Hort Innovation

Final Report

Soil wealth and integrated crop protection - phase 2

Project leader:

Dr Gordon Rogers, AHR

Delivery partner:

Applied Horticultural Research (AHR) and RM Consulting Group Pty Ltd (RMGC)

Project code:

VG16078

Project:

Soil wealth and integrated crop protection – phase 2 (VG16078)

Disclaimer:

Funding statement:

This project has been funded by Hort Innovation, using the vegetable, fresh potato and potato processing research and development levy and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

Publishing details:

ISBN 978-0-7341-4869-8

Published and distributed by: Hort Innovation

Level 7
141 Walker Street
North Sydney NSW 2060

Telephone: (02) 8295 2300

www.horticulture.com.au

Contents

Public summary

Phase two of the Soil Wealth and Integrated Crop Protection (ICP) project (VG16078) was delivered from December 2017 to February 2023. It was established as a continuation of the successful Soil Wealth ICP Phase one projects (VG13076 and VG13078) which were delivered over three years through collaboration between Applied Horticultural Research (AHR) and RM Consulting Group (RMCG). Soil Wealth ICP was developed to assist growers to improve and maintain the management of their soil and crop health, to drive their productivity, profitability, and sustainability.

The Soil Wealth ICP project has supported vegetable and potato growers to improve their farming operations in the areas of soil and crop health, segmented into 12 technical focus areas. This was achieved by providing the latest information and innovations, and remaining adaptive to current issues. Information was delivered using a range of extension and communication methods, ensuring products and services were relevant, practical, accessible and easy to use.

Phase two of the Soil Wealth ICP project delivered: 48 webinars; 19 podcasts; 31 videos; 32 factsheets; 35 case studies; 11 global scans; 4 best practice guides; 6 posters; 9 core demonstration sites; 8 case study sites; 26 field days and farm walks; 25 workshops and seminars; 3 masterclasses; 1 website; 14 social media accounts; 61 e-bulletins; 4 pest, disease and disorder ute guides; 30 Soil Wealth ICP articles; 13 partnership network articles; 1,147 industry articles; 6 industry events and 4 radio interviews.

The project had two end-of-project outcomes, see below. Both were **achieved**.

End of project outcome 1:

- **Target:** 25% of vegetable levy paying businesses have adopted, are adopting, trialling or intending to adopt soil and ICP practices which improve farm productivity and profitability sustainably.
- **Actual:** 75% of participating growers had or were intending to change practice to improve soil health and/or crop protection on their farm, partly because of the project.

End of project outcome 2:

- **Target:** 25% of agronomists and advisors we have engaged with during the term of the project, include a focus on soil and ICP practices which improve farm productivity and profitability sustainably in the work with their clients.
- **Actual:** 29% of participating advisors had or were intending to incorporate soil health and/or crop protection into advice with their clients, partly because of the project.

The end of project 2022 survey (surveying growers, advisors, and other industry representatives) indicated the majority (83%) of respondents had or were intending to change practice, but this change was more attributable to Soil Wealth ICP – with 49% partly or 2% definitely because of the project. Furthermore, 74% respondents increased knowledge, either partly (60%) or mainly (14%) because of the Soil Wealth ICP project.

A grower and agribusiness service provider from Tasmania said “I’ve identified unsustainable practices and received support and advice regarding strategies for mitigating crop losses.”

For attendees who completed a survey after Soil Wealth ICP training and events, 57% of respondents indicated they would change farm practices following the event. In addition, 76% of respondents indicated they had an improved ability to make more informed decisions about the topic following the event, and provided an average rating of 3.7/5, demonstrating attendees changed their knowledge and confidence on the topic after attending the event.

One grower explained “I’ve taken more notice of paddock history, lowering the risk of problems arising and increasing my knowledge on management practices. Haven't had a major issue since, half due to biofumigants, half due to increased knowledge and risk management.”

