Final report

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Accelerating adoption of Area-Wide Integrated Crop Management in vegetable, onion and potato growing regions

Delivery partner:

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION

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Public summary

Key Project Metrics and Engagement

- Review of secondary sources and 39 in-person stakeholder interviews conducted across Tasmania and South Australia with growers, agronomists, researchers, extension personnel, processors, industry representatives and other key actors.
- Two cross-industry in-person workshops delivered, involving interview participants to validate interview findings, prioritise entry points and propose solutions.
- More than 27 stakeholders participated in a national sensemaking webinar to reflect on cross-state findings and implications for broader adoption of area-wide approaches.
- 58 constraints affecting AW-ICM adoption were identified and analysed, including 27 in Tasmania and 31 in South Australia.
- Constraints were grouped into five overarching themes: grower capacity and capability; knowledge sharing and extension; coordination and collaboration; responsibility and resourcing; and incentives and motivations for action.
- Workshop participants prioritised nine key constraints in Tasmania and six key constraints in South Australia and respective solutions for future action.
- 68% of webinar participants indicated a strong willingness to collaborate across industries to address shared pest, disease and biosecurity challenges.
- Findings were disseminated through industry engagement activities, including the RMCG researchers meeting and PotatoLink R&D Forum (Victoria, July 2026).
- Project outputs, including a final report, a summary of the final report, regional workshop detailed reports, a Field Note co-authored with VegNET and PotatoLink colleagues to be published via APEN Rural Extension and Innovation Systems Journal with practical lessons as grower and extension-facing output and one paper to be published, will continue to support extension practitioners to facilitate cross-industry coordination to accelerate adoption of AW-ICM and other sustainability-oriented changes.

The project *Accelerating Adoption of Area-Wide Integrated Crop Management (AW-ICM) in Vegetable, Onion and Potato Growing Regions* explored opportunities and barriers to implementing area-wide approaches in Tasmania and South Australia. The project was funded by Hort Innovation and delivered by CSIRO in collaboration with the Bioeconomy Science Institute of New Zealand, involving VegNET, PotatoLink and industry stakeholders.

AW-ICM recognises that many pest, disease and biosecurity challenges extend beyond individual farms and require coordinated action among growers, advisors, researchers, industry organisations, governments and supply-chain actors. To better understand the conditions needed to support adoption, the project adapted the Rapid Appraisal of Agricultural Innovation Systems (RAAIS) methodology to the Australian horticulture context. The approach combined stakeholder interviews, regional workshops, a national webinar and secondary data analysis to identify system-level constraints and opportunities.

The findings demonstrate that the most significant barriers to AW-ICM adoption are not primarily technical. While growers face practical challenges associated with pest and disease management, many of the underlying constraints originate within the broader innovation system. These include fragmented coordination across industries and organisations, limited long-term investment in extension and capability development, weak incentives for collective action, inconsistent knowledge-sharing mechanisms, and unclear responsibility for managing landscape-scale biosecurity risks.

Although the specific priorities differed between regions, common themes emerged. In Tasmania, participants emphasised machinery hygiene and biosecurity, industry silos, unclear responsibility for

cross-industry issues, limited incentives for adoption, and barriers to pest reporting. In South Australia, participants highlighted fragmented and short-term funding arrangements, the absence of a formal IPM extension system, limited grower coordination, market pressures, and reliance on individual champions to sustain progress.

Across both regions, stakeholders consistently identified the need for stronger collaboration, trusted extension services, clearer governance arrangements, and longer-term investment mechanisms. Participants also recognised that effective AW-ICM requires action beyond farm-level practice change, including improvements to market signals, policy settings, industry leadership, knowledge exchange and shared accountability.

The project produced eight recommendations focused on strengthening extension systems, demonstrating the business case for AW-ICM, improving industry engagement, supporting cross-industry collaboration, exploring incentive mechanisms, consolidating existing knowledge, and applying systems-based diagnostic approaches to future industry challenges. Collectively, these recommendations seek to create the enabling conditions necessary for sustained adoption of area-wide approaches.

A key outcome of the project was the successful adaptation of the RAAIS methodology for a highly commercial Australian horticulture context. The findings demonstrate the value of systems-based approaches for understanding and addressing complex agricultural challenges and suggest that similar approaches could support future work in biosecurity, climate adaptation, sustainability and other areas requiring coordinated action across multiple actors and industries.

Overall, the project concludes that accelerating adoption of AW-ICM will require more than promoting individual farm practices. Sustained progress depends on strengthening the broader system of relationships, incentives, knowledge flows, governance arrangements and investment mechanisms that enable collective action across landscapes and industries.

Keywords

Vegetables; onion, fresh produce and processing potatoes; area-wide integrated crop management; integrated pest management, crop biosecurity; vegetable production; stakeholder engagement; innovation systems; shared challenges, collective action.

1. Introduction

The Australian horticulture industry, valued at $19.5 billion in 2026, operates in a complex and demanding environment. It faces the challenge of maintaining productivity and profitability while managing increasing input costs, stricter regulatory requirements, market expectations, and environmental pressures. Producers of vegetables, onions, and potatoes encounter ongoing issues with pests, weeds, and diseases, compounded by rising input costs and restrictions on chemical use. This environment is shaped by the need to maintain productivity and profitability while responding to increasing input cost pressure, tightening regulatory requirements, market expectations, and environmental pressures. These challenges are further complicated by the interconnected nature of production landscapes, where pest dynamics and management outcomes extend beyond individual farm boundaries. In this context, there is a growing recognition that conventional, farm-level approaches to crop protection and management are inadequate for addressing system-wide risks.

Recent industry and policy analyses reinforce the scale and systemic nature of these challenges. Biosecurity assessments for the Australian vegetable sector identify hundreds of potential pest and disease threats—many of which cannot be effectively managed by individual growers acting alone and require coordinated, industry-wide responses. At the same time, reviews of pest and disease management across horticulture highlight persistent gaps in control options, increasing resistance pressures, and the need for integrated strategies that combine chemical, biological, and cultural approaches. These trends are occurring alongside a broader transition toward more sustainable production systems, including reduced reliance on synthetic inputs and the adoption of alternative pest and weed management technologies. Together, these factors underscore the need for more coordinated and system-level responses to crop protection challenges

AW-ICM offers a promising pathway to respond to these challenges by promoting coordinated action across farms, industries, and regions. By aligning pest and crop management practices at a landscape scale, AW-ICM seeks to improve the effectiveness of pest control, reduce reliance on chemical inputs, and support more sustainable production systems. While the concept of AW-ICM encompasses the full range of crop management components—spanning soil health, water and nutrient management, crop rotations, and broader system sustainability—this project does not assess all elements in equal depth. Instead, the analysis focuses on those challenges identified as most immediate and significant by industry stakeholders, particularly crop protection issues associated with pests, weeds, and diseases. These challenges represent critical constraints to productivity, profitability, and sustainability across vegetable, onion, and potato industries and align closely with the biosecurity and management functions that currently anchor the innovation system. By concentrating on these priority areas, the project provides a targeted examination of the factors influencing the adoption and coordination of area-wide approaches, while recognising that AW-ICM inherently requires integration with broader crop management practices over time.

The implementation of AW-ICM depends not only on technical solutions but on the effective functioning of a broader innovation system that connects growers, advisors, researchers, industry organisations, policymakers, and market actors. Insights from the secondary data analysis indicate that this system in Australia is characterised by strong institutional capacity, with a wide range of organisations involved in research, extension, policy, and industry support. However, it also exhibits significant fragmentation, with overlapping roles, commodity-specific coordination structures, and a complex landscape that can be difficult for growers to navigate. While the system is comparatively strong in knowledge generation and diffusion—through advisory services, training, and demonstration activities—it is less developed in terms of system-wide integration, coordination mechanisms, and processes that support the scaling of AW-ICM practices.

