

Industry Development Portfolio Review Report

December 2021



Hort
Innovation

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Cover photo: The Building Best Management Practice Capacity for the Australian Mango Industry (MG17000) delivered by The Australian Mango Industry Association employs Industry Development Manager, Paige Liebich. Here Paige conducts dry matter testing ahead of the 2021/22 mango season. Dry matter testing was developed within the Hort Innovation funded Building Best Management Practice Capacity for the Australian Mango industry project which began in 2019. Prior to project initiation the dry matter technologies and testing prototypes were not commercial. As the project draws to an end several large mango farming businesses have purchased their own instruments, the mango IDO team are invited to conduct tests for over 65 farming enterprises each season and more recently supply chain managers are increasingly using the dry matter data to assist in the management of quality. *PHOTO CREDIT: Australian Mango Industry Association*

Summary

This review meets an action item of the [Hort Innovation 2019-2023 Strategic Plan](#), which was “to review the Industry Development Portfolio to help maximise efficiency of levy investment and impacts for growers”. It has also provided an opportunity for the newly established Extension team at Hort Innovation to review the projects within the Industry Development portfolio and the environment it operates in and how this has influenced the findings reported on here. Extension like research is forever evolving and this review has given Hort Innovation an opportunity to take stock and consider how it can work in collaboration with Delivery Partners in adding value. Working closely with growers and other industry stakeholders Hort Innovation can support Delivery Partners to bring innovative solutions in what are, at the best of times, challenging situations.

Working in industry development entails the wearing of many hats. Creating awareness, increasing knowledge and skills and practice change is historically seen as the main responsibility of industry development projects. Supporting industry in what are often intangible ways to help build trusted networks, cohesion and resilience are just as important and often undervalued.

Hort Innovation’s industry development Delivery Partners play a valuable role in delivering much needed services to horticulture. This review, along with the needs analysis of our Industry Development Delivery Partners in 2020 has enabled Hort Innovation to better understand what’s working well, and what areas need support to flourish and meet the needs of industry. Joint responsibility between Hort Innovation and its Delivery Partners is required to achieve this. Also, a willingness by both parties to innovate not only in identifying growers needs but also in how solutions are developed and achieved.

The extension team with collaboration from some of our Delivery Partners have begun to work on and roll out the review recommendations. Hort Innovation trusts this is the start of an alliance that will continue to grow and thrive for the betterment of industry.

The review involved a desktop analysis of 44 projects managed within the Industry Development Portfolio which were contracted to external Delivery Partners. 24 interviews with Industry Development Delivery Partners to gain a greater understanding of their experience in delivering a Hort Innovation funded project were also undertaken and a review of the [Hort Innovation Industry Development Delivery Partner Needs Analysis \(2020\)](#). A copy of the Needs Analysis report can be requested from the Hort Innovation Extension Team.

Key evaluation questions were used from the Hort Innovation M&E guide to assess the design, implementation and monitoring and evaluation (M&E) attributes of these projects.

Key findings

- A high proportion of current projects were able to demonstrate “effective” or “very effective” engagement with growers and other industry stakeholders.
- An increase in the knowledge and skills of growers and their intention to change was outlined.
- There was a high level of reporting of all project outputs, but a lack of rigor in reporting on outcomes benefitting growers. This can partly be attributed to Hort Innovation Request for proposals (RFPs) having been broad in asking for required project objectives and outcomes.
- Project management upgrades in relation to the Monitoring and Evaluation guidelines implemented by Hort Innovation in 2017 have helped Delivery Partners report on project outputs and outcomes.

Key recommendations

Hort Innovation to:

- Improve contractual agreements to enhance the quality of reporting with greater emphasis on demonstrating project outcomes including having positive long term on ground outcomes for levy payers.
- Provide extension resources and project management training to support project leads and Industry Development Officers/Managers (IDO/M) where needed.
- Ensure effective and efficient project Monitoring, Evaluation, Reporting and Improvement (MERI) is in operation within projects.
- Optimising effective and efficient levy investments in the industry development portfolio and gaining impacts for growers can be achieved by further developing meaningful working relationships between Hort Innovation Extension team and Delivery Partners.

Next steps

The Hort Innovation Extension team are working collaboratively with Delivery Partners to initiate these recommendations as required. This forms a part of their [Extension Strategy](#), that aligns with the Hort Innovation 2019-2023 Strategy.

Introduction

What we did

The review was conducted by the Hort Innovation Extension team, consisting of seven senior extension managers with experience in extension and project management. Only investments within the Industry Development Portfolio were included in the review, with the range of projects including:

- Industry development projects that employed an IDO/M with a focus on meeting the needs of growers by extending levy funded R&D outcomes
- IDO training and coordination projects
- Issue-specific extension projects, such as *Soil Wealth and Integrated Crop Protection – Phase 2* (VG16078).

Industry communication projects were not a part of this review.

There were 44 projects reviewed (refer to Appendix 1 and 2); 26 were current projects and 18 were completed projects. The oldest completed project was contracted in 2013.

The review involved a desktop analysis of projects and semi-structured interviews with Delivery Partners. A review of the Hort Innovation Industry Development Delivery Partner Needs Analysis (2020) was also carried out. Qualitative and quantitative methods were used. The different types of Delivery Partners were also identified. Key evaluation questions were used from the Hort Innovation M&E guide (Table 1) to assess the design, implementation and M&E attributes of these projects.

The review was conducted to meet an action item of the Hort Innovation 2019-2023 Strategic Plan, “to review the Industry Development Portfolio to help maximise efficiency of levy investment and impacts for growers”.

Industry* development projects have typically had two objectives:

- To identify grower needs that can be met by Research and Development (R&D) outputs.
- To deliver along the impact pathway to:
 - primarily, but not exclusively, increase grower awareness of relevant current and completed research project outputs.
 - provide extension¹ of relevant research outputs to growers and other major industry stakeholders that enable a positive change in grower Knowledge, Attitude, Skills and Aspirations (KASA²), leading to practice change. This will in turn have positive long term on-ground benefits on their business and builds wider impact on the capability and capacity of the industry.

Projects were each assessed against the three phases of a project, being the ‘design’, ‘implementation’, and ‘evaluation and reporting’. For each phase, the five key evaluation questions from the Hort Innovation Project M&E planning guide (detailed in Table 1) were used to assess them using either an objective or subjective rating scale. Results for completed and current projects were kept separately to allow for analysis of potential improvements over time. The proportion of projects in the different categories was calculated to provide a quantitative measure.