Five grower practice change case studies were also prepared to demonstrate the benefits of adoption of improved practices and the subsequent benefits they have observed following their involvement as a demonstration site grower.

One of the Western Australian demonstration site growers said “the strip-till machine paid itself off within the first year, given the time and fuel we saved from reducing tillage. The changes we have made have been beneficial not only to the success of our vegetable crops, but also to the health of our livestock.”

Technical summary

The most effective communication and extension methods and learnings of phase one of the Soil Wealth ICP project (2014-2017) informed the design and delivery of phase two (2017-2023). These included:

- **Focus on demonstration sites and champion growers**
  The demonstration sites and champion growers played an important role in showcasing improved practices on a commercial farm. It allowed other growers and industry members to see the practices first-hand and the opportunity for the champion growers to discuss the activities with the group. This was valuable in encouraging other growers to try and adopt improved practices after seeing innovation in their own district or region. The project team and the grower worked collaboratively to navigate challenges and identify key learnings.

- **Use of a diversity of communication styles**
  The project delivered information in a number of different modes and platforms to support the different learning style preferences of growers and other industry representatives. The diversity of delivery models offered the target audience with a choice of how they wanted to receive information, ultimately driving engagement, reach of the project and the potential for practice change. The methods of delivery included **reading** factsheets, case studies, magazine articles and best practice guides; **watching** videos and webinars; **listening** to podcasts; **in-person immersive experiences** at field days and workshops; as well as short engaging bites of information on social media.

- **Inclusion of advisors in the target audience**
  As advisors typically engage with growers one-on-one and are considered by growers as a primary source of information, they play an important role in supporting them to improve farm productivity and profitability. While project resources and activities were developed with growers in mind, it was important that the project engaged advisors, considering their potential to influence a number of growers and amplify the project reach.

- **Delivery of information in a clear, concise, and practical format**
  For maximum engagement and uptake of information shared by the project, resources were developed into relevant, practical and concise formats, easy to understand. This would prove effective in the projects’ efforts to increase grower knowledge and awareness, and to drive practice change.

- **Targeted activities with leading innovative growers**
  The project worked closely with leading innovative growers who were passionate and interested in trying improved practices. Collaboration with these growers, often in association with the demonstration sites, helped to drive practice change and other outcomes of the project due to their reputation and standing with the industry.

- **Consideration of the whole production system**
  Because plant-environment interactions are complex, successful management of crop and soil health should consider the interconnectivity amongst plant functions and management decisions. The project team recognised this and sought to discuss focus topics, with reference to the whole production system and other relevant management strategies, rather than deal with issues in isolation. This ensured the project outputs were more relevant in a commercial business setting.

- **Proactive review of new industry developments**
  The project undertook a proactive review for new information through global scans and collaboration with other Hort Innovation research projects, to encourage innovation and best practice adoption in industry. This reduced the time that growers had to spend to search for new information, and strengthened the independent, evidence-based extension and communication products from the project.

Keywords

- AHR- Applied Horticultural Research
- Biofumigation
- Biological crop protection products
- Cover cropping
- Cover crops
- Disease management
- Emerging technology
- Equipment
- Insect
- Integrated Crop Protection
- Integrated Pest Management
- Irrigation management
- Machinery
- Mite
- Nematode
- Nutrition management
- Precision agriculture
- Reduced tillage
- RMCG- RM Consulting Group
- Soil amendments
- Soil biology
- Soil health
- Strip tillage
- Weed management

Introduction

Phase two of the Soil Wealth and Integrated Crop Protection (ICP) project (VG16078) was delivered from December 2017 to February 2023. It was established as a continuation of the successful Soil Wealth ICP Phase one projects (VG13076 and VG13078) which were delivered over three years through collaboration between Applied Horticultural Research (AHR) and RM Consulting Group (RMCG).