A defining feature of the system is the central role played by intermediaries, including extension providers, industry bodies, and advisory networks. These actors broker relationships, translate knowledge into practice, and support growers to navigate a complex institutional environment. This reflects the fact that AW-ICM depends on ongoing interaction between multiple actors operating across different levels and sectors. Despite this, coordination remains largely organised along commodity-specific lines, limiting the ability to respond effectively to shared pest challenges that span crops and landscapes.

In response to these challenges, this project adopts an adapted Rapid Appraisal of Agricultural Innovation Systems (RAAIS) methodology to analyse the AW-ICM innovation system across South Australia and Tasmania. The RAAIS framework provides a structured approach for examining how actors, institutions, and processes interact to shape innovation outcomes, with a focus on identifying system constraints, coordination gaps, and

opportunities for change. As part of this approach, secondary data analysis was undertaken to map key actors, roles, and relationships within the system, complemented by stakeholder engagement and cross-industry workshops. Together, these components enable a comprehensive assessment of both system structure and the practical factors influencing the adoption and coordination of AW-ICM.

This milestone report presents the findings of this analysis, integrating insights from secondary data, stakeholder engagement, and workshop processes to identify key constraints and opportunities for strengthening AW-ICM. The report aims to support a shared understanding of system dynamics and to inform the development of practical strategies that improve coordination, align incentives, and enable more effective implementation of area-wide approaches across industries and regions.

2. Methodology

This project examined the factors enabling and constraining the broader adoption of AW-ICM in vegetable, onion, and potato growing regions of Tasmania and South Australia. As illustrated in Figure 1, the project team applied an adapted version of the Rapid Appraisal of Agricultural Innovation Systems (RAAIS) methodology originally developed by Schut et al. (2015). RAAIS provides a systems-based framework for analysing complex agricultural challenges by examining interactions among diverse stakeholders across multiple levels of the innovation system. The system-based framework allowed for assessment of the structures and functions of the regional innovation systems of the cases (Wieczorek & Hekkert, 2012).

2.1. Adaptation of the RAAIS Approach

The original RAAIS methodology typically starts with multi-stakeholder workshops, followed by interviews and surveys. This sequence is primarily designed for smallholder farming contexts, where collective engagement is more attainable. However, in this project, the approach was adapted to better suit the Australian horticulture industry, where growers face significant competing demands on their time and may have limited availability for extended group processes.

To accommodate this, the study prioritised secondary data analysis and in-depth individual interviews as the initial diagnostic step. This was followed by targeted cross-industry workshops and a final sense-making process (see Figures 1 & 2). This adaptation aligns with the RAAIS principles of triangulation, inclusivity, and iterative learning while enhancing participation and providing deeper insights.

By conducting a broad analysis of various industries using secondary data sources and gathering individual perspectives at the outset, this approach captured candid and context-specific insights that might not arise easily in group settings. Consequently, the subsequent workshops were more focused and analytically robust. Overall, this adaptation not only addresses practical constraints but also improves the quality of understanding within the system.

The adapted approach focused on three core analytical stages (See Figure 1):

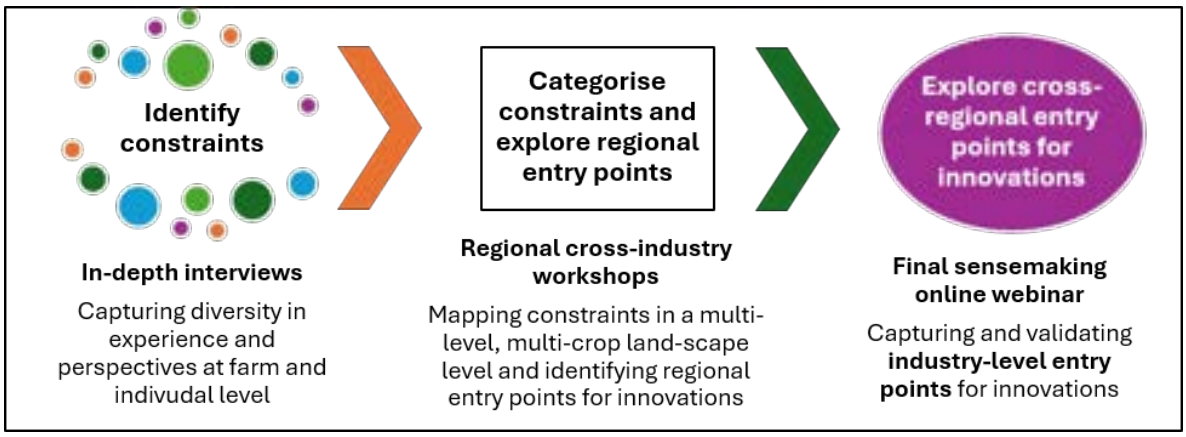

Figure 1: Analytical approach using an adapted RAAIS methodology, showing three stages—identifying constraints, categorising, validating and prioritising constraints, and exploring solutions and entry points—to support co-development of solutions at regional and industry levels.

2.2. Data Collection

Stakeholder Interviews

The study commenced with semi-structured interviews involving multi-stakeholders across the horticulture innovation system in each region, including growers, agronomists, researchers, extension personnel, processors, input suppliers, and industry representatives. A total of 40 interviews were conducted across two states by experienced researchers, with about 20 interviews undertaken in each state (TAS and SA). Participants were drawn from key vegetable, onion, and potato (both fresh and processed) industries and represented both farm-level growers and agronomists, value chain actors and broader system actors involved in pest, weed, and disease management.

Interview participants were identified through a purposive sampling strategy to ensure representation across different roles in the innovation system, following close advice, collaboration and support from Regional Development Officers (RDOs) from VegNET and PotatoLink. Initial participants were selected based on their involvement in crop management decision-making, advisory roles, or influence within the industry, while subsequent interviewees were recruited through referrals, enabling the inclusion of actors who play important roles in information exchange, coordination, and implementation processes.

The interview protocols, tailored to growers and non-growers, examined pest and pathogen dynamics across past, current, and emerging contexts; management practices (including IPM/IPDM); and the effectiveness and drivers of control strategies. They explored the practical, economic, and institutional factors shaping crop management decisions, with particular attention to how stakeholders manage shared pest, weed, and disease challenges. In addition, the interviews investigated actor roles and interactions, knowledge and information flows (including sources of advice and trust), and the extent of coordination across farm, industry, and regional levels, consistent with a systems-oriented RAAIS diagnostic.

By engaging stakeholders individually, the approach captured the diversity of experiences, constraints, and incentives operating at farm, industry, and system levels, while enabling the elicitation of candid insights on coordination challenges, advisory influence, and institutional barriers that may not readily emerge in group-based settings.

Cross-Industry Regional Workshops

Findings from the interviews informed the design of two regional, cross-industry workshops in Tasmania and South Australia in April 2026. Each workshop brought together a diverse group of stakeholders across the vegetable, onion and potato industries, including growers, agronomists, researchers, extension personnel, processors, and industry representatives, with 12 participants attending in Tasmania and 11 participants in South Australia (8 in person and 3 online).

These workshops were designed to address key system-level issues identified during the interview phase and to provide a structured platform for collective analysis and reflection. Workshop participants undertook a series of structured and facilitated activities, including:

- Validating and refining the key constraints and enablers identified during the interview phase
- Ranking and prioritising the most critical barriers to AW-ICM adoption specific to each state
- Classifying priority constraints according to whether they fell within individual, collective, or external spheres of control
- Jointly identifying potential solutions and entry points for coordinated action through group discussions and plenary sessions

Overall, the workshop process fostered cross-industry dialogue, enabled participants to critically reflect on shared challenges, and supported the development of a collective understanding of system-level constraints and opportunities, thereby identifying coordinated solutions to address the problems to help accelerate area-wide integrated crop management.