Throughout the report where two figures are provided, the result for current projects is presented without brackets and the result for completed projects is within brackets e.g., 45% (42%).

* Hort Innovation acknowledges the decision to adopt a new practice not only involves the development of KASA but can also be governed by a number of influences outside of what an industry development project can deliver services on.

1 ‘extension’ is used in its broadest sense and may include various methodologies, approaches, activities, and tools to achieve project outcomes. In alignment with ExtensionAUS, Hort Innovation defines extension as “Working in partnership with stakeholders, especially growers, to identify needs and deliver economic, social and environmental outcomes for levy payers and the broader industry. The clear processes, information and support for skill development that extension provides are vital in creating a positive impact.” Beever, G (2019). What is extension? ExtensionAus, viewed 1 July 2019 <https://extensionaus.com.au/extension-practice/what-is-extension/>

2 Bennett’s Hierarchy, <https://extensionaus.com.au/extension-practice/bennetts-hierarchy-extension-program-evaluation-model/>

1. Industry development project characteristics

Our industry development project Delivery Partners fell into the following categories:

- 64% (77%) of projects were delivered by Peak Industry Representative Bodies, state, and regional industry bodies
- 20% (23%) delivered by private consultancy companies
- 16% (0%) delivered by government organisations.

Most of the Delivery Partners (73%) had over five years project delivery experience with Hort Innovation.

Who delivers to growers?

Within the projects, it was found the IDO/ M³ was the major deliverer of on-ground extension. In addition, it found their extension knowledge, skills and experience varied, from low to high:

- 46% (44%) of projects employed IDOs with ‘up to 2 years’ of extension knowledge, skills and experience
- 27% (34%) of projects employed IDOs with ‘2 – 5 years’ of extension knowledge, skills and experience
- 27% (22%) projects employed IDOs with ‘more than 5 years’ of extension knowledge, skills, and experience.



Facilitating the development of the Australian berry industries (MT18020) is delivered by Berries Australia. As COVID began to disrupt the industry, the five IDO's delivering this project including Suzette Argent pictured here, responded successfully to the needs of the industry which required them to embrace technology and develop new knowledge and skills in e-Extension.
PHOTO CREDIT: Jen Rowling, Berries Australia

3 Hort Innovations definition of the roles and responsibilities of an Industry Development Officer and/or Manager can be found in Appendix 3.

Table 1: Key Evaluation Questions used in desktop analysis of projects

Characteristic	Key evaluation questions
Effectiveness	1. To what extent has the project achieved its expected outcomes?
Relevance	2. How relevant was the project to the needs of the intended beneficiaries?
Process appropriateness	3. How well have intended beneficiaries been engaged in the project? 4. To what extent were engagement processes appropriate to the target audience/s of the project?
Efficiency	5. What efforts did the project make to improve efficiency?

Project contracts, final reports, mid-term review reports and M&E plans were used as sources of information to undertake this assessment, including project characteristics such as budget, staff, and project team level of experience as a Delivery Partner with Hort Innovation and in extension practice.

In addition to reviewing documents, 24 industry development Delivery Partners were interviewed, via semi-structured phone interviews. This included project leaders and IDO/Ms. Questions focused on delivery partner experiences in delivering Hort Innovation Industry Development projects.

The extension team also revisited the results from the Hort Innovation Delivery Partner Needs Analysis that was conducted in 2020.



The Dried Grape Production Innovation and Adoption Program (DG17001) delivered by Dried Fruits Australia provides services which include exploring a range of best management practices as well as new and emerging technologies such as establishing swing arm latch mechanisms for trellising. The project has been successful in bringing growers together to share their experiences and learn together through organised farm tours, technology sharing with other industries and workshops that explore pertinent issues such as production benchmarking and investment modelling for establishing new plantations. *PHOTO CREDIT: Dr Jay Cummins*

2. Did project design ensure they met the needs of project outcomes?

The results of assessing projects on ‘project design’ are in Table 2.

Table 2: Findings from review of project design

<p>Effectiveness – Is it likely that project design will lead to achievement of their outputs, KPI's and outcomes?</p>	<ul style="list-style-type: none"> • 100% (100%) of projects at the time of contracting lacked specificity in their overall objectives and outcomes. The review team believe this can partly be attributed to Hort Innovation Request for proposals (RFPs) having been broad in their description of required project objectives and outcomes. • 65% (38%) of current projects reported that their methodologies, if followed, would achieve the desired outcomes. • 69% (33%) of project design suggested their KPIs should be achieved. • 81% (50%) of project logics suggested outcomes should be achieved.
	<p>Outcomes stated to be achieved that were included in projects were:</p> <ul style="list-style-type: none"> • 57% (50%) of projects included ‘<i>creating engagement and awareness of R&D project outputs</i>’. • 69% (63%) of projects included ‘<i>increasing grower knowledge, attitude, skill and aspiration (KASA)</i>’. • 53% (63%) of projects included ‘<i>increasing adoption and/or practice change</i>’ • Project design had improved in current projects compared to completed projects. • Proposed outputs and activities were well documented. • There was a lack of specific detail with a lack of KPI's and metrics in M&E plans. • An increase in specific best practices and increasing productivity were rarely stated in outcomes and if so, only in general terms. • On-ground outcomes if referred to in M&E plans was considered a long-term outcome outside the life of the project.
<p>Relevance – did the projects aim to meet the needs of industry?</p>	<ul style="list-style-type: none"> • 92% (94%) of projects demonstrated that they aligned from “adequately” to “very well” with Industry Strategic Investment Plan (SIP) priorities.

(continued)

Table 2: Findings from review of project design (continued)

Process appropriateness

Effective engagement approaches are based on adult learning principles and appeal to growers.

- 88% (56%) of projects used methodology that provided “good” to “plenty” of opportunities for achieving appropriate engagement with growers/ industry/stakeholders.
- 39% (28%) of project methodology provided “good” to “plenty” of collaboration within the industry, but little cross-industry collaboration.

Efficiency

The definition of adequate budget was ‘to ensure that the project has the resources required to deliver the outputs necessary to achieve the project outcomes.’

- 69% (83%) of projects were considered to have an appropriate budget necessary to achieve their stated outputs.
- 58% (72%) of projects were considered to have an “adequate” duration to achieve their outcomes.



