagement. In particular, the network involving researchers and end-users/stakeholders provides a strong platform for knowledge exchange.

Indeed, knowledge transfer is a core component of all B3 projects. There is a requirement to set out how knowledge transfer will be facilitated, as part of research proposals submitted for funding. In addition, the B3 team has created specific and dedicated processes for knowledge transfer. The 'Science Partnership Forum', for example, is a regular event where project leaders share progress and results with end-users/stakeholders and discuss emerging trends and issues.

Research planning depends on end-user/stakeholder input and support, in a co-innovation process. Research topics are aligned to recognised industry and sector challenges. An impact pathway must be defined for all funded projects. Knowledge transfer processes, such as those noted above, facilitate shared understanding and agreement about research priorities and how research results will be shared.

B3's recent involvement in the international collaborative platform EUPHRESKO alongside MPI also illustrates how the Collaboration's unique expertise may contribute to inform international phytosanitary guideline, and raise New Zealand's plant biosecurity profile globally.

Funding

Currently, the annual funding is around \$7m, sourced from 4 CRIs (Plant and Food Research, Scion, AgResearch, Manaaki Whenua). Lincoln University is sub-contracted by Plant and Food Research.

Where possible and appropriate, B3 connects its investment to related investment from other sources (e.g. MPI, New Zealand Biological Heritage NSC, GenomicsNZ), and is extensively involved in complementary research with its international partners (e.g. Plant Biosecurity Research Initiative (PBRI) and Centre of Excellence for Biosecurity Risk Assessment (CEBRA) in Australia). Linking complementary investments in this way enables larger, stronger and more coherent responses to complex research challenges, in turn increasing the aggregate value generated.

Industry groups are increasingly connected to the research and are able to co-fund related initiatives. In this way, the reach of the B3 programme is enhanced, through its linkages and potential to leverage investment in industry-funded programmes.

B3's investment model is transparent, giving research organisations, end-users and other stakeholders a clear picture of investment priorities and project funding. This transparency is facilitated through both formal reporting and regular communication/dialogue with stakeholders.

The investment (funding) for the B3 collaboration has changed relatively little since inception in 2004. While continuous funding has enabled the B3 collaboration to endure, the real value of this funding has declined over time, constraining the scope and scale of research that can be carried out. B3 has in turn found it increasingly difficult to respond effectively to new challenges facing the plant-based sectors it serves.

B3 – Demonstrating many features in the *Te Ara Paerangi/Future Pathways* report National priorities

Since inception, B3 has operated as a mission-led science collaboration, focused on a nationally important 'priority'.

While biosecurity is not formally recorded as a 'national priority', the parties to the B3 collaboration have inferred such a priority and collaborated accordingly. Indeed, the expanding sector/stakeholder engagement with the B3 collaboration over time reinforces the implicit priority of biosecurity and the demand for science-based solutions. The importance of sustaining a focused biosecurity investment and collaboration is checked regularly with stakeholders and end-users (e.g. through the annual meeting of B3 collaborating parties). The feedback from such meetings has consistently been that biosecurity not only remains a priority issue but is becoming increasingly critical to the resilience and long-term success of the plant-based sectors that the B3 collaboration serves.

The CRIs investing directly in the B3 collaboration do so on the basis of the importance of B3 science for the industry sectors they respectively serve. Furthermore, they recognise that many features of the biosecurity 'system' are not sector-specific, so a collaborative, multi-sector approach makes sense. Their long-term commitment, while it is checked annually, has enabled the design and implementation of a coherent research portfolio over an extended time-frame. It has enabled the development of cross-CRI and University teams to target major biosecurity concerns including sharing of expertise and infrastructure. This collaborative and long-term approach has in turn strengthened the affiliation and commitment of individual researchers.

Our B3 experience has highlighted the importance of stakeholder/end-user engagement and support for identifying, reviewing and confirming the overall strategy, objectives and areas of research focus.

Extrapolating this experience to the concept of biosecurity as a national priority, it will be important to work with stakeholders/end-users to define specific purpose, goal, objectives and research priorities. Our experience has also highlighted the importance of research leaders participating in the strategy process, to ensure goals and objectives are informed by awareness of knowledge gaps, innovation opportunities and technological risk.

We are very conscious of the importance of an appropriately scoped investment plan, to give effect to an agreed priority. As noted above, the limited funding for the B3 collaboration has in turn constrained the scale and scope of the science-based solutions we have been able to develop. For the future, we believe it is vital that the definition of any national priority is accompanied by an overall investment plan, acknowledging the long-term investment needed for a research response commensurate to the priority.

Te Tiriti, Mātauranga Māori, and supporting Māori aspirations

We acknowledge that the B3 collaboration has only recently actively embraced the challenge of building a Tiriti-anchored approach. However, we fully endorse the value and importance of Te Tiriti, mātauranga Māori and supporting Māori aspirations.