Final Sensemaking Workshop

A final online sensemaking webinar was conducted, bringing together more than 27 stakeholders from the three participating vegetable-growing regions (WA, TAS, and SA), as well as national-level industry representatives involved in biosecurity, funding, research, extension, and industry coordination. Most participants had previously engaged in the semi-structured interviews and/or cross-industry workshops in TAS and SA and were interested in learning about findings from other regions and collectively interpreting the results with peers and industry partners. Participants represented growers, industry organisations, advisors, researchers, and other stakeholders involved in vegetable production and pest management. Stakeholders from TAS and SA reflected on the findings emerging across the two regions and explored similarities, differences, and shared challenges relevant to the implementation of AW-ICM, with few participants from WA listening and reflecting from their regional perspectives.

The workshop provided an opportunity to validate and interpret the consolidated findings from the earlier phases of the project and to develop a shared understanding of the key constraints, opportunities, and enabling conditions for implementing AW-ICM. The insights generated through this process were subsequently analysed by the research team to identify common themes, cross-regional priorities, and potential national-level entry points for advancing AW-ICM adoption and coordination across the Australian vegetable industry.

Specifically, the session aimed to:

- Reflect on and verify the consolidated findings from the interviews and workshops on the identified priority constraints and potential solutions for AW-ICM adoption.
- Explore common and region-specific challenges and opportunities and share insights relevant to AW-ICM implementation across different production systems and jurisdictions.
- Generate insights to inform the identification of strategic leverage points and opportunities for national-scale AW-ICM initiatives.

2.3. Analytical Approach

Qualitative data from interviews and workshops were synthesised using a thematic analysis guided by innovation systems concepts, particularly systems function. This analysis examined technical, organisational, and institutional dimensions influencing AW-ICM adoption, with a particular focus on system-level interactions and coordination challenges.

2.4. Agricultural Innovation Systems Perspective

Consistent with RAAIS principles, the study moved beyond an individual farm-level focus to analyse how pest, weed, and disease management is shaped by interactions across farms, industries, value chains, and governance systems. This approach enabled identification of both farm-level and systemic constraints, as well as opportunities for coordinated, landscape-scale action. Each of the case study regions were assessed regarding their structures and the functions of their systems with respect to AW-ICM. Function strength was assessed following approaches to previous research (Fielke et al., 2018). These functions include: entrepreneurial activities, knowledge development, knowledge diffusion, guidance of the search, market formation, resource mobilisation, and creation of legitimacy (Hekkert et al., 2007) to assess how the functions perform and also how we can improve them (Wieczorek & Hekkert, 2012).

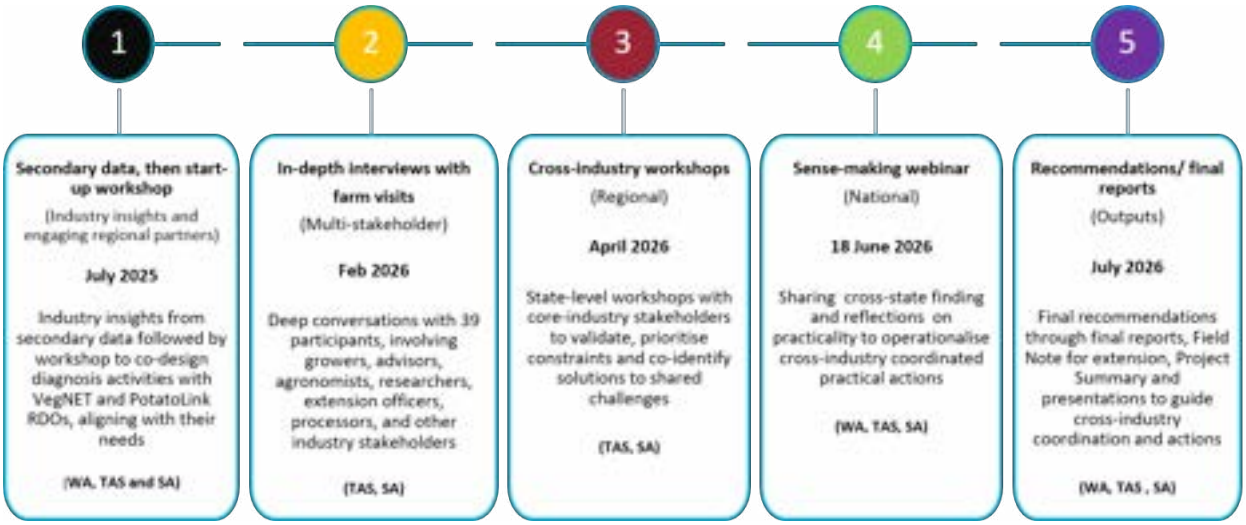

Figure 2: A brief illustration of an adapted RAAIS methodology designed and employed to explore barriers and enablers to accelerate AW-ICM in the Australian horticulture context.

3. Results and discussion

Results are presented for the completed work in Tasmania and South Australia. The section begins with regional interview findings, including a brief regional context and the main barriers and opportunities identified through the adapted RAAIS analysis. It then presents the outcomes of the regional cross-industry workshops, which were used to validate and prioritise constraints and to co-identify entry points for action. Results from the sensemaking webinar also highlight what emerges from cross-regional interactions. The section concludes with a cross-regional discussion, drawing together shared findings from the interviews, workshops and final sensemaking webinar to highlight system-level implications for future research, development and extension.

3.1. Secondary data analysis

The secondary data analysis examined the visible structure of the AW-ICM innovation system, drawing on publicly available information from organisational websites, programmes, and documents. The analysis mapped key organisations and their roles across research, extension, biosecurity, regulation, industry representation, advisory services, and market influence. Its purpose was to provide a practical overview of the current support landscape that could be considered during the purposive selection of key stakeholders for the interviews and then alongside the priorities and constraints raised through the cross-industry workshops.

The analysis suggests that the AW-ICM system already has considerable strengths. Many organisations and programmes are contributing to research, knowledge-sharing, grower support, biosecurity preparedness, and industry coordination. National organisations, including Hort Innovation Australia and other industry and government partners, appear to play important roles in setting priorities, investing in RD&E, and supporting collaborative initiatives. At the same time, state and regional actors are important for translating these priorities into practical support for growers, advisors, and industry groups.

A key finding was the importance of intermediaries and advisors in helping the system work effectively. Programmes and organisations such as VegNET, PotatoLink, AUSVEG, Ag Excellence Alliance, private agronomists, and specialist IPM providers appear to play a central role in connecting growers with research, industry programmes, and policy settings. These actors help interpret information, tailor advice to local conditions, build relationships, and support growers to navigate a complex operating environment. This highlights the value of trusted delivery networks in supporting more coordinated crop management approaches.

The analysis also points to opportunities to strengthen system integration. While there is strong activity in knowledge development, extension, training, and advisory support, the wider AW-ICM system appears more fragmented across crops, regions, and organisational responsibilities. Much of the current activity is still organised through commodity-specific structures, which may limit opportunities to address shared challenges across crops, landscapes, and supply chains. There also appears to be scope to better connect market, regulatory, advisory, research, and grower perspectives within collaborative innovation processes.

Overall, the secondary data analysis informed the research team in identifying key organisations as part of the interviews and cross-industry workshops, and the findings also align well with the workshop findings. Both suggest that the AW-ICM system has many of the necessary building blocks in place, but that its impact will depend on how well these are connected and coordinated. For industry organisations such as Hort Innovation Australia, the findings point to practical opportunities to strengthen cross-industry collaboration, support trusted intermediaries and advisors, connect national investment priorities with regional delivery, and make grower practicalities more visible in the design and implementation of AW-ICM.