The Soil Wealth and integrated Crop Protection program (VG16078) delivered by Applied Horticulture Research (ahr) and Resource Management Consulting Group (RMCG) provides vegetable producers with the latest soil health and pest related research and development insights. Delivery is nationally through workshops, horticultural masterclasses, webinars and on farm-demonstration sites, which include

- Implementing IPM at Werribee South, Vic and Tasmania
- Cover drops for cucurbit growers in Katherine, NT
- Controlled traffic, Cover Crops and compost, SE Qld
- Compost trials, SA
- Cover crops + strip till Manjimup, WA
- IWM in Bathurst, NSW

PHOTO CREDIT: Applied Horticultural Research

3. Did project implementation ensure projects met the needs of growers?

The results of assessing projects on 'project implementation' are in Table 3.

Table 3: Findings from review of project implementation (see Appendix 5 for more detail)

Effectiveness

The extent to which a project has attained or is working towards attaining its intended outcomes.

- 81% (94%) of projects implemented the methodologies contracted.
 - The proportion of projects that reported a change along the practice change continuum (KASAP)⁴:
 - 42% (94%) reported change in awareness
 - 31% (72%) reported change in skills
 - 27% (67%) reported an intention to change
 - 27% (50%) report change in practice
 - Reporting of these outcomes did not include significant detail and was often reported on per event rather than on a continuum throughout the project.
 - From the review several reasons for a lower percentage of KASAP change being documented in current projects than completed projects were the result of the project design, the operation of M&E plans and/or milestone expectations.
 - Identifying a base line of current practices and tracking changes over time was rarely evident in project reporting.
 - 73% (100%) projects demonstrated at least “effective” engagement.
-

⁴ Evidence of an increase of skills and knowledge, intent to change and practice change in 42%, 12% and 54% of projects respectively were too early into delivering their project to make a fair assessment on these issues. Measuring and reporting measurable on-ground outcomes has not until recently been a requirement of Hort Innovation industry development projects.

Table 3: Findings from review of project implementation (see Appendix 5 for more detail) (continued)

Relevance

- 74% (61%) of projects have demonstrated they have been received “well” or “very well” by growers and other industry stakeholders.
- Some 31% (78%) projects showed evidence that growers and other industry stakeholders were satisfied with the outputs of the project, “so far” for current projects.

Appropriateness

- 54% of current projects initiated a needs analysis in the first six months of the project implementation, to help gauge where practice gaps existed.
- Event feedback sheets and annual project M&E surveys undertaken by Delivery Partners were usually divided into subject/issue, where growers will indicate if they have found the event useful, have gained knowledge and intend to make a change or have made a change. It was noted that there was an absence of specific detail in project reporting for a range of characteristics within this general topic that any change applied to. For example, a change in water management was recorded but may not have given any particulars on the actual changes in practice.
- Whilst participation rates are captured in the project reporting, they do not necessarily demonstrate how representative these are in relation to the target audience/s.

Efficiency

- 54% of current projects were assessed as “running to schedule”, with a further 35% of current projects considered to be “partly running to schedule” (largely due to factors such as recruitment, pest incursions, bushfires and/or COVID). Project variations were largely able to address these challenges. In these circumstances the need to modify the project outcomes was unnecessary and the need to modify the budget was rare.
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4. Did evaluation and reporting ensure a reliable indication of project progress and outcomes?

The results of assessing projects on ‘project implementation’ are in Table 4.

Table 4: Findings from review of project implementation

<p>Effectiveness</p> <p>Collecting appropriate data for M&E reporting posed challenges to being able to establish project progress and KPI/ outcome findings.</p> <p>Projects were assessed as to whether the KPIs measured, and outputs achieved accurately reflect whether the outcomes are currently or were achieved.</p>	<ul style="list-style-type: none"> • Outputs associated with both current and completed projects were well documented. • 27% (11%) of projects were reporting KPI's and outputs, that accurately reflected if outcomes were being achieved and 34% (78%) partially. 31% of recently contracted projects were yet to start reporting on this. From the review several reasons for inadequate measuring of KPI's were the result of the project design, the operation of M&E plans and/or milestone expectations.
<p>Relevance</p> <p>Projects were evaluated on whether they delivered appropriate services on relevant issues that meet the needs of industry.</p>	<ul style="list-style-type: none"> • Generally, end of project outcome reporting included the measurement of parameters that comprise increased grower engagement, awareness, intent to change and practice change (at a broad level). • Output, outcomes and KPI results were reported on very differently between projects and were not always clearly evident in final reports. • 15% (6%) of projects adequately reported results of achieving their KPI's for Hort Innovation to be able to aggregate the data for evaluating their levy funded extension program. 12% (39%) of projects partly achieved this.
<p>Efficiency</p> <p>‘Value for money’ was a subjective rating based on comparing budget against resources required to deliver the project and expected and achieved project outputs and outcomes.</p>	<p>Key findings indicated that:</p> <ul style="list-style-type: none"> • 31% (11%) of projects demonstrated “good value for money”. • 31% (56%) of projects “adequately” demonstrated value for money. • 35% of current projects were considered to be too early in their contract to assess value for money.

Independent mid-term reviews are delivered by experts in monitoring and evaluation. Hort Innovation consider their findings as a good indication of whether projects are achieving their outputs, KPIs and outcomes. One particular project assessed was reported as having

‘a good description of change and where on (the change) continuum’

whilst another reported

‘There is some evidence that the project is impacting on the decision-making process with stakeholders providing examples of changes that have been/going to be made’.

This same mid-term review also recommended that IDOs would benefit from participating in refresher M&E training, as a means to improve their skills relating to current M&E data collection, reporting and assist with continual improvement.



The Pineapple Integrated Crop Protection Program (PI17001) collectively delivered by Queensland Department of Agriculture and Fisheries, Agri Supply Global and GrowCom are working with grower study groups and together have identified a number of challenging issues and possible solutions which are now being demonstrated on 17 on farm sites. Sites include new innovative ways to improve various different management practices including layout and drainage via the use of aerial imagery, topographic maps and/or in-field surveying, also, practices in, pre and post plant nutrition management, fallow management, bed formation and planting. *PHOTO CREDIT Jane Wightman*

5. Delivery Partner feedback

Common themes emerged from talking with project team leads and IDOs. In general, the interviews demonstrated that positive outcomes came from Hort Innovation increasing interactions with Delivery Partners. This has improved relationships between both parties including a greater understanding of the highlights and challenges of delivering industry development projects.

