Evaluation of the Ballance Clearview Innovations Primary Growth Partnership Programme

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Public summary

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Executive summary

Introduction

This document presents the results of an evaluation of the Ballance Clearview Innovations Primary Growth Partnership Programme (hereafter referred to as "the Clearview Programme", "Clearview" or simply "the Programme") conducted by Scarlatti and BakerAg on behalf of the Ministry for Primary Industries (MPI). The Primary Growth Partnership (PGP) initiative was a series of joint ventures between government and industry partners aimed at stimulating innovation to deliver long term economic growth and sustainability for the primary sector.

The Ballance Clearview Innovations Programme

The Clearview Programme was a seven year PGP co-investment between Ballance Agri-Nutrients Ltd (Ballance) and MPI that aimed to transform the primary sector by reducing its environmental footprint while enhancing its profitability. The goal of the Programme was to develop novel products or services that would enable farmers to reduce their reliance on traditional fertilisers, increase their nutrient use efficiency, and reduce farm system nutrient loss to waterways. To date, the Clearview Programme has resulted in the development and launch of four products – My Pasture Planner, MitAgator, SpreadSmart, and SurePhos – along with a series of extension materials and activities to engage with farmers.

Summary of evaluation findings

- There is consensus among the participants in the Clearview Programme that it was a success. The Programme resulted in four new products that have the potential to deliver significant benefits to the pastoral agriculture sector, along with knowledge in other areas that may lead to new products in the future or provide guidance for future research and investment.
- The products developed through Clearview have arrived at an opportune time, given growing public awareness and heightened regulatory scrutiny of water quality issues in pastoral agriculture. Farmers are seeking options to help them reduce their environmental impact, and these products are a valuable contribution.
- It is unlikely that these products would have been developed in the absence of Clearview, or at the very least they would not have been developed as quickly and would not have the same adoption potential as they now do in the hands of Ballance.
- Clearview has not achieved the original targeted outcomes but, as these were highly ambitious targets, this does not mean we should consider the Programme a failure. It is likely that the high level of ambition embedded in these targets has contributed to both MPI and Ballance being bolder and more committed to the long term innovation process than would otherwise have been the case.
- The overall economic benefit of the Clearview Programme is likely to be lower than that stated in the Clearview Final Report, although still positive and still a good return on investment for MPI and Ballance.
- The adoption rates assumed in the Final Report are optimistic but attainable if regulatory pressure on farmers to reduce their environmental footprint continues to increase and if

Ballance allocates sufficient resources to extension and commits to a strategy of driving adoption.

- A benefit of the Clearview Programme has been the changes it has catalysed within Ballance, which is attempting to transition its business away from being a traditional supplier of fertiliser products towards being a nutrient management company with a much stronger innovation infrastructure. This should have long term benefits for the pastoral agriculture sector.
- Ballance can improve the chances of successful uptake of some of the Clearview products by further growing the capability of its workforce. This should include getting better at supporting farmers to use software and systems management approaches and increasing awareness among its own consultants about the critical KPIs that the Clearview Programme has targeted, namely fertiliser use efficiency and the reduction of nutrient loss into waterways.
- Ballance will need to better leverage external providers such as agricultural consultants and rural professionals if it wants products like MitAgator and My Pasture Planner to achieve high levels of adoption.
- It would accelerate adoption significantly if environmental regulators such as Regional Councils recognised the spatial actions MitAgator promotes as part of their compliance assessments.

Introduction

Background

This document presents the results of an evaluation of the Ballance Clearview Innovations Primary Growth Partnership Programme conducted by Scarlatti and BakerAg on behalf of the Ministry for Primary Industries (MPI).

The evaluation approach has involved:

- Reviewing key documents from throughout the Programme, including the original Programme Business Case and the Clearview Final Report ("the Final Report").
- Testing the assumptions and methodologies used to project the economic and environmental benefits of the Programme, as cited in the Final Report.
- A schedule of interviews with key Programme participants and members of the Programme Steering Group (PSG), along with farmers and other industry stakeholders.

The Primary Growth Partnership

The Primary Growth Partnership (PGP) initiative was a series of joint ventures between government and industry partners aimed at stimulating innovation to deliver long term economic growth and sustainability for the primary sector. Administered through the Ministry for Primary Industries, PGP programmes involved central government co-investing with commercial partners in multi-year innovation programmes. Each programme aimed to enable the development of new products, tools or services for the primary sector that either would not have been developed or would have taken much longer to develop and implement in the absence of this investment.