3.2. In-depth interviews and farm visits

Tasmania interview results

The Tasmanian regional horticultural production system studied is characterised by highly diversified mixed farming operations, where growers commonly rotate across a broad range of crops and often integrate livestock enterprises. As one non-grower interviewee put it:

Most people here do a bit of everything. You'll see the diversity on farms are growing potatoes for processing. Yeah, they're growing maybe onions, are growing carrots for the fresh market. Yeah, they're growing poppies. They're growing pyrethrum; they're growing cereals. Yeah, they've got livestock. Most farms are like that. [TASNG106]

Production is closely linked to a relatively small number of major processing and packing companies, alongside several smaller operators, with most growers supplying multiple buyers under a mix of contractual and market arrangements. Processing dominates for key crops such as potatoes, while smaller fresh-market segments operate with more direct marketing pathways. Supply relationships are varied and evolving, including traditional grower contracts, processor- and packer-managed production on their own land, and increasing use of land leasing by large-scale growers and packers. Contributing factors to the growth in lease arrangements may include older growers wanting to reduce workload and the financial certainty that leases provide in a tight market. As one representative of a large-scale grower and packer commented:

Traditionally used to be the growers had a contract, so we paid them on pack-out. So, they were invested in the crop. But we do that still, but there aren't many that do it. They all want security of the lease, so they know what their returns will be. So, the guys that do grow contract tend to do better, but if something fails or whatever, then they… don't carry the risk. So, we carry a lot more risk, but also, I suppose we get good crops, we can carry the benefit there too. [TASG108]

Agronomic advisory services are similarly complex, with multiple advisors frequently engaged per farm, including generalist and crop-specific specialists employed by supply companies, processors, or independently. As an example, one grower outlined their agronomy arrangement and commented on other growers' arrangements:

So, with our Brussels sprouts with [agronomist 1], we pay them a consultancy fee. For companies like [agronomist 2] we use through [supply company]. Their cost is reimbursed through the product we buy from them. So, the more product we buy, the better rate we can get for that product. But yeah, they make their cut out of that per se. And then [field officer] with the poppies, like he is paid by the company; that is his job. We don't do that. So, everyone's slightly different. You can always bring in outside people, and there are a lot of people that use independent agronomists like [agronomist 3]. [TASG105]

No interviewed growers described using a full formal IPM approach, though elements of IPM were often used

in combination with blanket or more selective use of chemicals. It appears that all Tasmanian vegetable growers use crop rotation, and this is seen as the primary way to control pathogens, particularly in soil. Interviewees also described use of a range of other IPM elements, including crop monitoring, biological disease or pest control, resistant varieties, cover cropping, cultivation, machinery cleaning, and management of irrigation and nutrition.

Overall, the system reflects a high degree of integration between growers and downstream packers and processors, strong reliance on crop rotation, and a layered advisory network supporting diverse production systems.

The Tasmanian interview analysis identified five key themes and 27 constraints that limit the adoption of AW-ICM (see Appendix 1). These themes and constraints developed from the data were categorised such that explicit constraints could be workshopped and prioritised.

South Australia interview results

The South Australia regional horticultural production system studied is characterised by highly diverse, predominantly family-run enterprises operating across a wide range of commodities, production models, and scales, including open-field, protected cropping, and vertically integrated operations. Farm decision-making is largely autonomous and embedded within family structures, with growers often fulfilling both management and technical roles. Production systems balance commodity specialisation with rotational diversity, though this is constrained in some cases by land access and leasing arrangements. There is also a concentration of protected vegetable cropping in the Virginia region of South Australia.

Supply chains are complex and multi-channel, with growers frequently servicing a mix of processors, supermarkets, wholesale markets, and export pathways, each imposing different requirements that shape production decisions. For example, one Vegetable grower explains their lines and supply routes:

So our product lines are bunch line leafy virgin herbs, and the product list is fairly extensive, so just bear with me. Spinach seed bead, spring onions, radish, parsley, beetroot, parsley, kale, coriander, dill, rosemary, and we supply those to the state and interstate markets in Australia. I recently found out about international markets as well through our merchants. And we also supply to the supermarkets indirectly through other businesses which we supply bulk product lines to. (SAG106)

Market drivers prioritise reliability, quality, and timing, with limited recognition of system-level practices such as integrated pest management or reduced chemical use. As a result, innovation and adaptations are typically driven by individual growers or trusted networks, rather than via coordinated system support. An advisor notes the challenges associated with market requirements against sustainable practice:

We're trying to use sustainable practices. If [we] went to a grocery and saw there's a couple holes from a diamondback moth, he's not going to give a stuff. But we've educated people that [fresh produce] has to be perfect. It has to be pretty... That's where we're at with food and vegetables, which is really unfortunate. (SANG105)

Across the system, there is strong evidence of on-farm innovation and willingness to trial new approaches, but adoption of Integrated Pest and Disease Management (IPDM) remains uneven due to fragmented coordination, weak market incentives, and increasing pressures from input costs, climate variability, and compliance demands.

[Pest management] definitely could be more effective. Because it takes a lot of labour and hours to manage the spray... So if we can get the price for the IPMs a lot cheaper in the area, definitely that would be a lot a lot more easier to manage the pest[s] as well… the pest[s] we get it from is the neighbours. So once we start putting new plants in they kind of stop their pest management. And all the pests come into the new plant. And then we have to – before putting any [beneficial] bugs in the farms, we actually have to put it on the – there's like a fence. Create a biological fence… The cost of production doesn't go down, but the price [of produce] fluctuates. So it's very hard to manage. At this point, we're barely surviving. It's not good for the future.

(SAG109)

Overall, the system demonstrates pockets of resilience and capability but is structurally constrained in its ability to align innovation, markets, and resources to support consistent, system-wide transition. Such individual business and production management resilience was articulated well by one Vegetable grower:

*So you got to be able to be on your toes and **not** be dogmatic and say, this is what we've done… this is what my father did and my grandfather… and we don't change. (SAG103)*

The South Australian interview analysis resulted in five key themes and 31 constraints (see Appendix 2). These themes and constraints developed from the data were categorised such that explicit constraints could be workshopped and prioritised.

Across-state comparison of interview results

The two regions shared both system function similarities and differences, which are summarised in Table 1. The seven functions following the existing analysis relating to innovation system performance (Wieczorek & Hekkert, 2012). While Tasmania and South Australia differ markedly in farm structure and market organisation, both horticulture systems exhibit similar innovation system weaknesses. In each case, knowledge development and entrepreneurial activity are evident, but guidance of the search, market formation, and resource mobilisation remain weak. Tasmania's more coordinated processing sector provides partial institutional support, while South Australia relies more heavily on individual capability and trust-based networks. In both regional horticultural systems, future R&D impact will depend less on generating new technical knowledge and more on aligning institutions, markets, and infrastructure to stabilise and scale system-based practices.

Table 1. Comparison of the different functions across regions

Function	Function description	South Australia	Tasmania
Creation of legitimacy	The extent to which new practices, technologies or coordinated approaches are seen as credible, acceptable, worthwhile and supported by influential actors, policies, norms or institutions.	Evident but fragile; heavily dependent on individuals and trusted relationships	More institutionally embedded through processors and established rotational systems
Entrepreneurial activity	The extent to which growers, advisors, businesses, researchers and other actors are experimenting with, testing or implementing new practices, products, services or ways of working.	Strong but highly individualised; largely self-funded and risk-bearing	Present but more constrained by processor requirements and system structures
Guidance of the search	The extent to which there is a shared direction, vision or set of priorities that helps actors decide which problems to focus on and which solutions are worth pursuing.	Weak, fragmented, and reactive; often crisis-driven	Weak to moderate; stronger within crops but limited coordination across systems
Knowledge development	The generation of new technical, practical, social or institutional knowledge needed to understand the problem and develop possible solutions.	Evident but uneven; strong on-farm learning with limited synthesis	Stronger formal research base, though often siloed by crop and discipline
Knowledge exchange	The ways knowledge, experience and learning are shared between growers, advisors, researchers, industry bodies and other actors, including through extension, networks, demonstrations and informal exchange.	Trust-based and variable; participation uneven with limited supporting infrastructure	Extensive but fragmented; duplication and weak cross-crop integration evident

Market formation	The development of market demand, commercial pathways, business models or value-chain incentives that make new practices or innovations attractive and viable.	Weak; limited differentiation or reward for system-level practices	Moderately stronger via processing contracts, but limited incentives for IPM or sustainability practices
Resource mobilization	The availability and alignment of financial resources, people, skills, infrastructure, time and organisational capacity needed to support innovation and implementation.	Weak; reliance on grower self-funding dominates	Weak overall; more actors involved but still under-resourced and short-term in focus

3.3. Tasmania workshop results: prioritised constraints and co-identified solutions

A participatory workshop with 12 stakeholders from the Tasmanian potato, onion, and vegetable industries was conducted to identify and prioritise constraints to the adoption of AW-ICM. From an initial list of 27 constraints identified through interviews, nine were prioritised, each receiving six or more votes, as summarised in Table 2 below.

