Review of the Clearview Innovations Primary Growth Partnership Programme

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Ministry for Primary Industries
Manatū Ahu Matua

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Executive Summary

The Clearview Innovations PGP Programme (Clearview Programme) is a partnership between Ballance Agri-Nutrients and MPI to develop new and innovative nutrient products and services. It is a seven year Programme which started in 2011 and finishes in December 2018. Total project funding is $19.5 million of which MPI will fund up to $9.75 million. The objectives of the Programme are to improve the efficiency of nutrient use in agriculture in New Zealand and to reduce the losses of Nitrogen (N) and Phosphorus (P) to the environment. The outcomes expected from the Programme include:

- A 50% improvement in N fertiliser use efficiency in pastoral systems by 2018.
- A 20% improvement in P fertiliser use efficiency by 2020.
- A reduction by 30% in losses of N and P.
- Economic benefits of $348 million per year by 2025.

The scope of this Review includes:

- All projects within the Clearview Programme.
- Management, governance and reporting.
- Project resources – contractors, staff and research providers.
- Programme funding.
- Programme risks.
- Other internal and external factors affecting the Programme (if any).

Findings

The overall finding of the Review is that the Programme is well run and resourced, and generally progressing toward its intended outcomes. It is too early for most areas to determine certainty of successful attainment of outcomes. A go/stop gating approach and 'fast fail' methodology is being applied to facilitate the projects through their stages. Two outcome areas are highly unlikely to be met other than as a by-product of other projects, and should be revised.

Nitrogen

Outcome One: 50% improvement in nitrogen fertiliser use efficiency by 2018

> *The products and systems being developed have the potential of meeting the target of achieving a 50% improvement in nitrogen use efficiency by 2018. This will only be achieved in systems that are more intensive users of nitrogen inputs (e.g. dairy farms or intensive arable systems).*

Outcome Two: 30% Reduction in Nitrogen Loss from a Dairy System

> *The 30% reduction in nitrogen loss from a dairy system outcome appears unachievable and should be revised.*

Phosphorus

There are some valuable technologies, systems and products for the increased efficiency of phosphate use and reduced P loss, however significant challenges will need to be overcome

with MitAgator[1] in particular. Particular challenges include: ensuring compatibility with Overseer[2] to gain available synergies; the need for a clear delivery mechanism to farmers and the industry; and a robust strategy for engagement with stakeholders, to enhance uptake.

Biologicals

There are some promising opportunities arising from the Biologicals part of the Clearview Programme, but progress in this area is slower than anticipated. Although some progress has been made it is not generally possible to assess likelihood of achieving Biologicals outcomes at this stage in the Programme.

Extension

Extension is recognised as the largest risk to Programme delivery and it has taken some time to establish an agreed approach. A comprehensive extension strategy has recently been developed, including milestones. The extension Strategy and Milestones were only approved in August 2014, so meeting of milestones, and effectiveness of the strategy could not be assessed at this early stage.

Governance, Stakeholder Engagement & Programme Management

Although Programme governance is generally adequate, there are areas we believe could be improved to increase effectiveness.

Recommendations

There are a total of 18 recommendations made by this Review.

Nitrogen Recommendations:

N1. Review the Nitrogen loss outcome and either create new projects to provide for the achievement of the outcome, or change the outcome to reflect what is achievable.

N2. Review the extension strategy for N-Guru, focusing in particular on broader stakeholder engagement.

Phosphorus Recommendations:

P1. Develop a formal strategic alliance with the owners of Overseer to ensure alignment between the long term development pathways for MitAgator and Overseer.

P2. Review the Cadmium reduction outcome and either create new projects to provide for the achievement of the outcome, or change the outcome to reflect what is achievable.

Biologicals Recommendations:

[1] MitAgator is a trademarked GIS-based Decision Support System that generates a hydrological flow model that describes water movement through soils and across the landscape, underpinning spatial variation in nutrient loss.

[2] OVERSEER is an agricultural management tool which assists farmers and their advisers to examine nutrient use and movements within a farm to optimise production and environmental outcomes.

B1. Identify a single point of contact within Ballance for the Biologicals projects to act as an internal 'champion' and ensure the work gets the appropriate level of internal focus.

B2. Consider additional opportunities for Bio-fertiliser product development beyond the current field trials.

B3. Undertake cost benefit analysis of the bio-fertilisers work in terms of savings with respect to use of P fertilisers or reductions in environmental consequences of reduced P fertiliser use to demonstrate whether P outcomes could be assisted through the Biologicals work.