The Ballance Clearview Innovations Programme

The Clearview Programme was a seven year PGP co-investment between Ballance Agri-Nutrients Ltd (Ballance) and MPI that aimed to transform the primary sector by reducing its environmental footprint while enhancing its profitability. The goal of the Programme was to develop novel products or services that would enable farmers to reduce their reliance on traditional fertilisers, increase their nutrient use efficiency, and reduce farm system nutrient loss to waterways.

To date, the Clearview Programme has resulted in the development and launch of four products:

- My Pasture Planner combines nitrogen soil test data with a decision support software tool that helps farmers predict variations in pasture response to nitrogen fertiliser, enabling adjustments to be made in the quantity, timing and location of fertiliser application thus increasing overall nitrogen use efficiency.
- MitAgator is a geo-spatial software tool that identifies critical source areas and environmental hotspots, along with the most cost effective mitigations available to farmers to reduce these contaminants. The outputs – provided to farmers as a service – include risk maps and ranked mitigation options.
- SpreadSmart combines GPS guidance and tracking systems with computerised farm mapping to automate the opening and closing of the fertiliser hopper door during aerial topdressing for improved application precision and the option of varying application rates.

- SurePhos is a slow-release phosphorus fertiliser that results in the retention of more phosphorus in the soil with less lost into waterways than existing phosphorus fertilisers.

The Clearview Programme also prompted Ballance to develop a series of extension materials and activities to engage with farmers on the issue of nutrient loss to waterways and available mitigation options.

Document structure

The terms of reference provided by MPI contained a set of evaluation questions divided into the following three categories, which we have used to structure this document:

1. Outcomes – What has been achieved by the Programme and what are the benefits to New Zealand?
2. Execution – How well has the Programme been implemented?
3. Lessons learnt – What are the lessons to be learnt from the Programme and implications for other programmes?

In each section of this report, we have attempted to answer the evaluation questions posed by MPI directly. Some of these questions are more applicable to the Clearview Programme than others or elicited more feedback from stakeholders interviewed. The amount of detail and commentary provided for each section reflects this fact.

1. Outcomes

Did MPI and the partners get what they expected from the investment in the Programme – as set out in the original business case?

- The outputs of the Clearview Programme are not what MPI or Ballance would have expected at the start of the PGP, but this does not imply that the Programme outcome was not positive.
- The initial Business Case focussed on the expected development of a range of agrichemical and biological solutions that would enable pastoral farming and other agricultural sectors in New Zealand to reduce their environmental footprint, increase productivity, and improve their financial viability.
- Most of the actual outputs delivered by the Programme are software-based – My Pasture Planner is a decision support tool (DST) for farmers and both MitAgator and SpreadSmart are software-enabled services – while only one new agrichemical product (SurePhos) has been launched.
- That said, given the fundamentally uncertain nature of any long term research and development process, the outcomes achieved – four new products in the market with the potential to generate financial and environmental benefits for the pastoral farming sector, several potential future products and progress made in other areas of basic science that could help direct future investments – are still admirable.
- The original PGP Business Case set out a transformational vision and several highly ambitious outcome targets for the Programme. Clearview has not fully achieved these targets, and the Programme is unlikely to be as transformational for the sector as initially hoped for.
- However, given the fact that PGP applicants were encouraged to be highly ambitious, and the KPIs were (at least at the start of the Programme) considered to be "stretch" targets, this should not be considered a failure to meet expectations.

Can MPI have confidence that the economic benefits of the Programme listed in the Final Report are based on sound assumptions using robust methodologies? Comment on the inclusion of counterfactual benefits, in particular.

- Our view is that the overall economic benefit of the Clearview Programme is likely to be lower than that stated in the Final Report, although we still expect the Programme to provide a good return on investment for MPI, the taxpayer and Ballance.
- The four products launched as a result of the Clearview Programme have the potential to deliver significant economic benefits to New Zealand, however the magnitude of these benefits will depend on the rate and extent of adoption.
- The adoption rates assumed in the Final Report are optimistic but attainable if Ballance opts to pursue an adoption-focussed strategy and allocates sufficient resources to product improvement, extension and upskilling its workforce.
- A key factor in determining adoption will be the degree to which pastoral agriculture comes under regulatory pressure to reduce its environmental footprint. Currently, a large proportion of farms are *not* nitrogen- or phosphorus-constrained, so do not yet have the same incentives

to adopt the Clearview products as those that are already hitting nutrient limits. If nutrient limits become a constraint for more of the sector, demand will rise for these products.