Recent changes we have made in line with our developing commitment in this area include:

- Asserting partnership with Māori and a Tiriti-anchored approach as a priority in the most recent refresh of the B3 strategy. This includes a core commitment to embedding partnership with Māori at all levels – governance, management and operations.
- We have changed the governance structure to include two Māori positions; one is drawn from Te Ara Pūtaiao – the CRI Māori Leadership Group; the other is an independent position nominated by Te Ara Pūtaiao.
- We have adopted a partnership structure at executive leadership for B3, by establishing a new position – Pourangahau (Māori Research Leader) – to work alongside the Director.
- A new Māori strategy is now being developed.
- We are now seeking to include assessment from a te ao Māori perspective of all research project proposals before funding decisions are made. We have dedicated funding for kaupapa Māori/Māori-led research projects, which reflects the Māori strategy of some CRI partners.

We are mindful of the significant further development needed before B3 can meaningfully operate as a Tiriti-anchored collaboration. However, we are keen to be held accountable, by Māori, for our overall commitment and the progress we make.

Institutions and Funding

As a collaboration that has endured for nearly 20 years, B3 has functioned as a collaborative, agile and adaptive 'institution' (although without any legal authority for staff, infrastructure and other resources). Stable governance and management structures have overseen strategy and operations for the collaboration spanning multiple organisations and working with an increasing array of stakeholder and end-user organisations.

A key to the enduring nature of the B3 collaboration is the absence of competition for funding between the research organisations involved:

- Each research organisation commits a level of funding
- The research programme is developed collaboratively

- Each research organisation then contracts to deliver projects up to the level of committed funding.

The B3 research strategy has been reviewed comprehensively about every 5 years and the B3 research project portfolio is refreshed annually. This cadence of strategy and project review has enabled the collaboration to adapt to emerging priorities and to shift course and or focus where needed. We believe it's important to have a mix of short- and longer-term projects in the portfolio, to build knowledge and capability at the same as refreshing the project mix.

While research priorities have evolved over time, leading to changes in the skill sets needed, the participating organisations have generally managed to reassign funding internally in a way that enables them to contribute effectively to the collaboration's changing needs.

This overall approach to reviewing and refreshing the research strategy and project portfolio has also enabled the collaboration to adapt and respond quickly to key industry and sector needs. For example:

- We quickly reallocated investment into research on Psa, following the discovery of that incursion in 2010
- We shifted out our research focus towards brown marmorated stink bug (BMSB) as the incursion risk for this insect pest became more apparent; this included support for an industry-led priority for pre-emptive development of a biological control for BMSB
- We have scaled up research (and international collaboration) to better prepare New Zealand industry sectors for a potential incursion of *Xylella fastidiosa*.

Notwithstanding the 'institutional' character of the B3 collaboration, B3 has limited institutional authority in areas such as physical infrastructure and human resources. Our experience generally is that key investment decisions in such areas rarely reflect specific interests of the B3 collaboration (e.g. our research programme would benefit from investment – somewhere – in an irradiation unit, but we have limited ability to influence such an outcome).

Research Workforce

The long-term investment commitment from the CRIs involved in B3 has – somewhat indirectly – enabled a focus on capability, skills and workforce development for biosecurity research.

We recognise three complementary workforce interests:

- The capability needed now to address current research priorities. In this context, we are fortunate to be able to draw on a wide range of research capabilities across the various research organisations involved. However, we are often constrained by the amount of 'key person' time we can secure, where the funding we have available is limited.
- The future capability needed in the future, to respond to emerging priorities and issues. We are able to develop future researchers with new skills through PhDs (and to a much smaller extent Post-Docs). However, it is difficult to attract PhD candidates who are committed to a long-term research career in New Zealand.
- The long-term capabilities needed across New Zealand institutions, to provide a capacity to respond to key biosecurity risks and threats as/when they occur. Such capability can overlap strongly with the capability needed to address current research priorities, it can be a scramble to assemble the requisite capability if/when a major risk or threat emerges.

The B3 collaboration offers some distinctive capability and workforce development opportunities:

- Research teams frequently comprise staff from multiple organisations. This generates opportunities to expand the scale and scope of research approaches, tackling larger and longer-term challenges through multi-disciplinary approaches. At the same time, researchers gain wider experience of methodologies and infrastructure otherwise limited to individual organisations.
- The close engagement between research teams and end-users (especially industry and sector partners) strengthens researchers' understanding of end-user needs and operating contexts. This is typically enabled through sharing research theme and project leadership between research organisations and end-user/stakeholder organisations. The close working relationship underpins a rapid feedback loop, which helps focus and accelerate science solutions for industry/sector challenges.
- We play an increasingly active role in early career experiences for young Māori within the research partners, and are planning to broaden this with placements within the non-research partners such as MPI.

B3 has a strong focus on knowledge exchange and building capability to support this.

Conclusion

Overall, we believe the experience, over nearly two decades, of the B3 collaboration provides valuable insights to inform policy, structural and operational decisions through the *Te Ara Paerangi/Future Pathways* process.

We have demonstrated an enduring commitment to a national priority (biosecurity) and have built a stable institutional arrangement to enable collaboration across organisations, disciplines and sectors to address this priority. We have been able to adapt as policy settings, industry needs and biosecurity system challenges have changed over time.

The B3 collaboration is not without challenges. We have had limited opportunity to seek funding commensurate with the scale and importance of the challenges we are addressing. We have had limited access to research capability and infrastructure without direct institutional authority for such resources. More recently, we have grappled with whether and how to admit new parties to the collaboration, as institutional interest in joining the collaboration widens.