B4. Undertake complete techno-economic evaluation of biological products at the pre-commercialisation phase to provide robust analysis in support of development and commercialisation activities.

Extension Recommendations:

E1. Increase levels of engagement with rural professionals to provide them with knowledge and confidence in the Clearview products.

E2. Revise extension framework categories in Table 1 from the perspective of likely uptake by the industry.

E3. Consider creating a position within the Programme for a dedicated communication specialist.

E4. Broaden extension related engagement, to include:

- Key farmers including Landcorp Farming Ltd
- Key rural professionals and influencers of farmers eg. Members of the NZ Institute of Primary Industry Management, and Certified Nutrient Advisors
- All Regional Councils
- Sector groups

E5. Develop a more detailed and structured plan for stakeholder engagement and extension with regulators and the broader agricultural community for MitAgator.

Governance Recommendations:

G1. Consider adding an independent chair to the PSG to provide specialist governance expertise.

G2. Consider adding an extension specialist to the PSG, recognising that extension will become a major priority for successful Programme delivery.

G3. The PSG should adopt a greater strategic role in revising Programme outcomes in the short term, and having a greater role in annual planning and strategy on an ongoing basis.

G4. The Programme Manager should report to the PSG, not participate in the PSG.

Programme Management Recommendations:

PM1. Consider more frequent, face to face interaction with AgResearch to improve communication.

Addenda

When noting these findings please read the accompanying addenda to these findings in Appendix One.

Subsequent to the completion of the Review, the Reviewers have been informed that significant programme changes are being contemplated by Ballance. This was not known during the main Review period so we were unable to test the implications of these changes.

Had this decision from Ballance been made prior to the Review, it may have had a material impact on the Review findings and recommendations. The changes, if confirmed, will affect the achievement of some of the programme's objectives. The reviewers recommend that the PGP's Investment Advisory Panel (IAP) give serious consideration to the impact of these changes on the Clearview Innovations Programme.

1.0 Introduction

1.1 The Primary Growth Partnership

The Ministry for Primary Industries (MPI) is committed to helping the primary sector to double the value of exports by 2025. To help achieve this, MPI is co-investing with primary sector industries in innovation through the Primary Growth Partnership (PGP) which aims to drive substantial gains in economic growth and sustainability through shared investment in complementary and mutually supporting projects.

1.2 Overview of the Clearview Innovations Programme

The Clearview Innovations Programme is a partnership between Ballance Agri-Nutrients and MPI to develop new and innovative nutrient products and services. It is a seven year Programme which started in 2011 and finishes on 31 October 2018. Total project funding is $19.5 million of which MPI will fund up to $9.75 million.

The objectives of the Programme are to improve the efficiency of nutrient use in agriculture in New Zealand and to reduce the losses of N and P to the environment.

The outcomes expected from the Programme include:

- A 50% improvement in N fertiliser use efficiency in pastoral systems by 2018.
- A 20% improvement in P fertiliser use efficiency by 2020.
- A reduction by 30% in losses of N and P.
- Economic benefits of $348 million per year by 2025.

To achieve these outcomes, the Programme is investing in research and development activities to develop a range of new nutrient and bio pesticide products and decision support services for farmers. It is also designing and implementing an extension Programme to maximise uptake by end users. Figure One depicts the general structure of the Programme, separating research & development, and extension elements. Each of the outcomes in Figure One has a series of specific projects and associated milestones and objectives that collectively are intended to deliver the expected outcomes.