- An unknown that may impact the ultimate benefit derived from Clearview is what sort of response there is, if any, to the requirement to make the Clearview intellectual property available on a commercial basis after Ballance's exclusivity period ends. MPI may have a role to play in encouraging uptake and competition.
- There is potential to leverage the offerings of Regional Council regulators, independent environmental planners and the agricultural service industry to drive adoption, and Ballance should embrace these if it wants to maximise adoption and benefit to the sector.
- Further potential exists to integrate the mapping and nutrient management data from MitAgator and My Pasture Planner with other farm data platforms such as Farm IQ, Farmax and Cloud Farmer, which offers upside to the adoption assumptions.
- The environmental benefit claims cited in the AgFirst Independent Review are based on scientific research and/or expert opinion (from AgResearch and Ballance staff). Farmers have not adopted these products widely enough to validate these claims, but we find no reason to doubt the robustness of the assumptions used (and in some cases have found anecdotal evidence that farmers are exceeding these benefits). Whether or not these environmental benefits will be captured more broadly depends, again, on the adoption rate of these products.
- One of the products cited in the Final Report – a nitrogen product – has not yet been launched, so we do not believe it should be included in the total benefit calculations.

Review the achievements reported by Ballance in the Final Report. What progress has been made towards achieving the Programme's intended short, medium and long term outcomes as set out in the PGP Agreement between Ballance and the Crown, and the Outcome Logic Model?

- Short term – Ballance has made progress towards achieving the short term intended outcomes, with four new products in the market that each have the potential to drive efficiencies in nutrient management and fertiliser use while providing environmental benefits. Early adoption has been strong for SpreadSmart and SurePhos in the areas where these products have been made available. Adoption has been slower for My Pasture Planner and MitAgator, but this is more a reflection of Ballance not yet ramping up its extension activities, rather than any deficiencies in the products themselves.
- Medium term – In the medium term, these products are likely to achieve greater adoption, and should provide farmers with economic benefits and additional options to comply with environmental regulations. Historically, innovations in agriculture can take more than a decade to reach maximum adoption, so efforts should be made to accelerate this process for the Clearview products in order to deliver these benefits earlier.
- Long term – It is unlikely that these products on their own will be transformational for the New Zealand pastoral farming sector, but they should form part of the solution to increased sustainability and compliance with government regulations for water quality, helping to enable the sector to continue contributing to New Zealand's economic performance.

Has the Programme made sufficient progress with its extension achievements to provide confidence in Ballance's projections for adoption of the new fertiliser products, software tools and technologies by the New Zealand farming sector?

- Ballance has progressed its own approach to extension, making it a more integral part of product development while embracing new digital strategies to engage with farmers. Ballance have also put effort into shifting the mindset of its client base, a necessary first step to driving adoption of the Clearview products.
- Ballance still has scope to increase awareness of the Clearview products, but the majority of farmers we spoke with were aware of and either using or likely to use at least one of these products.
- My Pasture Planner – In the projections used for the Final Report, adoption reaches 80% of Ballance dairy customers by 2025. This is an ambitious assumption for a new product, although Ballance does have levers available to drive this sort of adoption should it make the strategic choice to do so.
- MitAgator – Ballance will need to significantly increase access to this product through third parties (e.g. licensing it to external agricultural consultants) if it is to achieve the adoption rates projected. Ballance has acknowledged this, although it appears these commercial conversations are only in their earliest stages.
- SpreadSmart – As (Ballance subsidiary) Super Air will effectively mandate its use, adoption will largely be a function of the speed of the roll-out of the technology to the Super Air fleet. Both farmers and Ballance consultants are optimistic about this product.
- SurePhos – This product has only been launched very recently (October 2019), but early adoption and sales data has been promising. As a fertiliser product it is closer to Ballance's core product line, so there is less of a concern about Ballance's ability to drive adoption (this view is supported by the fact that Ballance is already promoting the product heavily on its website and through online advertising).

Does Ballance have the planning and resources in place to achieve the projected future outcomes?