Other feedback included:

- More consistency is required with Request for Proposal (RFP) documents and other project requirements and level of detail required in relation to the size of the project.
- More use of final reports by Hort Innovation to guide future investments and independent midterm reviews for large investments.
- Need for project flexibility to be able to respond to seasonal issues and in deliverables (activities).
- Need for five year project contracts to support consistency of delivery and encourage project staff retention as well as consideration of a range of capacity building initiatives targeting IDOs and other project staff. These include the development of mentoring programs, peer to peer networking opportunities, encouraging collaboration between Delivery Partners and regional face to face training (where IDOs can learn and practice in a safe environment).
- The impact of COVID highlighted the need to be flexible, with Hort Innovation proving responsive to this.

Project management resources which include templates, guides, and tips and tools can be found on the Hort Innovation website. Delivery Partners were asked which resources they used and how beneficial they were. The most often cited resources utilised were the Milestone Report and Final Report templates, followed by the VegNET templates and the M&E planning resources. Most Delivery Partners reported that the templates helped them to understand Hort Innovation expectations relating to project reporting requirements. Further details in relation to Delivery Partner feedback can be found in Appendix 6.

6. Hort Innovation Industry Development Delivery Partner Needs Analysis

In early 2020 a survey was sent to 91 industry development and extension Delivery Partner personnel (with a 37% response rate) to help gain insights into their successful extension activities and the challenges they face. The intent of this survey was to investigate the extension support needs of Hort Innovation industry development and extension Delivery Partners. The findings of this survey support the Industry Development Portfolio review findings.

Respondents indicated they were over committed in the delivery of project outputs, lacked extension theory, and had limited breadth and depth of extension practice. This limits their ability to adequately demonstrate practice change and impact, even when it is being achieved.

Some felt project management and reporting was an arduous task, and that contracts lacked flexibility. This is demonstrated in the findings of this review in project contracts, milestones, and final reports. Some 78% of completed and 50% of current projects were identified as having required at least one contract variation.

Respondents indicated their top three strengths were:

- Grower engagement and communication skills
- Focussing on client/industry needs
- Industry knowledge and experience.

A summary of further findings from the survey are presented in Table 5.

Table 5: Summary of key findings from the project partner survey

Respondents considered the weaknesses of their extension role were:	Respondents communicated there is a high need for professional development in the following areas:
<ul style="list-style-type: none"> • Lack of professional development • Lack of flexibility with project funding • Geographical spread of their industry and the resources they use • The need to be able to meet regional grower needs when delivering extension via project funding was emphasised • The difficulty in delivering extension to industries with diverse needs was highlighted several times. 	<ul style="list-style-type: none"> • Grower engagement • Digital tools and social media • Facilitation • Monitoring and evaluation • Peer-to-peer learning for service providers • Planning extension activities based on industry needs (segmentation) • Peer-to-peer learning for growers • Using demonstration and trial sites for effective collaboration.



VegNET 2.0 – Gippsland, Vic region (VG190013) delivered by Food and Fibre Gippsland organised a grower visit to Schreurs and Sons, where Andrew Schreurs describes how they design and use sediments traps to slow the flow of run-off water leading to much higher quality water. Follow-up evaluations (6 months after then event) revealed that more than 71% of those who attended had increased their aspirations to improve the nutrient and water use management on their farm with the aim of protecting surrounding waterways. *PHOTO CREDIT: Bonnie Dawson, VegNET Regional Development Officer – Gippsland, Vic.*

Discussion

This review meets an action item of the Hort Innovation 2019-2023 Strategic Plan, which was “to review the Industry Development Portfolio to help maximise efficiency of levy investment and impacts for growers”.

The review found RFPs were broad in their project requirements which led to project design also being broad in focus. Project design concentrated on delivery of events and activities, with little evidence the design and delivery of these followed a clear impact pathway. Due to a broad project focus it was reasonable to expect events/ activities and support tools would cover a broad area of needs within the industry. Taking a broad approach to delivery is also supported by the typical industry development objectives (page 3) which are to *identify grower needs that can be met by R&D outputs* and *increasing grower awareness of these outputs that enable a positive change in grower KASA*, leading to adoption of best practices. Industries can have a multitude of R&D projects across the supply chain, with the expectation from researchers, Hort Innovation, and growers for the industry development project to deliver extension for all R&D investments. This often eventuates in an IDO/M spreading themselves very thinly and investing a lot of resources into awareness creation activities with less being invested in developing grower skills and knowledge and follow up support in embedding practice change.

Projects were successful in delivering project outputs. The projects reported IDO/M's put a lot of time and effort in organising and delivering events and activities and in the development of support tools such as posters and fact sheets. Projects also reported on effective grower engagement and their awareness of R&D outputs and projects were received well or very well by their industries.

A common approach used in projects in interactions to convey R&D outputs, innovations and new practices with industry is information delivery. This is a well recognised approach which most growers are use to, participating either face to face or online. It usually entails a presentation from an expert of research outputs or new practices followed by a question-and-answer session. Tools are often made available in the form of posters and fact sheets posted on the industry and Hort Innovation websites for easy access. This delivery approach is often supported by the need for researchers to present their findings to industry and meet a specific milestone achievement. Field days and to a lesser extent on farm demonstration sites are activities included in project delivery and are highly supported by growers as they can see best practices in a commercial setting and hear first-hand a grower's experiences.

Occasionally a project specified the needs of growers and identified best practices and associated project outputs which would support the adoption of those said practices. Measuring and reporting the increase in the adoption of these practices on a continuum across the life of the project did not occur. Linking in with programs such as Hort360, EcoHort, Banana industry Best Management Practices Environmental Guidelines and EnviroVeg that have developed industry benchmarks for best practices may assist in setting a baseline, supporting growers and continuation in monitoring progress.

The review and results from the Delivery Partner Needs Analysis (2020) highlight the challenge for Delivery Partners in the design and delivery of project M&E. This review revealed projects reported adequate M&E on delivering outputs and creating engagement with growers and other industry stakeholders and awareness of R&D outputs and best practices. Increasing the engagement and awareness throughout the life of the project was not reported on. Increasing KASA and practice change was reported in general terms, not on a continuum with final results reported on in final reports and rarely for specific best practices and innovations. M&E reporting indicated a lack of project design which included adequate planning for change along the practice change continuum (KASAP) and inadequate reporting on project outcomes.