Participants worked in small groups to analyse the prioritised constraints and co-develop practical and system-level solutions. The findings highlight that the most significant barriers to AW-ICM are not purely technical but relate to coordination, governance, communication, and incentives across the system.

Two constraints received unanimous support (12/12 votes):

1. Practical and resource constraints limit farm-level biosecurity and machinery, and
2. *Industries focus on individual crops, limiting cross-industry funding and responses (e.g. oxalis, herbicide-resistant ryegrass)*.

These results underscore the need for coordinated cross-industry responses to enable AW-ICM adoption.

Table 2. Prioritised Constraints and Proposed Solutions (Tasmania)

Prioritised Constraints	Summarised Proposed Solutions
1. Ineffective communication of research to growers and knowledge brokers (6/12 votes).	Shift towards grower-driven and context-specific research; improve translation into practical outputs; strengthen the role of extension services and advisors as connectors between research and practice.
2. Practical and resource constraints limit farm-level biosecurity and machinery cleaning (12/12 votes)	Address time, cost, infrastructure, and equipment design barriers; improve awareness and standards; clarify responsibilities across growers, contractors, and supply chain actors; adopt shared, system-level solutions.
3. Industries focus on individual crops, limiting cross-industry funding and responses (e.g. oxalis, herbicide-resistant ryegrass) (12/12 votes)	Establish cross-industry coordination mechanisms; define shared priorities; improve governance transparency; assign clear leadership and accountability; align incentives toward common challenges.
4. Agronomists focus on limited crops (6/12 votes)	Strengthen cross-crop advisory approaches and collaboration; improve integration of agronomic advice across farming systems.

5. Limited coordination among researchers leads to duplication, missed cross-industry opportunities, and less holistic solutions (6/12 votes).	Root causes: Fragmented funding, organisational complexity, short-term project cycles, high staff turnover, and siloed thinking limit coordinated, whole-farm approaches. Solutions: Reform institutional models toward longer-term, integrated programs, improve funding coordination, retain skilled staff, and address industry concerns to enable stronger collaboration
6. Stigma and fear discourage reporting of pests and diseases (9/12 votes)	Create safe, non-punitive reporting environments; use trusted intermediaries; provide incentives and demonstrate benefits of reporting; strengthen coordinated knowledge-sharing systems.
7. Unclear responsibility under landownership and leasing arrangements (8/12 votes)	Promote clear agreements and standards; support long-term land management planning; leverage financial and compliance mechanisms to encourage good practices.
8. High cost of registering alternative disease control options (9/12 votes)	Explore cross-industry cost-sharing, alternative regulatory pathways, and national coordination; encourage a more facilitative regulatory approach.
9. Lack of incentives for AW-ICM adoption (9/12 votes)	Introduce financial and policy incentives aligned with AW-ICM practices to support adoption.

Overall, the prioritised constraints highlight that barriers to AW-ICM adoption in Tasmania largely require cross-industry coordination rather than farm/industry-specific solutions. Effective uptake will depend on:

- Stronger cross-industry coordination and governance
- Improved translation of research into practice
- Better alignment of incentives and regulatory frameworks
- Clearer roles and shared responsibility across the value chain

Immediate actions identified for Tasmania:

- **Establish a Multi-Commodity Biosecurity Working Group:** Form an immediate cross-industry team bringing together vegetable, potato, and onion levy representatives alongside contractor networks to address the lack of cross-industry coordination and responsibility directly.
- **Conduct a Machinery Hygiene Feasibility Study:** Rather than generic awareness campaigns, fund an operational audit to resolve the contractor washdown barrier. This must explicitly define regional washdown infrastructure gaps, evaluate machine modifications to prevent soil trapping, and build a cost-sharing model that dictates who pays for clean-down time during harvest.
- **Prototype Non-Punitive Reporting "Safe Zones":** Work directly with VegNET and PotatoLink to formalise anonymous pest and resistance reporting channels, using independent extension personnel as the trusted firewalls to eliminate social stigma.

3.4. South Australia workshop results: Prioritised Constraints and Co-identified Solutions

A stakeholder workshop in South Australia identified and prioritised constraints to the adoption of AW-ICM. From an initial list of 31 constraints, six were prioritised, each receiving three or more votes (Table 3).

Due to the smaller number of participants (7 in person and 2 online), a single group discussion was conducted to analyse the prioritised constraints and co-develop solutions. The findings highlight that constraints in SA are primarily related to fragmented funding, weak coordination, and limited extension capacity, rather than technical knowledge gaps alone.

Unlike Tasmania, fewer constraints received very high agreement, but there was strong consensus that

system-level improvements in coordination, investment, and extension delivery are critical to enabling AW-ICM adoption.

Table 3. Prioritised Constraints and Proposed Solutions (South Australia)

Prioritised Constraints	Summarised Proposed Solutions
1. Fragmented, short-term, project-based funding	Strengthen collaboration across organisations; increase awareness and participation in SIAP; involve local government (LGAs) to convene stakeholders and co-fund engagement; invest in long-term, coordinated programmes; promote IPM benefits through education and trusted grower-led trials.
2. Absence of a formal IPM extension system	Establish a dedicated IPM extension framework, supported by targeted resourcing, coordinated delivery, and integration with existing infrastructure.
3. Insufficient resourcing to connect and coordinate stakeholders	Secure funding for stakeholder coordination; establish an IPM Development Fund with clear criteria; provide one-on-one implementation support; strengthen the evidence base through cost–benefit analysis and demonstrated outcomes.
4. Change in pest management driven by crisis	For 4-6, no specific solutions were identified during the workshop, due to insufficient time to go through all of them as a group, which meant only a limited number of constraints could be worked through
5. Regulatory, planning, and compliance pressures affecting farm viability	
6. Market pressures (e.g. supermarkets prioritising cost, quality, volume)	

The top three prioritised constraints in South Australia emphasise the need for system-wide coordination and sustained investment to support AW-ICM uptake. Key themes include:

- The importance of long-term, coordinated funding models rather than short-term projects
- The need to establish a formal and resourced IPM extension system
- Strengthening collaboration and stakeholder connectivity, including a clearer role for local government
- Improving practical support for growers, supported by credible evidence and trusted demonstration

Overall, the findings suggest that adoption of AW-ICM in SA will depend less on new technical solutions and more on strengthening enabling systems, governance, and delivery mechanisms.

Suggested Next Steps for South Australia

Workshop participants identified several immediate actions:

- Strengthen governance and coordination through increasing awareness and transparency of SIAP and improving industry participation in priority setting and communication
- Enable collaboration through the local government, as LGA representatives suggest LGA convene stakeholders, provide seed funding, and facilitate grower engagement
- Establish an IPM Development Fund to provide long-term funding, clear requirements, and utilise existing infrastructure
- Enhance extension and knowledge transfer that can deliver one-on-one support for growers to

demonstrate and develop case studies, cost–benefit analyses, and communication outputs from trusted grower-led trials
- Improve communication and capacity building to implement coordinated IPM communication strategies (e.g. workshops, demonstration farms, digital content)

The South Australian workshop highlights that advancing AW-ICM will require stronger coordination, longer-term investment, and more effective extension systems. Participants emphasised the need to move beyond reliance on short-term projects and individual champions toward shared responsibility, structured collaboration, and sustained leadership, creating the conditions for broader and more consistent adoption across the region.

3.5. Across TAS and SA workshop analysis

Workshop Dynamics

In South Australia, due to the relatively small number of workshop participants, they worked in a joint group to brainstorm solutions for prioritised constraints. This approach led directly to regional, systems-level solutions, focusing heavily on how Local Government Areas (LGAs) can act as structural anchors to convene growers and subsidise attendance to reduce participation barriers.