Soil Wealth ICP was developed to assist growers to improve and maintain the management of their soil and crop health, to drive their productivity, profitability, and sustainability. This was in alignment with the vegetable industry Strategic Investment Plan outcomes (2017-2021) of *improving farm productivity* and *industry capabilities for innovation and adoption*. The Australian vegetable and potato industries are diverse, with each grower operating under differing environmental and business conditions. Growers also experience new and ongoing challenges like varying and extreme weather events, rising costs of inputs, labour shortages and changes in consumer preference.

The Soil Wealth ICP project has supported vegetable and potato growers to improve their farming operations in the areas of soil and crop health, segmented into 12 technical focus areas (outlined in the methodology section). This was achieved by providing latest information and innovations, and remaining adaptive to current issues, delivered through extension and communication methods, available in different formats, that were relevant, practical, and easy to use. Importantly, the outputs delivered needed to accommodate for the varying needs of growers to ensure they can manage their farming system in a way that meets their specific business objectives, skillsets, and capacities.

The aims of the project were to:

- Increase industry awareness of the latest relevant R&D outcomes on improved integrated soil and crop management on-farm.
- Coordinate and deliver improved-practice information to the Australian vegetable and potato industries using existing and new innovative methods including regionally based demonstration sites, field days and training events, supported by electronic resources (e.g. website, social media, videos, webinars) and print materials.
- Complement and utilise existing industry information delivery channels of the AUSVEG National Communications Program (VG15027) and the National Vegetable Extension Network (VegNET).

The end-of-project outcomes established at the commencement of the project, which were monitored on an ongoing basis, included:

- 25% of vegetable levy paying businesses have adopted, are adopting, trialling, or intending to adopt soil and ICP practices which improve farm productivity and profitability sustainably.
- 25% of agronomists and advisors we have engaged with during the term of the project, include a focus on soil and ICP practices which improve farm productivity and profitability sustainably in the work with their clients.

Key learnings of phase one of the Soil Wealth ICP project include:

- Demonstration sites and involvement of the champion grower at field days offers powerful communication, allowing growers to talk directly to other growers. However, the resources and time taken to establish the relationships and operate these sites should not be underestimated.
- The importance of using a range of communication approaches to connect and engage with industry e.g. face-to-face field walks, workshops, written, social media, videos, webinars and the website.
- Developing inclusive working relationships with project partners e.g. agronomists and advisors to bring about practice change.
- Extension, training, and communication activities need to be supported by clear, concise, and practical information, targeted to the needs of the various regions and supply-chain sectors.
- The importance of practical and useful monitoring and evaluation to support continuous improvement and demonstrate impact of the investment to industry.

New challenges such as the COVID-19 pandemic and the incidence of new invasive pests (Fall Armyworm, Serpentine leaf miner, Varroa mite) impacted the industry during the life of the project. The pandemic caused disruptions to much of the supply chain, initiating product shortages and a sharp increase in the cost of inputs. The Soil Wealth ICP project addressed these challenges by sharing practical information with growers and

advisors on optimising the use of on-farm inputs and managing invasive pests. The travel restrictions imposed during the pandemic were navigated by transitioning planned face to face activities to an online format, ensuring training and events could still be delivered effectively.

Methodology

Overall project approach

The approach to phase two of the Soil Wealth ICP project was to begin with clear objectives and technical focus areas to underpin the plans and activities of the project. With these in mind, the project team prepared latest improved-practice information and innovations drawn from various sources to support communication and extension activities. Strong consideration was also given to the diverse nature of the vegetable and potato industry on things such as growing conditions, operating environments, and regional needs, to bring relevancy and drive adoption of improved practice by industry.