Request for Proposals (RFPs) have been broad in their request for objectives and outcomes and have unintentionally influenced project design leading to the implementation of projects that have taken a broad approach to identifying the needs of growers and meeting those needs by extending R&D outputs. Delivery Partners indicated Hort Innovation needed to be clearer in their RFPs with project outcomes and also project reporting requirements during the delivery of the project. Hort Innovation need to be clearer in their Request for Proposal (RFP) and both Delivery Partners and Hort Innovation have a responsibility in the content of the project plan (MRT) and project reports. Over the last 5 years continuous improvement has seen refinement of the project guidelines, attention to M&E and introduction of innovation system approach to provide focus for industry development projects, in addition to traditional linear technology transfer. This review has identified further collaboration between Hort Innovation and Delivery Partners will optimise efficiency of levy investment in the industry development portfolio and in gaining impacts for growers.

Design

- It was identified that many project outcomes that were considered to have been achieved were simplistic in description and did not follow SMART (Specific, Measurable, Achievable, Realistic and Time-based) principles.
- Historically, industry development projects were designed based on one model, commonly known as Technology Transfer: to identify grower needs and meet those needs via the extension of outputs from R&D projects, such as information and results. In this model the R&D comes first followed by the extension. This is a linear model and although the method is suited to helping solve some problems, benefits from drawing on a mix of methods such as participatory, knowledge and innovation systems approaches needs to be supported further by Hort Innovation. The challenges highlighted by growers are expanding as they operate in a global environment. Where once on-farm production issues dominated grower concerns, now a wider set of drivers are bearing on the business such as water (availability, quality, and cost), labour (availability, awards, HR, and skills), market development, social license to operate, biosecurity and food traceability are high on the list. These issues cross the farm boundary and require engagement of a wider community of people and are suited to knowledge and innovation systems approaches to help solve. These approaches acknowledge a solution to a problem that suits one person may not suit all and there can be many barriers to adoption to change. These approaches also understand that although development of grower knowledge, attitude, skill, aspiration and practice change is very important it is only part of the solution and resolving the problem involves the engagement of many different stakeholders.

- There was no consistent approach in relation to rates for resources including staff salaries or the level of description for rates for budget items across projects (such as travel, catering, workshops, field days, salaries) or how they were itemised. When interviewed a number of Delivery Partners requested further advice/guidance in budget allocation for specific resources.
- Industry development projects deliver services which cross a lot of different industry needs. The number of levy funded R&D projects that require extending may influence this with the larger industries. This inadvertently leads to creating a lot of awareness, on R&D project outputs but not always development of grower knowledge and skills leading to practice change. Development of industry extension strategies to help guide the Request for proposal (RFP) for new projects will assist in project design that delivers services in high priority areas. It will help projects stay focused on fewer but higher priority issues that are highly likely to eventuate in grower practice change and long term on ground outcomes. Industries may also wish to consider the value of investing in projects that focus on helping industry solve specific issues. Examples of current projects include *Soil wealth and integrated crop protection (VG16078)* and *National biosecurity and sustainable plant production program (NY20001)*.

Implementation

- A review of current project documents indicated that a very high percentage of projects were very successful in engaging appropriately with growers and were either 'very well' or 'well' received.
- The review found it difficult to identify in reports other than the project plan, significant evidence that activities were working towards achieving project outcomes.
- Milestone reports and observations indicate IDO's are very busy delivering activities and are attentive to industry needs.
- Most of the changes in project delivery due to COVID have been negotiated and agreed. Phone conversations and emails between Hort Innovation project managers and Delivery Partners were used, with few requiring official variations. Delivery Partners have appreciated making delivery changes to their plans without needing official variations.
- Delivery Partner interviews strongly indicated further grower benefits can be realised with an improvement in cross project and cross industry networking, coordination, and collaboration.

Monitoring and Evaluation

- As indicated in the Hort Innovation M&E project guide, project logics are used as a thinking tool. Developing project logics, the M&E plan and KPI's run the risk of being a "tick the box" exercise particularly amongst busy Delivery Partners. Under these situations, projects tend to skip over demonstrating the causal chain or impact pathway and often focus on delivery of activities.
- Projects will use anecdotal evidence to indicate practice change. This makes it very difficult to objectively judge whether a project is achieving its objectives and outcomes.
- M&E plans were not adequately operationalised, leading to insufficient and inadequate data collection and reporting. It cannot be assumed that because a milestone or final project report did not provide sufficient evidence relating to change (including increased KASA, or practice change) it did not actually happen. This lack of documentation and reporting may stem from insufficient M&E and/or these specific outcomes not being clearly articulated in the projects' contract. Anecdotal evidence sourced by the review team indicated that in many cases such projects probably achieved change (but was not necessarily supported with evidence-based information with reporting).
- Achievement of activities (outputs) are tangible and demonstrated action has been taken to assist industry build capability. Contracts tend to focus on reporting of delivery of outputs in milestones, rather than the gradual demonstration of outcomes throughout the life of the project.
- Some of the current industry development projects reviewed were in their second or third project, yet there has been no expectation from Hort Innovation evident to measure an increase in KASA or grower practice change on a continuum from one project to the next.
- The review highlighted the current challenges in adequately documenting and reporting on project outcomes. Team leads and IDO's can often see when growers and other beneficiaries increase KASA and/or make a practice change. Growers who participate experience the benefits first-hand. Greater emphasis needs to go into documenting and reporting these changes in ways that can easily be communicated to encourage greater grower participation and adoption of best practices and assist in showing the projects return on investment.
- Projects were often three years in duration, and generally it is unrealistic to expect significant grower practice change across an industry in this relatively restrictive time frame unless there is a strong driver in place. Three-year contracts have frequently led key staff to seek other employment before project completion, evidenced from conversations between the review team and Delivery Partners and IDO's. This was found to disrupt project delivery and the possibility of losing a valued person permanently to another industry or sector.