In Tasmania, 12 participants were divided into small breakout teams of four to discuss and brainstorm solutions. One of the group utilised targeted diagnostic exercises, such as a cause-and-effect fishbone diagram, to map out highly specific supply chain friction points surrounding contractor machinery hygiene and operational realities.

Distinct Regional Priority Areas & The Tasmanian Mandate

- **What is prioritised for South Australia?** Priorities focused primarily on the institutional absence of a formal regional extension system, resource coordination deficits, and building clear funding pathways via the Strategic Investment Advisory Panel (SIAP) and a dedicated IPM Development Fund, together with one-on-one support and successful case studies to demonstrate cost-benefit for IPM approaches.

- **Priorities identified for Tasmania:** The voting patterns in Tasmania reveal a powerful, clear mandate. Stakeholders think that the current siloed approach to advisory and industry support is a problem; instead, they want to tackle system-level biosecurity and funding structures:

    - First-tier Tasmania priority (12/12 vote) demonstrates strong agreement across the horticulture sector—including growers—on the urgent need to address shared system constraints. Key actions include resolving practical bottlenecks related to contractor machinery hygiene and moving beyond siloed, commodity-based funding arrangements, which currently hinder coordinated responses and allow cross-industry issues in Tasmania to fall through the gaps.
    - Second Tier Tasmania priority (8-9/12 Votes) shows a strong majority demands immediate action to address structural and cultural bottlenecks, specifically by creating non-punitive "safe zones" to remove the social stigma of disease, pest and weed reporting, pooling cross-industry funds to overcome alternative registration costs that have become a unique problem in Tasmania, and establishing clear AW-ICM incentives.
    - The Lower Tier Tasmania priority (6/12 Votes) focuses on gaps in research presentation, and a narrow agronomist crop focus received the lowest support, indicating far more mixed views on how severely these issues affect day-to-day operations.

Regardless of geography, crop type, or exact voting weights, both workshops arrived at identical structural conclusions for the long-term success of area-wide integrated crop management:

- A short-term approach is a key barrier to tackling complex biosecurity issues: Short-term, project-based funding models fundamentally undermine adoption. Both cohorts explicitly stated that longer-term,

funded programs are essential to successfully demonstrate on-farm value, maintain project momentum, and retain the trusted extension personnel required to deliver them.

- Operating crop-by-crop strictly creates clear fragmentation. When industries focus entirely on individual commodities and responsibility for cross-industry issues remains unclear, landscape-scale threats such as weeds, pests, and biosecurity risks fall through the gaps.

- The primary barriers to area-wide adoption extend beyond technical farm-level issues. Success relies entirely on strengthening the enabling systems: establishing clearer governance, developing trusted extension pathways, and building frameworks for shared responsibility across industries, researchers, advisors, and processors.

3.6. Sensemaking national webinar

This section summarises key insights emerging from stakeholder discussions during the national sensemaking webinar organised on 18 June 2026 with more than 26 participants, including reflections, challenges, and cross-regional comparisons.

Shared challenges with context-specific complexity

- Participants across regions confirmed that core challenges are broadly consistent (e.g. pest pressure, coordination gaps). However, implementation is shaped by local conditions such as:
- geographic dispersion of production, cultural and language diversity and variability in advisory access

Structural coordination and collective action constraints

A dominant theme was the limitation of farm-level approaches:

- Outcomes depend on neighbouring practices… “the grower that tries the best… is surrounded by growers that don’t”.
- pests, weeds and diseases move across farms and through contractors
    - Individual efforts are often undermined; individual growers investing in IPM are undermined by neighbours not adopting
    - Contractors moving equipment amplify the spread

This is a classic collective action failure as the benefits of IPM adoption depend on others’ behaviour, while costs are borne individually.

- WA participants confirmed that Tasmania and SA findings largely transfer across regions. However, additional dimensions emerged: Cultural and language barriers (e.g., growers with English as their second language in protected space in Virginia, SA (interviews) and with over 40% of vegetable growers in WA).

Regional dispersion affecting the feasibility of area-wide approaches, such as SA (hills and plains), a highly varied landscape and production systems, ranging from climate-controlled glasshouses growing capsicums, cucumbers, and tomatoes on the Plains, to open-field brassica and root vegetable farms.

Economic and supply chain market actors and consumers misalignment

Stakeholders emphasised that decision-making is governed by:

- tight margins and risk exposure
- lack of financial incentives for improved practices
- market requirements prioritising cost and cosmetic quality over sustainability

Retail rejection example: produce rejected because of “ladybugs on their lettuce… it’s non-compliant”

- Broader frustration: “We grow for a retail consumer base that shops with their eyes”; need to “educate the consumers”;

Current market conditions create a structural disincentive for adoption, making non-adoption economically rational. There are repeated calls to educate consumers and engage retailers and supermarkets. Current interventions are overly focused on growers, while key leverage points lie downstream.

Knowledge, capability, and extension gaps

Discussion highlighted:

- wide variation in grower capability and readiness; reliance on informal or fragmented advisory networks; limitations of group-based extension models.

Example - some growers “don’t even know how to spray properly… or calibrate their gear”; “people sometimes don’t speak up… they need that individual help”

Participants emphasised the importance of:

- trusted relationships; one-on-one engagement; tailored support

Effective adoption requires segmented and relational extension approaches, not uniform or purely information-based models.

Perception gaps and uncertainty around IPM

There was a clear divergence in views regarding whether IPM is expensive:

- Some stakeholders perceive it as costly, risky and hard to justify financially
- Others report evidence of cost savings and long-term benefits

IPM adoption is not just about cost—it is about when benefits materialise, who captures them and uncertainty in outcomes, which creates a perception gap between evidence and practice.

Governance and institutional gaps

Participants raised concerns about the limited effectiveness of some landscape-level actors (e.g., the role of local councils/ LGA), including:

- unclear roles in pest and weed management, limited engagement with growers and weak support for coordinated action

There is a governance gap at the landscape scale, limiting the implementation of coordinated approaches.

- Perceived lack of action: Example - “they say they want to help, but they don’t really”; practical consequences: roadside spraying “creating resistant grass… which then moves into your paddock”
- Repeated concerns: local councils, seen as disengaged or superficial, and not responsive to practical issues (e.g. weed spread, hygiene).

Under-utilisation of existing knowledge and system inertia

Stakeholders noted that similar issues and recommendations have been identified previously, with limited progress over time. The key challenge is not knowledge generation, but implementation and system inertia.

System-level synthesis

Across discussions, stakeholders consistently pointed to systemic constraints, including:

- coordination failures; misaligned incentives; fragmented knowledge systems; limited governance capacity

A webinar discussion reveals how stakeholders across various states and industries are reframing the issue of pest management. Rather than viewing it as a purely technical problem, they recognise it as a systemic failure in coordination, incentives, and governance. Economic pressures, market signals, and gaps within institutions all limit the adoption of existing knowledge and solutions.

4. Outputs

Below is the list of outputs for this project, which are summarised in Table 4.