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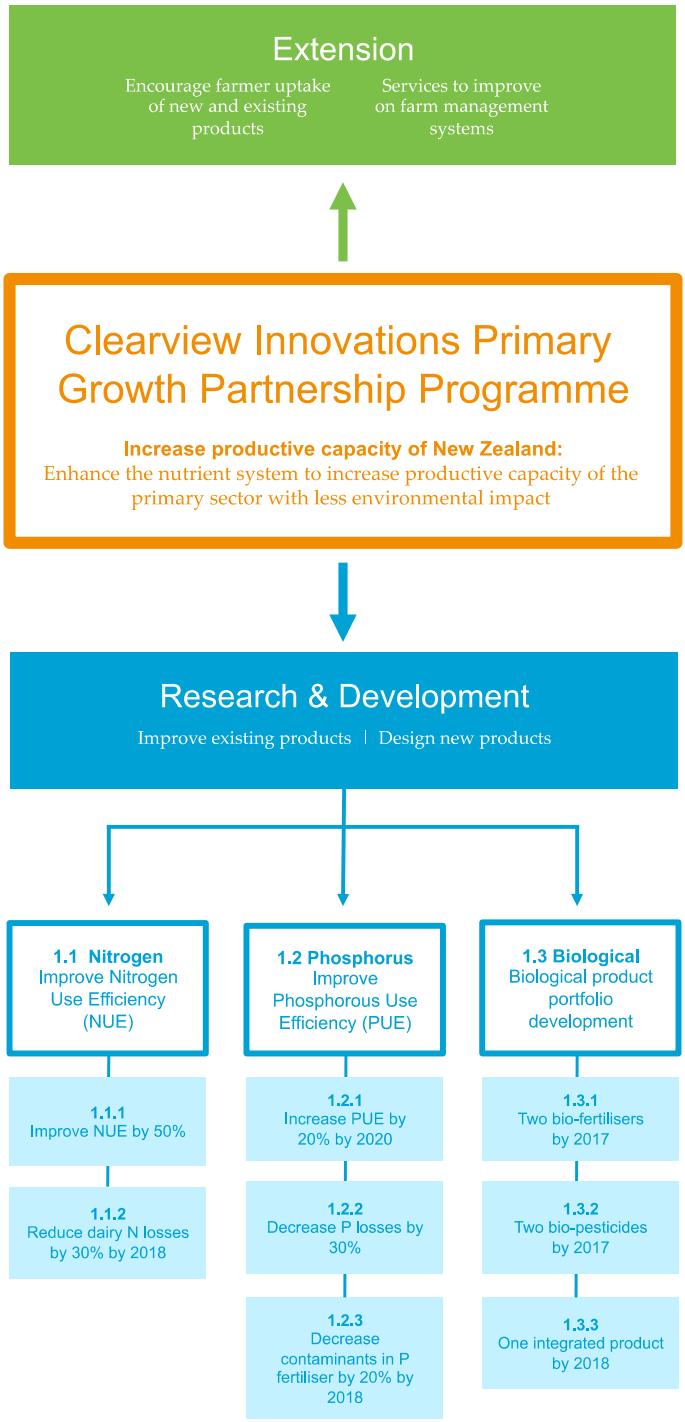
Figure One: Overall Approach to Clearview Innovations Programme



1.3 Independent Review

An independent progress review of the Clearview Programme is required under the PGP agreement.

1.3.1 Objectives of the Review

Provide an independent assessment of how the Programme is tracking towards its goals. The objectives are to:

- Review progress made to date in each of the Programme work streams.
- Assess progress made against the intended Programme outcomes.
- Review internal and external factors affecting the Programme including management and governance.

1.3.2 Scope

The scope of the Review includes:

- All projects within the Clearview Programme.
- Management, governance and reporting.
- Project resources – contractors, staff and research providers.
- Programme funding.
- Programme risks.
- Other internal and external factors affecting the Programme (if any).

For the purposes of this Review, we have not considered any of the projects that have been discontinued within the Clearview Programme, unless those discontinued projects materially affect the likelihood of achieving a particular outcome. We have not attempted to assess whether the Programme will deliver its intended economic benefits, as the majority of projects are too early in their development stages to reliably assess their respective economic contribution.

1.4 Approach

The original review was conducted over the period October to December, 2014. Amendments to the original draft were made in February – March 2015 and the document was finalised in October 2015. The review has been based on:

1. Desk-top reviews of progress reports, business plans and research reports.
2. Semi-structured interviews were conducted with 28 people. Interviews were conducted with:

- Programme Steering Group (PSG) members.
- Independent Advisory Panel (IAP) Chair.
- Programme Team members.
- Science providers.
- Regional Council staff.
- Farm consultants.
- External stakeholders.

The review team consisted of:

Maven Consulting Ltd (Dr Nigel Bradly – Lead Reviewer),

Wayne Allan (Allan Agricultural Consulting Ltd – Extension specialist),

Dr Peter Clinton (Scion – Science specialist).

2.0 Findings: Overall Programme Progress

The aim of the programme was to explore an initial set of projects and then narrow this down to a narrower set of projects with good prospects for success utilising a 'fast fail' methodology. This approach has been successful in reducing the projects that were deemed unlikely to succeed through the use of 'stop / go' stage gates, and has reduced the number of 'live' projects which are being further developed, and a number of other initiatives that are still being reviewed.