Recommendations

1. **Improve contractual agreements to enhance the quality of reporting and place greater emphasis on demonstrating project outcomes including having positive long-term on-ground outcomes for levy payers.**

- Continue to improve the clarity of RFPs to assist prospective Delivery Partners submit proposals that are outcome, process focused and include specific, measurable, achievable, relevant and time bound (SMART) objectives and outcomes.
- Develop an industry development RFP guide which includes examples of objectives, outcomes, outputs, impact pathways and milestones.
- Develop a common language for key concepts between Delivery Partners and Hort Innovation which are used in all templates and training guides and events.
- Ensure that projects contracted have well-articulated objectives with SMART outcomes and KPI's and well documented impact pathways.
- Fit for purpose proposal and reporting requirements in relation to the size of the investment.
- Ensure there is consistent messaging from Hort Innovation to Delivery Partners on contractual requirements.
- Seek opportunities to contract five-year projects that will promote efficient use of levy investment and outcomes for levy payers.
- Each industry has an extension strategy which guides all industry investments in identification of their impact pathway and delivery of suitable outcomes which support eventual positive long term on ground outcomes for levy payers. In taking a systems approach to the design and delivery of industry development projects, Delivery Partners can focus on their delivering the extension strategy and link in with R&D project outputs where relevant.
- Ensure there is adequate budget allocated to project M&E within future proposals.
- Provide a budget template for use by industry development Delivery Partners to be incorporated in the RFP guideline including the suggested ranges for some budget items.
- Deliver online training in interpreting an RFP and meeting proposal and M&E requirements and have the recording available on the Hort Innovation web site.

2. Provide extension resources and project management training to support project leads and Industry Development Officers/Managers.

- Ensure there is adequate project professional development funds specifically for the development of skills and knowledge in extension theory and practice for IDOs which assists in successfully achieving project outcomes and building careers in hort extension.
- Build IDO skills and knowledge in extension by continuing the professional development program and seek further opportunities to bring Delivery Partners together on a regional basis. The aim is to identify common areas of interest to learn from each other and seek solutions in relation to building industry capability and capacity.
- Ensure that Hort Innovation Regional Extension Managers work with their project leads to ensure IDOs receive appropriate guidance, support and extension training and professional development that support their career pathway and develop industry capability.
- Raise the profile and promote different extension methods with Delivery Partners, supporting them in taking new approaches to extension delivery.

3. Ensure effective and efficient project MERI is in operation

- Hort Innovation reaffirm with Delivery Partners the role of project M&E and independent mid-term evaluations.
- Develop industry development project M&E guidelines which link in to Hort Innovation project M&E guide.
- For investments running for more than 3 years, consider the benefits of an independent end of project review to evaluate the said project and guide future investments.
- Hort Innovation continue to directly contract independent project midterm reviews. To assist in maintaining quality and consistency in M&E, use preferred mid-term review Delivery Partners.
- The extension team support the Data & Insights team to develop a data collection process which will allow project outcomes to demonstrate a link to assisting in achieving SIP KPI's.

The Extension team are working collaboratively with Delivery Partners, where relevant, to initiate these recommendations as part of the Extension Strategy in alignment with the Hort Innovation 2019-2023 Strategy.

Appendix 1

Current projects included in the Industry Development Portfolio Review

Project code	Project title
AP15004	Australian apple and pear industry innovation and adoption program
AV17005	Avocado Industry Development and Extension
BA16008	Banana Strategic Industry Development Manager
BA17002	Banana Industry R&D Coordination
BA19004	National Banana Development and Extension Program
DG17001	Dried Grape Production Innovation and Adoption program 2018-2021
MC15004	Australian macadamia industry innovation and adoption program
MG17000	Building Best Management Practice Capacity for the Australian Mango Industry
MT18020	Facilitating the development of the Australian berry industries
OL15002	International Olive Council – Technical Committee
PI17001	Pineapple Integrated Crop Protection Program
PS17002	Technology Transfer for Pistachio Growers
TM17000	Processing Tomato Industry Capacity Building
TU16002	National Market Development Program for the Australian Turf Industry
VG16078	Soil Wealth and Integrated Crop Protection – Phase 2
VG19008	VegNET – Bowen Gumlu & Far North Queensland
VG19009	VegNET – Wide Bay Burnett
VG19010	VegNET – Southern Queensland
VG19011	VegNET – NSW
VG19012	VegNET – Victoria (South-East, West and Northern Regions)
VG19013	VegNET – Gippsland
VG19014	VegNET – Tasmania
VG19015	VegNET – SA
VG19016	VegNET – WA
VG19017	VegNET – NT
VG19018	Training in the development and delivery of innovative vegetable E&A regional plans

Appendix 2

Completed projects included in the Industry Development Portfolio Review

Project code	Project title
BA13023	Banana Strategic Industry Development
BA16007	Subtropical Banana Development and Extension Program
DG13001	Dried Grape Industry Development Project – Stage 2
MG13017	Capacity Building, Information, Technology and Extension for the Australian mango industry
PI15000	Facilitating the development of the Australian pineapple industry – Stage 3
PS13003	Technology Transfer to Pistachio growers utilising regional grower groups
TM13007	Processing Tomato Industry Capacity Building Program
VG15004	Regional capacity building to grow vegetable businesses – Bowen Gumlu and FNQ
VG15028	Vegetable Industry Education and Training Initiative
VG15041	Regional capacity building to grow vegetable businesses – Southern Queensland
VG15043	Regional capacity building to grow vegetable businesses – WA
VG15044	Regional capacity building to grow vegetable businesses – NT
VG15046	Regional capacity building to grow vegetable businesses – Tasmania
VG15047	Regional capacity building to grow vegetable businesses – East Gippsland
VG15048	Regional capacity building to grow vegetable businesses – Victoria (South-East, West and Northern regions)
VG15049	Regional capacity building to grow vegetable businesses – national coordination and linkage project
VM12003	Development of the Australian Melon Industry through communication and market focussed activity
VM17001	Melon Industry Development and communications plan

Appendix 3

Hort Innovation definition of Industry Development Manager/Officer roles and responsibilities

Industry development projects commonly employ industry development managers (IDMs) and/or officers (IDOs) to perform key project roles and responsibilities. IDMs are often senior extensionists responsible for leading project delivery and staff management. However, there is no clear differentiation between IDM and IDO project roles and responsibilities.

The list below is not exhaustive and can be used as a guide to Hort Innovation requirements of an IDO/M providing services in a levy funded industry development project. Although IDMs have more senior responsibilities than IDOs such as the management of project staff and more involvement in project design, M&E and reporting, their overall operational activities will be similar. To avoid duplication in listing roles and responsibilities and the relevant skills, knowledge and experience required by an IDM and IDO they are listed together.