The approach to communication and extension involved:

- Focus on **demonstration sites and champion growers** to encourage the grower-to-grower connection and the opportunity for industry to observe new and best practices first-hand on a commercial farm.
- Use of a **diversity of communication styles** (e.g. factsheets and case studies, webinars, videos, podcasts, field days, training workshops, website, social media, magazine articles) to keep growers engaged and to accommodate for different learning styles.
- **Inclusion of advisors in the target audience** of communication and extension activities to expand the reach of the project, streamline the key messages and drive efficiencies, to ultimately encourage practice change adoption.
- Delivery of **information in a clear, concise, and practical** format to encourage engagement and enhanced utilisation of the information.
- Targeted activities with **leading innovative growers** in the industry, to ensure the project was engaging the early adopters and to encourage further adoption by the early majority.
- Consideration of the **whole production system** to obtain best results.
- A proactive **review of new industry developments** to encourage innovation and best practice adoption in industry.

1: Development of a project workplan

A detailed workplan was developed for the duration of the project and reviewed annually to enable the project to remain focused on its objectives and technical areas. The workplan was designed in a way to allow the project to respond to emerging issues (such as COVID-19, new invasive pests and rising cost of inputs) and be adaptive, allowing for continual improvement. With the objective of the project to assist growers to improve and maintain the management of their soil and crop health, it was important that the preparation of the workplan considered the following:

- **Technical focus areas**
- **Outputs and activities** using diverse delivery methods targeting different industry segments
- **Opportunities and challenges** within the farming system
- Key vegetable and potato growing **regions** and **vegetable crops**
- **Linkage and coordination** with related projects for efficiency gains

Each year, the annual workplan was prepared and maintained in an online tool called Smartsheet, shared successfully between AHR and RMCG. Here, project outputs were planned and tracked on a regular basis to ensure delivery in alignment to the project objectives.

A **Project Reference Group** (PRG) was established at commencement of the project to guide the project team on technical focus areas, the annual workplans of proposed activities and the approach to delivery of the outputs. The diverse group was comprised of growers, advisors, an AUSVEG representative, Hort Innovation program managers and the core project team, each representing different perspectives of the industry.

The **technical focus areas** of the project were established through feedback obtained from growers and

advisors during phase one of the project and further reviewed annually by the PRG and expanded when necessary, during phase two. These technical focus areas kept the project targeting topics of grower interest and were developed to encompass a whole system approach. The technical focus areas were:

1. Soil amendments
2. Soil biology
3. Cover crops and biofumigation
4. Reduced tillage
5. Equipment and machinery
6. Emerging technology and precision agriculture
7. Nutrition management
8. Irrigation management
9. Insect, nematode and mite management
10. Weed management and crop protection
11. Disease management and crop protection
12. Biological crop protection products.

2: Use of latest information and innovations

Access to the latest information and innovations encourages the vegetable and potato industry to grow, remain proactive, build resilience, and continuously improve to overcome new challenges. Ultimately, it can help to improve efficiencies, encourage growers to respond to emerging trends and strengthen the reputation of the industry. It was important that the Soil Wealth ICP project facilitated this need by sharing new, relevant, national and international research and development. Through global scans; linkages with relevant Hort Innovation projects; and partnerships established with industry members, the project was able to communicate and extend new developments and best practice information using a mixed methods approach.

Global scans involved undertaking a review of latest information from various reputable sources on a specific topic. This review was then formatted into an extension output that was readily usable and easy to read, targeted towards growers and advisors. The purpose of global scans was to help the target audience source new information without having to undertake the time-consuming process themselves.

Forming linkages with other **Hort innovation projects** such as the Optimising cover cropping for the Australian vegetable industry (VG16068), A multifaceted approach to soilborne disease management (VG15010) and Strengthened biosecurity for the Australian vegetable industry - stage 2 (VG15020) to name a few, has helped to integrate new information into vegetable production systems.

Development of a **partnership network** involved regular connection and collaboration with agricultural retailers, agricultural suppliers and research organisations to strengthen information made available and activities conducted. This was to aid the extension of the latest soil and integrated crop management developments.