Most work is on track although it is too early for most areas to determine likelihood of successful delivery. The Review identified two outcome areas that have been significantly impacted by the fast fail approach leading to the halting of projects (*Nitrogen reduction – product b*, and *Phosphorus - decrease soil accumulation and/or plant uptake of Cadmium in P fertiliser*). Although the approach has been successful in halting projects at an early stage, both of these outcome areas are unlikely to deliver as intended and should be revised. This is discussed in greater detail in the relevant sections.

We summarise the overall findings of each component of work against intended outcomes based on our Review findings, in Table One below.

Table 1: Summary of Review Findings*

* these include the reviewers assessment of impact on the Programme of the proposed changes made after the Review was completed ("new status"). These changes are described in Appendix 1.

Outcome Area	Objective Outcomes	Review Assessment of Status	New Status
Nitrogen	Improve nitrogen use efficiency of fertiliser in pastoral systems by 50% by 2018	🟢	🟢
Nitrogen	Reduce nitrogen losses from the dairy farm system by 30% by 2018	🔴	🔴
Phosphorus	Develop a collective suite of technologies by 2018 that will deliver increased PUE by 20% by 2020.	🟢	🟢
Phosphorus	Decrease P losses in the farm system by an average of 30%.	🟢	⚫
Phosphorus	Decrease soil accumulation and/or plant uptake of cadmium in P fertiliser by an average of 20% by 2018.	🔴	🔴
Biologicals	Develop, test and have market ready two biological fertiliser products by 2017.	🟠	🟠
Biologicals	Develop, test and have market ready two biopesticide products by 2017.	🟢	⚫
Biologicals	Develop at least one integrated product solution for customers, using newly developed products with or without traditional products, by 2018.	🟢	⚫
Extension	Develop and execute a 'best practice' extension strategy, build capability, monitor and evaluate.	🟠	🟠

🔴 Poor / will not meet outcome / outcome should be revisited by Programme Steering Group

🟠 Adequate / outcome at some risk / needs improvement to meet outcome

🟢 Good / likely to meet outcome

⚫ Pathway to achieving the outcome is being reviewed by Programme Steering Group

3.0 Findings: Nitrogen

The products and systems being developed have the potential to meet the target of achieving a 50% improvement in nitrogen fertiliser use efficiency by 2018. However, this will only be achieved in systems that are more intensive users of nitrogen inputs (e.g. dairy farms or intensive arable systems). Improving efficiency of Nitrogen use may also contribute to meeting the targeted 30% reduction in nitrogen loss from a dairy system although this outcome appears unachievable due to products having being discontinued, and should therefore be revised.

Improve Nitrogen Use Efficiency by 50% by 2018

N-Guru is a trademarked Decision Support System that provides for strategic management of Nitrogen in farm soils. It has been completed and is being prepared for full deployment in 2015. Interviews with stakeholders including industry bodies, farm advisors and regulators confirmed that there is demand for a Decision Support System such as N-Guru to identify soils with differing total Nitrogen levels, particularly in the dairy and arable industries. Identifying soils with differing total Nitrogen levels is seen as very useful information in intensive farming systems, particularly when the results are consistent / stable over the medium term, meaning soils would only need to be tested and N-Guru run periodically.

Product X is under development, with the product being approximately 40% complete. It is too early in the development phase to comment. Extension for Product X will be relatively simpler than N-Guru, given it is a product that easily fits within a broad product suite sold by Ballance and will not require additional training or outreach.

Product C development is approximately 70% complete. We have no evidence to dispute this assertion and it is too early to comment otherwise, other than it is likely to be an imported product, is still in evaluation phase and with little detail discussed.

Risks

N-Guru extension needs stronger links with stakeholders (such as farm consultants, councils, Ballance sales staff, sector groups) to enhance likelihood of uptake. Interviews identified that there are some technical challenges with Product X, which are being actively investigated through the development process. Providing the technical issues with combining these products are worked through and the product is cost effective this product has considerable merit.

Reduce Nitrogen Losses from Dairy Farm Systems by 30% by 2018.

A significant project in this work stream was halted during the fast-fail process. Ballance had estimated this solution could provide up to 50% of the outcome if it had been successful. This is a material impact on the Programme. We recommend this outcome be revised by the Programme Steering Group.

Risks

N/A as this work has been halted.