Key roles and responsibilities

Key skills, knowledge, and experience

Project concept, planning and design

- | | |
|---|---|
| <ul style="list-style-type: none"> • Project proposal design, management, and collaboration with project reference group • Market segmentation to understand project requirements and target audience • Monitoring and evaluation (M&E) planning for continual improvement • Develop needs assessments and industry engagement strategies through collection of industry data and insights. | <ul style="list-style-type: none"> • Extension theory, practice, and adult learning principles • Monitoring, evaluation, reporting and improvement (MERI) including project logic and impact pathways • Needs/gap analysis • Knowledge of business or industry best practice and farming systems • Relationship and network building • Knowledge of Industry Strategic Investment Plan (SIP) and Industry Strategic Plan. |
|---|---|

Project delivery

- Meet growers needs by extending latest research and development (R&D) and best management practices
- Stakeholder engagement through delivery of extension approaches including, grower groups, demonstration sites, factsheets, field days, and e-resources
- Collaboration with industry communication projects – maximising promotion and awareness of R&D project outputs and outcomes.
- Project management/reporting
- Developing and/or use of stakeholder extension resources
- Capacity building to facilitate change – governance, project leadership, conflict, resource management
- Ability to pivot and address high priority industry challenges and opportunities
- Links to extension industry resources, including Australasia-Pacific Extension Network (APEN).

Monitoring, evaluation and reporting

- Demonstrate changes in Knowledge Attitudes Skills and Aspirations (KASA), practice change and where feasible impact
 - Understand success or barriers to adoption
 - Project milestones and final report.
 - Monitoring, evaluation, reporting and improvement (MERI)
 - Familiarity with Hort Innovation project resources, including project monitoring, evaluation and reporting templates.
-

Appendix 4

Delivery Partners who were interviewed as part of the Industry Development Portfolio Review

Organisation

- Almond Board Australia
- Apple and Pear Australia Limited
- Applied Horticultural Research
- Australian Banana Growers' Council
- Australian Macadamia Society
- Australian Mushroom Growers' Association
- Australian Processing Tomato Research Council
- AUSVEG SA
- Berries Australia
- Bundaberg Fruit and Vegetable Growers Cooperative
- Dried Fruits Australia
- Food & Fibre Gippsland Inc
- Fresh Growth – Dianne Fullelove & Associates Pty Ltd
- Greater Sydney Local Land Services
- Lockyer Valley Growers Inc
- Northern Territory Farmers Association Inc
- Pistachio Growers Association Inc
- Queensland Department of Agriculture and Fisheries
- RMCG
- Rural Consulting Group
- Turf Australia
- Vegetables WA

Appendix 5

Measurement of change Implementation – effectiveness

The review assessed the level of changes projects had achieved. Specific response categories and a summary of results are presented here.

Measurement of change Implementation – effectiveness	Project status	Yes	Partly	No	Unsure	Not yet
Is/was the methodology being implemented as per the agreement?	Current	21 (81%)	4 (15%)	1 (4%)	0	0
	Completed	17 (94%)	1 (6%)	0	0	0
Are/were the resources (human and other) adequate to achieve implementation?	Current	19 (72%)	3 (12%)	3 (12%)	1 (4%)	0
	Completed	12 (67%)	3 (17%)	1 (5%)	2 (11%)	0
Is/was there any evidence to show that the project will/is succeeding in increasing awareness	Current	11 (42%)	2 (8%)	2 (8%)	11 (42%)	0
	Completed	17 (94%)	0	1 (6%)	0	0
Is/was there any evidence that the project will/is increasing skills and knowledge	Current	8 (31%)	0	5 (19%)	2 (8%)	11 (42%)
	Completed	13 (72%)	0	3 (17%)	2 (11%)	0
Is/was there any evidence that the project will/is increased intention to change	Current	7 (27%)	0	3 (12%)	13 (49%)	3 (12%)
	Completed	12 (67%)	0	4 (22%)	2 (11%)	0
Is/was there any evidence that the project will/is increased practice change	Current	7 (27%)	0	2 (8%)	3 (12%)	14 (53%)
	Completed	9 (50%)	0	6 (33%)	3 (17%)	0

Appendix 6

Delivery Partner feedback

Overall, 24 Delivery Partners were interviewed by phone as part of this review. This included semi-structured interviews with project leads and IDOs to gain a greater understanding of the Delivery Partners' experience in delivering a Hort Innovation funded project.

What is working well:

In describing the experiences in working with Hort Innovation, a number of common themes emerged from talking with project team leads and IDO/Ms.

- Over 50% of those interviewed linked increased involvement by Hort Innovation staff with improved project management, project outcomes and project delivery enjoyment.
- Delivery Partners felt that Hort Innovation staff are well qualified and had a good understanding of their relevant portfolios.
- Delivery Partners highlighted that there has been continual improvement in the communication processes at Hort Innovation over the past years, both with Delivery Partners and industry, and that the investment in the Extension team should build on these improvements.

What needs to be improved:

Project team leads and IDO/Ms identified that an area for improvement related to the RFP, contracting, and reporting obligations. Specifically:

- RFPs were found to be inconsistent, being either too broad or too narrow in relation to the terms of reference.
- There was a degree of inconsistency between past and present Hort Innovation project managers in relation to expectations of project reporting requirements.
- The level and detail of project reporting required needs to be consistent with the size of the project funding.

Addressing these issues:

To address these issues, project leads and IDOs recommended the following:

- For large projects, the final project report should help guide the next investment (if justified).
- Independent project reviews should be implemented for large investments.
- The level of detail (and time input) when responding to RFPs needs to be aligned to the specific value of the project.

- There is a need to be able to access funds for running short projects that are in response to an urgent seasonal issue (that is considered to pose a high impact threat to growers).
- There is a need to provide greater flexibility in the deliverables, to help address grower and industry needs as they emerge (but linked to project outcomes). As sometimes contracted deliverables cannot be delivered, however other activities may contribute to delivering positive outcomes overall for the project.
- There is a need for improved communication with industry in relation to new project leads when new Delivery Partners come on board, as part of greater transparency in processes.
- Ideally, projects should be of a five-year length.

Final comments provided by Delivery Partners (that were considered important to note) included:

- The benefits of tailoring projects to regional needs (adopting a regional focus).
- The need to regularly update the Hort Innovation website.
- The need (and importance) for Hort Innovation to collaborate with local industry organisations.
- Support for the company's regional presence through the Extension team.
- Recognition of the recent improved communications with industry.
- The need for industry to create opportunities with Hort Frontiers.

Some of these findings and recommendations have broader applications across Hort Innovation business units.

Use of Hort Innovation project management resources

Project management resources which include templates, guides, and tips and tools can be found on the Hort Innovation website which has a dedicated section for Delivery Partners. The most often cited resources utilised by the Delivery Partners were the Milestone Report and Final Report templates, followed by the VegNET templates and the M&E planning resources. Most Delivery Partners reported that the templates helped them to understand Hort Innovation expectations relating to project reporting requirements.