- For products such as SpreadSmart and SurePhos, Ballance have clear plans in place to drive adoption and are deploying significant resources towards implementation. Super Air is steadily rolling out the SpreadSmart technology across its entire fleet, while Ballance has made major investments in both the production and promotion of SurePhos.
- For MitAgator and My Pasture Planner, Ballance are aware of the need to ramp up extension and to leverage external providers to drive adoption, but it is unclear the extent to which these plans have been fully formed or the timelines that implementation will follow.
- We don't doubt Ballance's capability to achieve this ramp up if they elect to, but it appears their current focus is on improving their own in-house competency as well as making tweaks and improvements to the products in terms of usability. This seems to us a sensible approach that will lay the groundwork for stronger adoption in the future.
- Ballance is also integrating these products into its digital platform – MyBallance – which it is rolling out as part of a wider strategy to drive farmer change and provide more complete,

wraparound services as a nutrient management firm. The additional resources that are being spent on MyBallance should have a further positive impact on adoption of both My Pasture Planner and MitAgator.

What plans does Ballance have in place to further enhance the Programme's legacy impact?

- In addition to the four products that have been launched as a result of the Clearview Programme, there are several potential products that have had significant investment but are not yet market-ready.
- Some of these, such as a nitrogen product, Ballance intends to continue developing itself. For others, such as bio-pesticides and bio-fertilisers, Ballance does not currently have plans to develop these itself but is exploring its opportunities.

What spillover benefits have been and will be generated by the Programme for the benefit of New Zealand?

- Even if a farmer does not adopt a tool such as My Pasture Planner or MitAgator directly, there are likely to be spillover benefits in terms of driving greater understanding and awareness of the methodologies and concepts underlying them. Indeed, helping to "mainstream" a more data-centric approach to nutrient measurement, management and loss-mitigation in New Zealand's pastoral farming sector may turn out to be one of the most valuable benefits of the entire Clearview Programme.
- Another category of spillover benefits from the Programme are the lessons that MPI and other stakeholders have learnt about how to design and operate a programme of co-investment in innovation. The lessons learnt from Clearview have been and will be applied to other government sponsored innovation programmes, which will help drive further benefits to New Zealand.
- One potential spillover benefit is the competitive response to Ballance's innovation efforts, most notably from Ravensdown who have invested in their own aerial variable rate application technology. Several people whom we spoke with suggested that Ravensdown's investment in this technology was a direct response to Ballance's development of SpreadSmart. Competitive responses like this increase the options available for farmers and put pressure on all actors in the market to continue to innovate.
- There have also been some spillover benefits for AgResearch who, in addition to the direct financial benefit from the funding they received via their research contracts, have been able to build their capability and credentials in partnering with commercial entities. This will enable AgResearch, as a major component of New Zealand's science and innovation eco-system, to continue to contribute to New Zealand's innovation performance.

Have there been any unintended outcomes or consequences (positive or negative)?

- One partly unintended consequence of the Clearview Programme was that it led Ballance to significantly overhaul their innovation and commercialisation infrastructure, and transform themselves into a more forward-thinking, innovation-oriented business. Having undergone this transformation, Ballance now considers itself much better placed to drive further

innovation in nutrient management and services for pastoral farming and the wider food and fibre sector.

- SpreadSmart was initially conceived of as a product to improve precision in fertiliser application. A major positive consequences of the technology that Ballance ended up developing is the significant health and safety benefits for aerial topdressing pilots, who no longer have to manually operate the hopper door while flying. This unintended positive consequence underpins the expectation that SpreadSmart (or similar technology) will become standard practice in the industry.
- An unintended consequence of the innovation funnel and fast-fail approach that the Clearview participants implemented is the suspension of development work for some ideas that may still have long term potential but were not considered financially viable or a good strategic fit for Ballance. This has led to a number of potential products and some areas of basic science where Ballance holds the intellectual property, but they are not being progressed. The future of these potential products will need to be resolved.

Has MPI's investment in the Programme been worthwhile?

- Yes – despite some unexpected developments over its seven years, the outcome of the Clearview Programme is several products with the potential to support business owners to address one of the biggest problems facing New Zealand's biggest industries.
- While the exact size of the benefits that are likely to accrue to New Zealand as a result of the Clearview Programme are debateable, we are confident that over time they will be well in excess of the $10 million investment made by MPI.
- It is unlikely that the products that were developed as a result of Clearview would have been developed in the absence of the Programme – or at the very least they would not have been developed at this time or as rapidly as they were, thus delaying any benefit.
- Add to this the spillover benefits and positive unintended consequences discussed above, along with the harder-to-quantify, but important, value of demonstrating which ideas are unlikely to work, and overall the Clearview Programme can be judged a worthwhile use of taxpayer money.