3: Delivery of communication and extension

The use of a variety of communication and extension methods supports the different learning styles of growers and creates a bank of resources and experiences that can be leveraged and reinforced over time. The diversity of delivery models provides growers with a choice of how they would like to receive information, ultimately driving engagement and the potential for practice change adoption. With an understanding of this, and with the learnings obtained through Phase one of Soil Wealth ICP, it was evident that phase two needed to offer a mixed methods approach to communicating and extending information.

The methods of delivery chosen for phase two included (Appendix 1):

1. **Demonstration sites and case study sites**
   The demonstration and case study sites were used to demonstrate improved practices on a commercial farm. The sites were typically associated with farm walks and case study write ups to allow growers and other industry members to see the practices firsthand and learn about the aspects that drove successes and challenges experienced. The demonstration site growers were identified through suggestions from the

PAG, the project team and other industry members, and were often demonstrating a path to success with changes in their practice. It presented the opportunity to recognise champion growers and was evident that successful demonstrations played a key role in encouraging other growers to try and adopt improved practices.

The sites were established in key vegetable and potato growing regions, with the topics of focus largely determined by the site growers' interests, which typically aligned to common regional issues. Two different demonstration sites were established, core sites (longer term with more intensive support) and case study sites (shorter term, focused predominantly on a technique or approach to inspire others to try something new and build confidence).

2. **Field days and farm walks**
   The field days and farm walks, often linked with the demonstration sites, allowed growers to see improved practices or the use of new technologies first-hand. It provided the opportunity for grower-to-grower communications, networking with other industry members and the sharing of technical information. The COVID-19 pandemic hampered the ability of the project to conduct field days and farm walks between 2020 and early 2022, so during this time, activities were shifted to delivery online.

3. **Workshops and seminars**
   Workshops and seminars were typically delivered in-person and focused on topics in alignment with project technical focus areas and were relevant to the needs of the region where it was delivered. The format included a combination of presentations for information sharing and interactive activities to improve attendees' knowledge and retention of information on the topic. They were often held in association with other industry events to generate efficiencies and enhance the reach of the information. The workshops and seminars also offered the opportunity for team members of other Hort Innovation projects to share their expertise and project findings.

4. **Masterclasses**
   Masterclasses were often delivered in-person, with some transitioning to an online forum during the COVID-19 pandemic. They focused on topics in alignment with project technical focus areas and were relevant to the needs of the region where it was delivered. The masterclasses were typically two days in length and explored the topic more deeply and technically. The masterclasses also offered the opportunity for attendees to network and learn from other attendees' experiences.

5. **Best practice guides, factsheets, and posters**
   Best practice guides, factsheets and posters provided relevant information on specific topics, presented clearly and in a format that was logical and easy to understand. Best practice guides offered a more comprehensive summary of available information, as well as actionable guidance on how the information can be adopted or used in practice. The factsheet format helped to summarise information on the different facets of the chosen topic and were often developed in association with the project's webinars. They were presented with headings to break up the text and had images, diagrams and tables integrated throughout for ease of the reader. Posters provided a visually appealing tool to summarise information as simply and concisely as possible, offering actionable steps for users to follow or to help with decision making.

6. **Webinars and podcasts**
   The webinars and podcasts were online forums that offered a greater depth of discussion on a specific topic. The webinars were delivered by project team members or industry representatives with expertise on the topic and allowed for members of industry to join live to ask the speakers questions. Webinars also offered a platform for leaders of other Hort Innovation R&D projects to present the progress and results of the project. Podcasts were developed to provide updates on demonstration site activities enabled through grower interviews; discussions on new technologies; summaries or interviews with experts on topics of interest and best management practices; and also conversion of webinar recordings to audio. Both resources were recorded and uploaded to either YouTube or SoundCloud, then shared on the Soil Wealth ICP website as a lasting resource for growers and all industry members to access into the future.

7. **Video**
   Videos were a useful platform to demonstrate new technologies and equipment in the field, grower

interviews or panel sessions, demonstration site updates, or overviews on specific cover crops species or soil borne diseases. Some field activities were delivered through videos when COVID-19 travel restrictions were in place.