Table 4. Output summary

Output	Description	Detail
Secondary Data Analysis of the AW-IPM Innovation System [available on the project SharePoint]	Summarises the secondary data analysis of the AW-IPM innovation system. It identifies key actors, system patterns, constraints, and gaps, and compares these findings with priorities raised in cross-industry workshops. The document is intended for researchers, programme teams, industry partners, policy and biosecurity stakeholders, and others involved in strengthening AW-IPM coordination, implementation, and system integration.	The output was summarised in the project milestone report.
Stakeholder interview guides (grower and non-grower versions)	Semi-structured interview instruments were developed to investigate pest management, AW-ICM adoption barriers, innovation system functions, and stakeholder interactions. Intended audience: project team and future researchers.	Two interview guides were developed and used across 40 interviews in Tasmania and South Australia.
Stakeholder interview dataset	Qualitative dataset comprising 40 interviews with growers, agronomists, researchers, extension officers, processors, industry representatives and value-chain actors.	Approximately 20 interviews were conducted in each state. The dataset generated evidence on barriers, enablers and innovation system performance.
Tasmania and South Australia interview analysis identified constraints to accelerate AW-ICM.	Interviews were conducted that involved 40 participants across the two states, and these qualitative data were analysed, leading to the identification of 27 and 31 constraints in TAS and South Australia, respectively.	The constraints identified were under five themes: Grower capacity, Factors limiting knowledge sharing, Narrow focus and lack of coordination, Lack of clear responsibility and resourcing, Actor interest and resourcing for aspects of AW-ICM.
Tasmania and South Australia cross-industry workshops	Facilitated a multi-stakeholder workshop involving vegetable, onion and potato stakeholders to validate, prioritise and co-identify state-specific collection solutions to support AW-ICM.	In TAS, a total of 12 participants attended. Nine priority constraints and associated solutions were identified and documented. In SA, a total of 11 participants (8 in-person and 3 online). Out of priority constraints, associated solutions were identified and documented.
Regional workshop reports (TAS and SA)	Reports documenting workshop findings, prioritised constraints, proposed solutions and recommended actions. Intended audience: industry stakeholders, Hort Innovation and researchers.	One combined report with sections dedicated to each state that documented outcomes attained from each workshop.

National sensemaking webinar	Cross-regional stakeholder webinar designed to validate findings, identify common themes and explore national opportunities for AW-ICM adoption.	More than 27 participants from Tasmania, South Australia, Western Australia and national organisations participated.
Sensemaking webinar report	Summary report documenting cross-regional insights, stakeholder reflections, common constraints and national-level recommendations.	Consolidated findings across regions and identified leverage points for future AW-ICM initiatives.
AW-ICM practice note: - Field Note on why we need a systemic approach and how to do this - Summary of recommendations and actions targeted to different actors	Practical industry resource translating project findings into concise recommendations and actions for growers, advisors, extension providers and industry bodies.	Designed for industry dissemination through Hort Innovation, VegNET, PotatoLink and partner networks.
Final project report	Comprehensive synthesis of project findings, methodologies, outputs, outcomes and recommendations. Intended audience: growers, industry organisations, researchers, policymakers and Hort Innovation.	Provides evidence-based recommendations for strengthening AW-ICM adoption across Australian vegetable, onion and potato industries.
Stakeholder network and engagement platform	New or strengthened connections among growers, industry bodies, researchers, advisors and extension personnel across sectors and regions.	Established through in-person and online communications, interviews, workshops and webinar participation, providing a foundation for future collaboration and AW-ICM initiatives.

5. Outcomes

Table 5. Outcome summary

Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence
Increased understanding of interdependencies between the sectors of AW-ICM systems at industry-wide, regional and farm level	The aligned outcomes and strategies in the Vegetable Onion, Fresh Potato, Processing Potato Strategic Investment Plan are detailed in Section 4.8 of the Hort Innovation RFP (January 2025)	A key theme from the webinar was the acknowledgement that the shared challenges are broadly consistent (pest pressure, co-ordination gaps etc.); however, implementation is shaped by local conditions. However, this understanding (of other sectors, regions, etc.) is still emerging; for example, in the poll at the webinar (n=17), the majority of responses (41%) to a question around understanding of constraints were in the middle of the scale between 'not at all' and 'to a great extent'.	Evidence was collected through the regional interviews and workshops in Tasmania and South Australia, then tested at the national webinar, which included representatives from WA. An online poll at a webinar which asked the question: "To what extent do you have a better understanding of the constraints faced by other sectors and regions to achieve farm and landscape resilience to insect, disease and weed incursions and resistance? On a scale of 1 (not at all) and 5 (to a great extent) 90% of responses were 3 and above, with the majority (41%) at 3.
Increased understanding of social, economic and institutional barriers and enablers to adoption of AW-ICM and recommended intervention points		The barriers (constraints) and potential solutions have been identified through the interviews, workshops and tested in the webinar and intervention points have been made available to the industry as part of this reporting.	Intervention points summary for growers (see Appendix). Webinar participants were asked "To what extent has the approach we've taken helped to understand the constraints and solutions to accelerate the adoption of AW_ICM" and the majority (61%) responded either 4 or 5 (on a scale of 1 'not at all' to 5 'to a great extent')
Potato, onion and vegetable sectors want to work together across industries to achieve farm and landscape resilience to insect, disease and weed incursions and resistance.		There were suggestions throughout the interviews and workshops of the willingness to work together.	Evidence from summaries of interviews and workshops. When this specific question was asked at the webinar, "To what extent are you (your organisation or industry) willing to work with other sectors on the proposed solutions to achieve farm and landscape resilience to insect, disease and weed incursions and resistance?" 68% of respondents answered 5 (' to a great extent'), and a further 25% gave this a '4' (on the 1 – 5 scale).
Increased understanding amongst VegNET and PotatoLink RDOs/ co-ordinators of systems approaches to adoption		The commitment and involvement of the VegNET and PotatoLink RDOs/ co-ordinators in this process, combined with follow-up feedback and conversations with the project lead, have suggested rethinking some of the more linear approaches to adoption.	This has been evidenced through direct comments from some of the RDOs about their interest and willingness to try something different, as well as their engagement in the overall process. This includes the need to consult growers widely if there is demand for education around AW-IPM, and to design training accordingly, as well as the need to consider how findings from this project inform ongoing projects, such as the Rey Grass weed resistance project, to

Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence
			convince Potato to invest along the Onion and Vegetables industries and extend the 3-year project to 5 years, including WA beyond TAS and SA as currently planned in the implementation. This is motivated by collective action for shared challenges and aims to make it a long-term initiative to demonstrate value to growers.