2. Execution

Did the Programme engage the right level of expertise to address the challenges it faced?

- The quality and vision of the programme and project management staff at Ballance was routinely noted as being crucial to the success of the Clearview Programme.
- Ballance contracted AgResearch to assist with idea generation and to conduct most of the early scientific research for the initial ideas that were generated. This meant there was a very solid scientific underpinning for all of the research and development work in the Clearview Programme.
- At the start of the Programme, Ballance lacked in-house expertise in terms of microbiology, which was understandable as this is not an area they have traditionally operated in (they have very strong scientific capability in areas like soil nutrient biochemistry). This meant that for the biologicals workstream, Ballance were heavily dependent on AgResearch for scientific information and insight. Subsequently, Ballance were less able to evaluate the scientific outputs being generated by AgResearch in the biological workstream, which may have contributed to Ballance's decision to halt work in this area.
- The unanticipated shift away from agrichemical and biological products towards the development of software-based tools resulted in a change in capability requirements. The Programme appears to have been able to manage this shift appropriately (despite Ballance's previous lack of in-house software development expertise).
- A number of people whom we spoke with raised the lack of focus on implementation early in the Programme as an issue, however we don't view this as fundamentally a question of expertise, but a structural, systems and process issue (addressed in the following section).

Were the Programme's structure, systems and management effective?

- In general the Clearview Programme was well-designed and adapted effectively over time as lessons were learnt.
- The Programme would have benefitted from a much stronger focus on implementation and rollout of the eventual products, particularly at the earlier stages of the research and development process. This would have resulted in faster decision-making and a more complete plan to drive adoption and secure maximum benefits from the Programme.
- While Ballance has made positive strides in terms of extension, there are still some areas that could be improved. For example, increasing capacity among its workforce to provide the necessary support for software-products and services like MitAgator and My Pasture Planner to a wider audience.
- The co-investment structure of the Programme, and the fact that it involved a long term commitment to the partnership with MPI, resulted in Ballance undertaking innovation activities that it believes it otherwise wouldn't have. The fact that Ballance was the only commercial partner involved also allowed Ballance to develop a level of trust with MPI that contributed to the positive outcomes of the Programme.

- The collaboration with AgResearch was generally positive and ensured that the Clearview products were underpinned by sound science. There were some relatively minor issues regarding communication between the parties, while AgResearch staff would have preferred greater visibility (and ideally involvement in) the Programme's decision-making processes. AgResearch staff also felt that they could have contributed more to the Programme if they had been more involved in its latter stages.
- Both Ballance and MPI raised reporting as an issue that caused some problems, although these appear to have largely been resolved by the end of the Programme.

How well did the Programme do in achieving its milestones and achievement measures?

- The Programme did not meet the original achievement measures it was set, although given the uncertain nature of innovation and the changes that the Programme encountered, these are not necessarily the most appropriate measures of success.
- Instead, a more informative way to answer this question is to focus on the extent to which the Programme was able to update and adapt its objectives and achievement measures over time, and to what extent the processes and procedures followed were well-suited to achieving a positive outcome.
- MPI did have some difficulty getting Ballance to provide both a big picture, strategic view, and to tie its progress reports more directly to the projected outcomes and target measures.
- The change in leadership at Ballance was significant, causing delays to the Programme and leading to the decision to halt work on bio-pesticides, effectively abandoning one the targeted outcomes. While there are sound commercial reasons for making this decision, the process by which it was made was probably not appropriate in the context of a true investment partnership.
- Programme staff at Ballance reported that both the changes to its own leadership and the significant changes to Programme governance resulted in changing perspectives about what the programme was trying to achieve and how it should be run. This turbulence resulted in some periods of slower progress.

Were there any external changes that impacted on the Programme? Were these anticipated at the start of the programme?

- The main external change that positively impacted the Programme was the increase in public and political awareness of environmental issues in the pastoral agriculture sector, particularly nutrient loss and water quality.
- With this growing awareness has come increasing regulatory scrutiny, and a ratcheting up of environmental compliance requirements for farm businesses, along with a signalling of intent to tighten requirements further.
- The impact of these changes for the Programme has been positive as they have increased the importance of the Programme's target outcomes throughout the sector and added to the urgency and importance of developing new products and tools to enable farmers to meet their increasing environmental obligations.