4.0 Findings: Phosphorus

There are some valuable technologies, systems and products under development for the increased efficiency of phosphate use and reduced P loss. The most important of these is MitAgator a decision support tool to help farmers understand and manage nutrient losses. However, MitAgator faces significant challenges; it is a considerably more complex technology than any of the other products in the Clearview Programme.

Increased Phosphorus Use Efficiency by 20% by 2020

Development of a new technology is approximately 60% complete. The technology offers real opportunities for more efficient and cost effective nutrient use in hill country with the overall goal of spatially managing N and P applications.

A project to develop a specific product is 90% complete although is still in the evaluation stage so we are unable to comment in detail on its likely success or otherwise. Documents reviewed and subsequent interviews with staff indicate that Ballance expect a high likelihood of technical success, and medium (50%) likelihood of adoption success

Risks

We have no reason to believe these will not succeed from a technical perspective although the technology may not be fully utilised unless it is low cost and relatively easy to implement for the farmer.

Decrease P losses in the farm system by an average of 30%.

MitAgator is a trademarked GIS-based Decision Support System. It generates a hydrological flow model that describes water movement through soils and across the landscape, underpinning spatial variation in nutrient loss. In addition to helping to manage P, MitAgator can potentially also be used in other areas (N, E.Coli, and sediment), although this will not be available in the initial release. MitAgator Phase One (focused solely on P) is 80% complete and due for release in 2015.

Risks

One area requiring improvement in the engagement process relates to Overseer, and ensuring that the owners of MitAgator and Overseer develop a formal strategic alliance to align their respective future development pathways. Both systems are potentially mutually beneficial but are not currently formally aligned.

Decrease Soil Accumulation and/or Plant Uptake of Cadmium in P Fertiliser by an average of 20% by 2018.

The initiatives specific to Cadmium were halted in January 2014 due to lack of viability.

Risks

We are not aware of other projects being developed at present to fill the outcome gap. We recommend this outcome be revised by the Programme Steering Group.

5.0 Findings: Biologicals

Although some progress has been made it is generally too early in the development of this work to assess likelihood of achieving Biologicals outcomes at the midterm stage in the Programme.

Develop, Test and have Market-ready Two Biological Fertiliser Products by 2017

Bio-fertiliser product development is approximately 30% complete. Documents reviewed and subsequent interviews with Ballance and AgResearch staff indicate that Bio-fertiliser products have a medium likelihood of technical success, a low (30%) likelihood of adoption success at this stage of the project, but could contribute 100% of the outcome being sought if successful.

Develop, Test and have Market-ready Two Bio-pesticide products by 2017

Development of the two bio-pesticides products are making significantly better progress than the bio-fertiliser component of the Biologicals work to deliver commercial products by 2017. This project is built on a considerable body of work completed prior to the Clearview Innovations PGP and appears to be well on track to delivering the planned outcome.

Develop an Integrated Product Solution for Customers by 2018

It is not possible to assess progress toward this outcome until greater understanding of the bio-fertiliser and bio-pesticide projects is available. There appears to be a need for these biological products, however uptake would be dependent on the products being sufficiently effective and price competitive with conventional chemical controls.

Risks

Biologicals are outside the core business of Ballance and may therefore be more difficult to sell through existing channels and extension practices.

6.0 Findings: Extension

Extension is recognised by the PSG and IAP as the largest risk to Programme delivery and it has taken some time to establish an agreed approach. Progress has been achieved following the appointment of an extension specialist within the Programme team in 2013 and development of a comprehensive Extension Strategy including Milestones. The Extension Strategy and Milestones were approved by the PSG in August 2014, therefore meeting of benchmarking milestones, and effectiveness of the strategy cannot yet be assessed.

Ballance are comfortable with extension for technologies and products that 'fit' their traditional model and have a clear route to market identified. Ballance are less well prepared for delivering extension for the more complicated technologies and products, where the existing sales staff may not be the primary delivery agents.

While MitAgator is a decision support system which could potentially have a very significant impact on nutrient management within the industry it will be the most difficult of those reviewed to achieve full adoption through extension (and thus the 90% expected contribution to this outcome).

Risks

There seems to be a lack of clarity about the route to market for non-traditional systems and products which runs the risk of a poorly delivered non-traditional extension programme.

Lack of stakeholder engagement runs the risk of stakeholders misunderstanding the intent or scope of MitAgator, particularly regulators.