6. Monitoring and evaluation

Programme logic

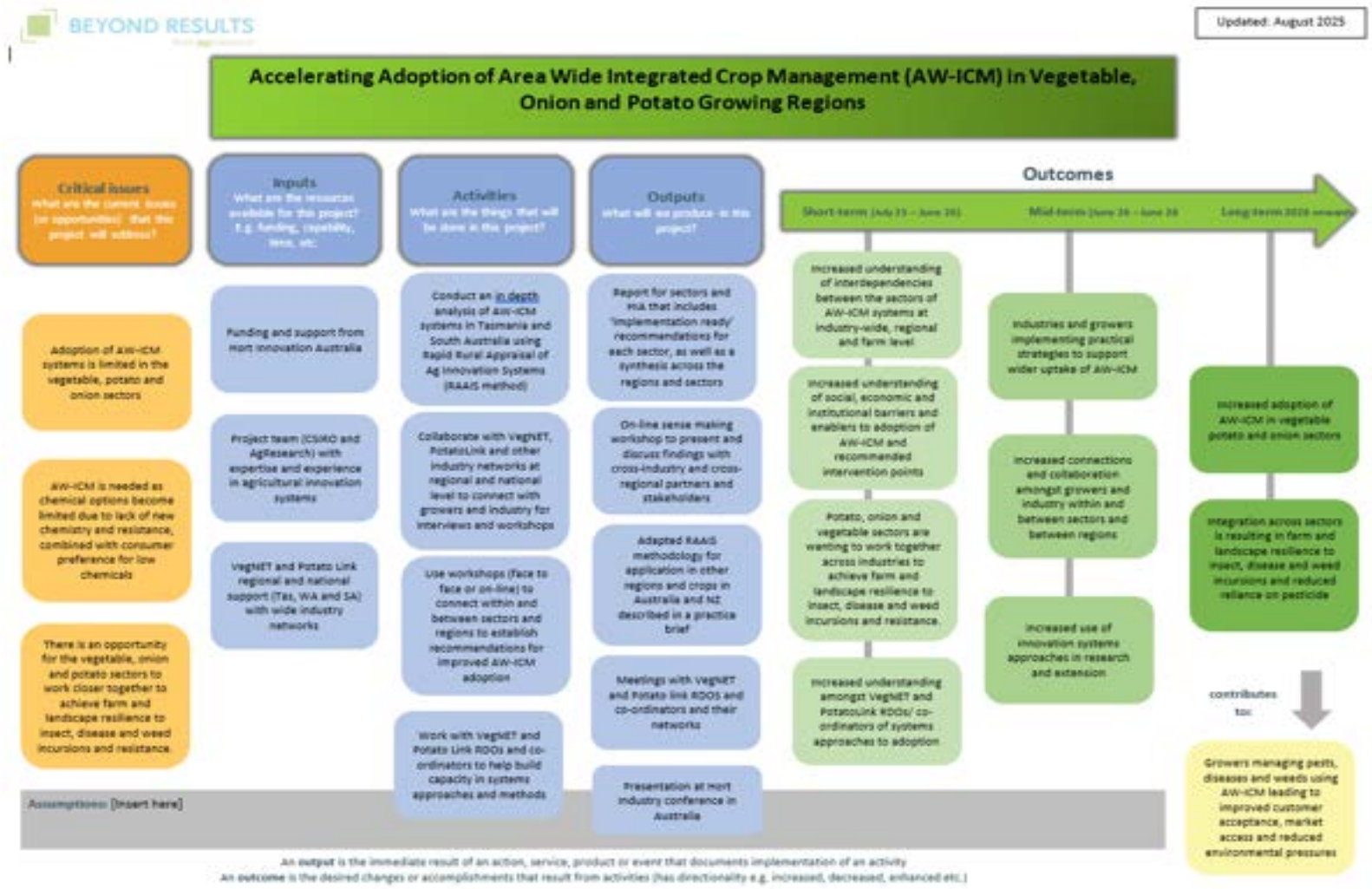

Table 6. Key Evaluation Questions

Key Evaluation Question	Project performance	Continuous improvement opportunities
To what extent has the project delivered on the short-term outcomes (as per programme logic)?	Given the 12-month length of the project, it is appropriate to measure progress through the short-term outcomes. The outcome table demonstrates that as a result of the activities and engagement over the past 12 months, these outcomes have been achieved within the scope of the programme participants and the regions within which we operated. While it appears that more work is needed to really consolidate a cross-regional and systems view of AW-ICM, achieving this would require a greater time period than the 12-month project length	An adapted RAAIS provides a useful framework for understanding and implementing a systems approach. We recommend a longer time period to further embed the systems approach and implement the suggested interventions across different industries.

7. Recommendations

This research project found that the main barriers to AW-ICM adoption are not primarily technical. Rather, they relate to fragmented coordination, limited incentives for practice change, gaps in extension and knowledge sharing, and challenges associated with managing pests, weeds, and diseases across multiple farms, industries, and regions. Future investment should therefore focus on implementing and scaling existing knowledge, strengthening collaboration across industries, and creating clear value for growers. The following recommendations outline practical actions and future RD&E opportunities for Hort Innovation, AUSVEG, PotatoLink, VegNET, researchers, and industry stakeholders.

Table 7 Relationship between the project's key findings, the system-level barriers affecting AW-ICM adoption, and the recommendations proposed to address them

Key findings	Underlying system barriers	Recommendations
Fragmented coordination across industries	Weak collective action and collaboration mechanisms	Strengthen cross-industry collaboration and engagement
Limited extension and knowledge sharing	Poor knowledge flow and learning pathways	Strengthen extension capability and support
Weak incentives for AW-ICM adoption	Limited motivation for collective action	Demonstrate the business case for AW-ICM; explore incentive mechanisms
Short-term and fragmented funding arrangements	Lack of continuity and long-term investment	Leverage existing projects and investments; support long-term collaboration
Unclear responsibility for shared pest and biosecurity risks	Governance and accountability gaps	Strengthen leadership, coordination and shared responsibility
Existing knowledge and lessons are not consistently applied	Underutilisation of available evidence and resources	Consolidate and apply existing knowledge and resources
AW-ICM challenges are interconnected and system-wide	Root causes are not visible through a technical lens alone	Apply systems-based diagnostic approaches in future programs

7.1. Strengthen IPM extension and grower capability

- Support VegNET, PotatoLink and industry advisors to deliver targeted Integrated Pest Management (IPM) training, demonstration activities, and grower-to-grower learning opportunities.
- Prioritise practical, regionally tailored extension approaches that help growers implement IPM and AW-ICM practices on-farm.
- Consult growers in priority regions to identify knowledge gaps and extension needs before developing future programs.

7.2. Demonstrate the business case for adoption

- Undertake cost-benefit analyses of IPM and area-wide management approaches across vegetable, onion and potato production sub-regions.
- Develop practical case studies that demonstrate economic, productivity, risk-management and resistance-management benefits.
- Use this evidence to support grower decision-making and investment in practice change.

7.3. Build on existing projects as AW-ICM demonstration opportunities

- Leverage existing initiatives, such as herbicide-resistant ryegrass management projects, as practical examples of cross-industry and area-wide collaboration.
- Explore opportunities to expand successful projects across vegetable, onion and potato industries and extend their duration to enable long-term impact.
- Use shared challenges as entry points for demonstrating the value of coordinated action.

7.4. Explore market incentives for sustainable pest management

- Conduct a feasibility study with retailers, processors and other supply-chain actors to assess opportunities for recognising and rewarding produce grown using IPM approaches.
- Investigate market differentiation mechanisms that could sit between conventional and organic production systems and create incentives for adoption.
- Identify opportunities to align market signals with improved pest, resistance and sustainability outcomes.

8. Increase industry engagement in RD&E priority setting

- Improve grower awareness of and participation in Strategic Investment Advisory Panel (SIAP) processes and other industry priority-setting mechanisms.
- Encourage collaboration across industries and organisations to shape longer-term RD&E investments focused on shared challenges.
- Increase transparency and communication around funding priorities and investment opportunities.

8.1. Consolidate and apply existing knowledge

- Review and synthesise lessons from previous IPM, biosecurity, resistance management and area-wide management projects.
- Focus future investments on implementing, adapting and scaling proven approaches rather than duplicating previous research.
- Develop accessible industry resources that capture lessons from previous AW-ICM initiatives and support wider adoption.
- Assess factors that have limited the long-term success of previous area-wide management initiatives and use these lessons to guide future investments.

8.2. Strengthen long-term cross-industry collaboration

- Establish mechanisms that enable vegetable, onion and potato industries to address shared pest, weed, disease and biosecurity challenges collectively.

- Align future research, extension and industry development investments around common priorities that require coordinated action beyond individual farms or commodities.
- Support long-term coordination structures and partnerships that can sustain collective action beyond individual projects.

7.8. Apply systems-based diagnostic approaches that are adapted to Australian horticultural contexts

- This project demonstrated the value of adapting the RAAIS methodology to suit the Australian horticulture sector. The adapted approach combined secondary data analysis, stakeholder interviews, cross-industry workshops and a national sensemaking process to identify underlying system barriers to AW-ICM adoption.
- The approach retained the core strengths of RAAIS, including systems thinking, stakeholder engagement and collaborative problem solving, while improving participation and generating insights relevant to commercial Australian horticulture.
- Future RD&E programs addressing complex challenges such as pest and disease management, biosecurity, resistance management, climate adaptation and sustainability transitions should consider incorporating systems diagnostic approaches, stakeholder interviews and targeted multi-stakeholder sensemaking processes to support more effective investment design and implementation.

Overall, the project highlights that accelerating AW-ICM adoption requires greater attention to the coordination, governance, extension and incentive systems that shape grower decision-making and collective action. Future investment should focus on strengthening collaboration across industries, improving the translation and application of existing knowledge, demonstrating clear economic benefits, and supporting long-term approaches to implementation and learning.

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10. Intellectual property

No new intellectual property, patents, plant varieties, proprietary technologies, software, or commercialisable products were generated through this project. All project outputs consist of reports, workshop findings, stakeholder insights, and recommendations intended for public dissemination and industry benefit.

11. Acknowledgements

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