- The direction of this change was anticipated at the start of the Programme, and indeed was one of the main motivating factors outlined in the Clearview Business Case. However, the degree to which environmental issues would become central to the future of the pastoral agriculture sector was likely not appreciated by most in the industry. In this sense, Ballance were ahead of the curve in anticipating, and planning for, these changes.
- One external change that negatively impacted the Programme was the voluntary withdrawal of all DCD products from the New Zealand market due to traces of DCD (from a competitor's existing product) being detected in exported milk powder in 2013. This contributed to Ballance's decision to halt a promising Clearview workstream that had been investigating the potential of DCD to reduce nitrous oxide emissions and nitrate leaching loss from animal urine and effluent.
- This external change could not have been anticipated at the start of the Programme specifically, but the design of the overall Programme – with multiple ideas and concurrent workstreams – allowed the Clearview team to adapt quickly and shift their focus to other ideas.

How effective was the Programme's governance?

- At the start of the Programme, governance was not given an appropriate amount of focus. The partners did not provide sufficient guidance to the PSG, and the members appointed did not have sufficient experience to effectively oversee an initiative of this size.
- There was also a lack of clarity about the role of the PSG, which meant that it became too involved with Programme management (rather than governance). This limited its ability to effectively oversee the Programme and ensure it was on track to meet its objectives.
- These issues were not limited to the Clearview Programme, but were apparent across the PGP programmes.
- A number of changes were made that significantly improved the governance structure, including the appointment of more senior staff, proper separation of governance from programme management and the appointment of an independent chairperson.
- The result was that by the final years of the Clearview Programme, governance was highly effective, which contributed to the successful outcomes discussed earlier.

3. Lessons learnt

Lesson 1 – Formalise a focus on implementation

Perhaps the most important lesson to take from the Clearview Programme is the importance of focussing on implementation from the outset of the project, and of formalising this requirement into the design of the overall programme.

While it is not possible to plan fully for how to drive adoption until the nature of any products that you are developing becomes clearer, there are still a number of ways in which implementation can be brought into the process at the start of the Programme to maximise the chances of securing good outcomes at the end of it.

Given the importance of implementation to the success of the Programme, strategic thinking about adoption of the products and services being developed needs to begin at an early stage, and this perspective needs to be fully incorporated into product development, reporting and governance.

A greater emphasis on incorporating the perspectives of potential end-users into the early stages of both product development and the stage-gating process is also likely to improve decision-making and the allocation of resources and effort.

Recommendations

- Provide tighter implementation objectives and oversight for the commercial partner from the start of the programme.
- Maintain MPI involvement/oversight during the commercialisation and adoption phases.
- Provide an explicit mandate to the PSG to ensure there is a focus on implementation.
- Ensure that the PSG and any other decision-making groups, such as those involved in the stage-gating process, have sufficient commercialisation and implementation/extension expertise.
- Ensure that end-user perspectives (e.g. through market research) are embedded into the product development phase.

Lesson 2 – Agree on expectations explicitly and consider incentives

Some of the main concerns or frustrations cited by both Ballance and MPI participants in the Clearview Programme stem from a lack of understanding or agreement about what success would look like for the Programme. This is largely because the PGP initiative itself was new and expectations were still evolving. This lack of clarity, however, resulted in a degree of unnecessary confusion and tensions that slowed progress and at times posed a risk to the success of the Programme.

Reaching common ground on the nature of the Programme's objectives, the expected roles and behaviours of all Programme participants, reporting and monitoring requirements (and their ultimate purposes) and the expected outcomes and measures of success for the Programme from the outset would be beneficial.

Recommendations

- Ensure that the nature of any targets, expectations about outcomes, measures of success, and tolerance for failure rates are discussed, negotiated and explicitly agreed to by all parties prior to the commencement of the Programme. Measures of success and tolerance for idea failure should be calibrated to the Programme's level of ambition.

- Provide templates for reporting and monitoring of progress that are clearly linked to the Programme's milestones and targeted outcomes.
- Review reporting requirements regularly and work with the commercial partner to ensure these remain fit-for-purpose and not overly onerous.
- Provide a clear rationale for each requirement and ensure the commercial partner is aware of the ultimate audience and purpose for each report.
- At the start of any future programme, work to identify and make explicit the incentives that drive each of the Programme's participants and other stakeholders. Where a programme is targeting outcomes that don't have a clear financial benefit to the commercial partner or their end-users (for example, phosphorus loss), consider ways to build such incentives into the Programme to ensure that the commercial partner and government are as closely aligned in their objectives as possible.