7.0 Findings: Governance, Stakeholder Engagement & Programme Management

7.1 Governance

Although Programme governance is generally adequate, there are areas we believe could be improved to increase effectiveness. The presence of an independent PSG chair could provide specialist governance expertise along with clear independence from either MPI or Ballance. We suggest that the PSG should consider adding some expertise in the extension area, as this is clearly a major priority for the future. The Review also noted that it is unusual to have the role of Programme Manager also participating in governance.

7.2 Stakeholder Engagement

Stakeholder engagement has been adequate, albeit limited. It has been challenging to balance confidentiality with the need for stakeholder engagement through the early phases of product design and development. Ballance recognises that, with the availability of some products; in particular MitAgator and N-Guru, increased stakeholder engagement in the short term will be key to maximising successful achievement of Programme outcomes.

7.3 Findings: Programme Management

The Programme is well funded and a lack of funding has not contributed to any negative outcomes. Core project controls are effective and well managed. The quality of reporting to the PSG has improved over time, and all core controls are in place and actively managed. The plan is well understood and monitored by the Ballance team and risks are regularly reviewed and reported.

7.4 Contractor Management

AgResearch is the principal contractor leading scientific work for the Programme. Interaction between AgResearch and Ballance has generally been effective and well managed, with the original suite of projects having been jointly developed. Greater cross-team interaction, especially face-to-face interaction would improve Programme level communications with AgResearch, and potentially add to the value that it could provide the Programme.

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8.0 Conclusions

The Clearview Innovations PGP Programme is well run and resourced, and is generally progressing toward its intended outcomes. It is too early for most areas to determine certainty of successful attainment of outcomes, although in general we find that it is likely to achieve most objectives. Two outcome areas are highly unlikely to be met other than as a by-product of other projects, and should be revised with a view to either identifying new projects to allow the outcome areas to be achieved or changing the outcomes to reflect their unattainability.

Addenda comments:

The changes proposed to the completion and commercialisation of MitAgator and some or all of the Biologicals work, if confirmed removes the certainty around likelihood of some outcomes being achieved. The Reviewers recommend that the Investment Advisory Panel give serious consideration to the impact of these changes on the Clearview Innovations Programme.

Appendix One: Addenda to the Main Review

Addenda

Subsequent to the completion of the Review (but before the final drafting was completed), the Reviewers have been informed that significant programme changes are being contemplated by Ballance. The outcome of this project review has seen the immediate placing on hold of the bio-pesticides programme and the continuation of the existing contracted bio-fertiliser field trials. The MitAgator software development will continue as planned to the completion of Version One due Quarter 1, 2015. An alternative commercialisation pathway for these products is now being investigated.

It is clear that our findings may have been significantly different had this information been available when conducting the Review, given the relative importance of both the Biologicals programme and MitAgator to overall programme outcomes. Another important element to consider is that the Extension Programme may not now require the same level of funding support and effort, and the Strategy should be revised accordingly.

We noted during the Review that two of the key outcome areas were highly unlikely to be successful (30% Reduction in N loss, and Product A). The decision by Ballance post-review now means that additional outcome areas (P use efficiency and Biologicals) are unlikely to be met, or potentially will be met by other organisations outside the remit of the PGP funded Programme (if sold within New Zealand and if the scope of development is maintained as it has been under the Clearview remit). The Reviewers are not able to assess whether the route to market for Biologicals or MitAgator will influence likely achievements of the outcomes in the Outcome Logic Model as the future owners are unknown.

The change in probable status implies that had this decision from Ballance been made prior to the Review, it may have had a material impact on the Review findings and recommendations. The removal of MitAgator and some or all of the Biologicals work from the Programme removes the certainty around likelihood of some outcomes and as such consideration should be given to future funding of the affected projects The Extension work should also be reviewed to ascertain whether it is still necessary at the scale, cost and scope of the current plan given these changes.

Halting of the Bio-pesticides work, review of Bio-fertiliser work following field trial, and market exit of MitAgator following Phase One will remove two of the three most challenging areas for extension. The extension for the remaining products is targeted to be mainly undertaken "in-house" by Ballance.

It would seem logical the funding allocation for extension within the Clearview programme be revised, in light of these changes. Extension of those products and systems that will remain within scope of the Clearview Programme will in the main be familiar to the existing extension capacity and capability of the Ballance organisation although these would be enhanced with further stakeholder engagement.

Given the number of outcome areas that are affected by the proposed changes, we believe the Independent Advisory Panel (IAP) should give serious consideration to the impact and implications of these changes on the programme.