Delivery Partners had a low awareness of the existence of more recent resources that had been added to the website, such as the “Extension tips and tools guide”. Some 17 respondents provided a range of suggestions as to how the resources could be improved, which can be found listed below.

Delivery Partner suggestions as to how Hort Innovation project management resources could be improved:

- Improve the RFP template by making it more industry development/extension specific.
- Update guidelines by providing specific examples, level of required detail, and a budget range for items (including salaries, activities, word limits) what information is best placed in appendices.
- Resources needed to be consistent, clear, and simple.
- Further instructions and guidance relating to how to complete different reports and RFPs, through webinar training was required.
- Improve ‘odd formatting’ aspects associated with reporting templates.
- Offer the option of verbal milestone project reporting, which was used by some IDOs in the previous VegNET 1.0 projects.
- Simplify the M&E processes, with consideration towards focusing on M&E efforts in mid-term and final report.
- Produce a two-page summary/overview for all past and current projects.

Glossary

Disclaimer: The definitions within this glossary do not represent a scholarly analysis of interpretations of each word.

Activities	The actions/work delivered by the project to bring about the desired changes, and the immediate effects – or tangible deliverables/outputs (products or services) – of those activities. The activities are what projects are funded to do. Activities include collecting field trial data, conducting consumer surveys, conducting an information event, product quality sampling. Example: surveying consumers to develop triggers and barriers to adoption of a certain best practice.
Anecdotal	(of an account) not necessarily true or reliable, because based on personal accounts rather than facts or research.
Appropriateness	(process) the extent to which a project/program is operating as intended.
Attitude	the way we think about the change proposed. It comprises aspects such as behaviour, perceptions, and feelings.
Awareness	whether or not we are able to perceive the impact and effectiveness of the change.
Effectiveness	the extent to which an intervention (a project) has attained (or is expected to attain) its intended outcomes.
Efficiency	the extent to which an intervention produces outputs and outcomes without wasting time, money, effort, or other resources.
Engagement	the process used to engage relevant stakeholders for a purpose to achieve accepted outcomes.
Evaluation	the systematic process of determining the value, merit or worth of an intervention, policy, program or the like. In the context of Hort Innovation’s activity, evaluation helps to provide perspective on the ‘so what’ of an investment in terms of achieving its intended outcomes for the select beneficiaries.
Extension	‘extension’ is used in its broadest sense and may include various methodologies, approaches, activities, and tools to achieve project outcomes. In alignment with ExtensionAUS, Hort Innovation defines extension as “Working in partnership with stakeholders, especially growers, to identify needs and deliver economic, social and environmental outcomes for levy payers and the broader industry. The clear processes, information and support for skill development that extension provides are vital in creating a positive impact.” Beever, G (2019). What is extension? ExtensionAus, viewed 1 July 2019 https://extensionaus.com.au/extension-practice/what-is-extension/

Impact	the effect or influence that something has on a situation or person.
Industry development	activities that address the constraints and opportunities facing an industry, and its businesses. It can include social or research processes that progress the industry.
Innovation system approach	recognises that some problems, and therefore their solution, are complex, being influenced by more than just the science required. For example policy or a collaborative effort are required to achieve practice change. The approach usually involves the inclusion of more diverse actors throughout the planning and implementing phase than just the researcher. A two way flow of knowledge is a feature of innovation system approach. Adopting an innovation systems approach to research means that technical, institutional and policy questions are no longer tackled in separate projects.
Knowledge	what we know about the subject matter.
Monitoring	the routine and systematic collection of data that may be used for management and/or evaluation purposes.
M&E plan	outlines the scope of Monitoring and evaluation (M&E) for a specific project, as well as what data will be collected (how, when and by whom) and how it will be analysed and used to meet identified M&E requirements.
Outcomes	the result or effect of an action, situation, or process.
SIP outcome(s)	Strategic Investment Plan outcome(s) that the project is ultimately expected to contribute towards. These are articulated in the SIP relevant to your project. The project must demonstrate contribution to at least one KPI of the SIP.
End-of-project outcome(s)	These outcomes are the desired result of the project, and represent the project's unique contribution to the relevant SIP outcome(s), strategy(ies) and Key Performance Indicator(s). They represent what the project could be reasonably expected to achieve given the level of investment and the timeframe for delivery (though some outcomes may be realised after the project period). Includes: practice or behavioural changes; adoption; incremental improvements stimulated through R&D; use of new information/protocol/technology; increased recognition of Australian horticulture products; increased consumer demand; improved product quality; commercialised intellectual property (IP).

Short to medium-term outcomes	brought about through project activities, and which describe the cause-and-effect pathway through which the activities support the achievement of the end-of-project outcome(s). Includes: changes in grower knowledge, attitudes, skills and aspirations (KASA); access to new information; training accessed by growers. Example: Industry stakeholders aware of quality standards and initiated implementation within their business.
Outputs	are the tangible products or services (deliverables) that are produced from the project activities. Will include: publications; data; field trial and experiment results; minor use permits; new farm management protocols or standards; new technology; marketing campaigns and collateral; training/extension events delivered; industry development services; study tours; reports; patents; prototypes; new varieties or technology. Example: Publication of quality standards, training of growers, and quality standards testing.
Participatory approach	means involving stakeholders, particularly those affected by the intervention, in the problem-solving process. This includes involvement in the design, data collection, analysis, reporting, and management of the study. At different levels it may see the 'power' associated with managing the problem-solving process is in the hands of a stakeholder, for example the end user, rather than the researcher. Although this is not necessarily required in order to be using a participatory approach.
Practice change	the process of moving from one practice, way of doing something, to another, usually in response to a driver.
Program logic	clarifies the project impact pathway, and how the project is expected to contribute to Hort Innovation goals and the relevant industry SIP outcomes.
Relevance	the extent to which the expected outcomes of an intervention are consistent with beneficiaries' requirements, government priorities, etc.
Skills	actions that we are able to carry out, the know-how.
Technical transfer	takes a linear approach and involves less two-way flow of information. It is considered more suitable for simple technology solutions. The key research decisions are made by scientists who experiment on research stations or under controlled, simplified conditions. Technologies are then handed over to the extension services for transfer to farmers. The relatively common use of the term 'technology transfer' may not be referencing this approach, instead referring to knowledge sharing etc depending on the situation.

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