Lesson 3 – Make governance a high priority (and review it regularly)

Everyone whom we spoke with agreed that the changes made to the governance of the Clearview Programme were beneficial and contributed to a successful outcome. The fact that the governance arrangements were identified as not being optimal for the Programme, and that steps were taken to make improvements, is itself positive (and something the SFF Futures initiative should seek to replicate).

However, the fact that these changes were not made until a number of years into the Programme suggests an opportunity may have been missed. With better governance arrangements from an earlier stage, some of the other issues identified – such as the lack of clarity in objectives or insufficient attention being paid to implementation – may have been corrected earlier or even avoided altogether.

This points to the need to not only focus on getting governance right at the start and making it more of a priority in the overall Programme, but also to ensure governance arrangements and personnel are regularly reviewed to ensure opportunities for improvement are not missed.

Recommendations

- Make governance a priority during both Programme design and throughout its duration.
- Ensure that the governance team are senior enough to ensure the Programme receives the appropriate amount of sponsorship, guidance and attention.
- Ensure that the PSG has a sufficient cross-section of expertise, with both subject matter/science experts and people with strong commercialisation or adoption/extension credentials.
- Continue to expand and strengthen governance training, particularly to members of the governance group who have been appointed for their knowledge/expertise rather than governance experience.
- Schedule and conduct regular reviews of the governance arrangements to ensure they are still fit-for-purpose and are engaging the appropriate level of expertise in light of any changes to the Programme or its direction.
- Retain independent chairpersons and consider additional independent governors to increase governance stability. While middle management roles in partner organisations will naturally have some churn, independent governors appointed based on their expertise rather than who

they represent are more likely to be able to continue even if they change roles or organisations. This does have an additional cost, but it is worth considering given the significant added value that the Clearview participants state was gained due to improvements in governance.

Lesson 4 – Ensure science can continue on rejected ideas

As discussed, one unintended negative consequence from the fast-fail development approach is that in some cases ideas need to be rejected that might still have commercial or scientific potential but would require further research.

There are a number of areas that some Programme participants believe still have potential but are not currently being developed as Ballance holds the intellectual property but has chosen not to invest in themselves (for understandable commercial reasons) and has not yet licensed or sold to a third party to develop.

While the PGP Agreement provides for intellectual property to be made available on commercial terms after a pre-defined period of exclusivity, these provisions may not be as effective for earlier stage intellectual property that is still in the basic science phase (i.e. is not yet commercialisable).

Recommendations

- Consider ways to ensure scientific research can continue on ideas even if they are no longer being progressed as part of the main Programme. This could involve mechanisms for rejected ideas to be transferred to alternative funding sources, such as programmes focused more on pure science than commercialisation.
- We note that there is a risk of creating perverse incentives or distorting decision-making. For example, if the commercial partner fears they will lose control of intellectual property, they may be incentivised to keep a currently infeasible idea alive but without investing sufficiently in it. Therefore, care should be taken to ensure all incentives are properly understood and aligned to ensure optimal decision-making and outcomes.

Lesson 5 – Encourage ongoing participation from research partners

An area of criticism emerged concerning the participation of AgResearch in the Programme. Some of the scientists whom we spoke with felt that they could have contributed more to the Programme's decision-making – particularly decisions about which areas of research to continue with and the viability of different products. At the very least, those scientists would have benefitted from greater visibility and understanding about the reasoning behind some of Ballance's decisions.

The role of AgResearch also diminished significantly in the later years of the Programme. This occurred somewhat naturally as the Programme moved towards implementation, but from the perspective of MPI, there are strong "NZ Inc." reasons for keeping AgResearch engaged throughout the lifetime of these programmes. This would allow AgResearch to build their own capacity and make them a stronger partner in future research commercialisation initiatives. It would also result in greater security of funding over the long term for AgResearch, which would enable them to develop and retain continuity of capability in the scientific areas of interest, which should have long term benefits for New Zealand.

Recommendations

- Explore mechanisms to ensure research partners like AgResearch remain involved and engaged in the Programme to ensure NZ Inc. benefits are captured, even if the core research stages have been completed. One option may be to involve the research partner in

programme governance arrangements, even if it is simply in a non-voting, advisory role and on areas where scientific understanding is a critical component of the decision.