8. **Electronic media- website, social media, e-bulletin**
   The Soil Wealth ICP website was the primary virtual source of information sharing, providing one location where growers and industry members could access a range of resources (including factsheets, videos, case studies, webinar recordings, podcasts, demonstration site updates and other articles) and the details for upcoming events. The website was accompanied by social media platforms Twitter and Facebook, which delivered regular updates to industry about new events and resources. The monthly e-bulletin delivered via email, offered another means to communicate information to industry.

9. **Showcase new equipment**
   To showcase new technology, the project sourced and supplied specialised or new equipment to demonstration site growers, giving them the opportunity to try and evaluate the equipment firsthand in a commercial environment. Industry was able to observe the functionality of the technologies through field walks at the demonstration sites, case study write ups, videos, webinars, panel sessions and factsheets. This has played an important role in encouraging growers to remain innovative, proactive and improve efficiencies. Some examples of technologies showcased include a strip tiller, finger weeder, roller crimper, ripper mulcher and precision agriculture.

10. **Case studies**
    Case studies have been produced in a written format to summarise the activities and findings of new and improved practices tried at demonstration sites, recognising both the successes and challenges experienced. They were developed in collaboration with the participating grower, telling their story, outlining the science behind the technology or practice, and offering guidance and resources for others thinking of trying the practice. They have also been used to recognise growers demonstrating best practice, thinking innovatively and striving to improve their practice.

11. **Updated pests, diseases and disorders ute guides**
    Four pest and disease guides produced by AHR in 2014 (project VG12087) were updated. The guides were: pests, diseases and disorders of: brassica vegetables; babyleaf vegetables; sweet corn; and carrots, celery and parsley. The guides required minor revisions to add new pests, improve some low-quality images, and name changes to some diseases. The vegetable industry SIAP also requested the addition of postharvest diseases and disorders.

    The following experts reviewed the existing guides, identifying changes and additions needed:
    - Vegetable pathologist: Dr Len Tesoriero (Crop Doc Consulting)
    - Vegetable entomologist: Andy Ryland (Integrated Pest Management Consulting)
    - Vegetable entomologist: Dr Paul Horne (IPM Technologies)

    Existing resources were reviewed, and new material was added to the guides. A major addition was postharvest diseases and disorders. The style was refreshed, and icons added to identify beneficial insects, exotic pests, and whether diseases and disorders affect the crop preharvest or postharvest.

4: Collaboration

With several Hort Innovation research, development and extension (RD&E) projects working towards a common goal of supporting growers to improve their farming operations, it was integral that Soil Wealth ICP collaborated with other relevant projects. Collaboration helped to offer the latest information, enhance extension and reach of the information generated, drive efficiencies, and strengthen desired outcomes. It also helped the RD&E projects to summarise and interpret their research findings for vegetable and potato production systems. This information was often integrated into new resources such as factsheets and webinars.

During phase two, Soil Wealth ICP worked closely with VegNET- the National Vegetable Industry Extension

Program (VG21000); AUSVEG on the National Vegetable Industry Communications Program (VG15027, VG18000); Optimising cover cropping for the Australian vegetable industry (VG16068); A multifaceted approach to soilborne disease management (VG15010); A strategic approach to weed management for the Australian vegetable industry (VG15070); Area wide management of vegetable diseases: viruses and bacteria (VG16086); Strengthened biosecurity for the Australian vegetable industry - stage 2 (VG15020) and Australian potato industry communication and extension project (PT20000), to name a few.

Collaboration with **VegNET** involved connecting with the Regional Development Officers (RDO) during the planning and delivery of events in their regions to ensure the topics aligned to regional priorities. The RDO's helped to promote the events, strengthen the project's relationships with demonstration site growers and ensure events were delivered at appropriate times and locations in the region. The Soil Wealth ICP team sought to build the skillset and capacity of the VegNET RDO's.

Connection to the **National Vegetable Industry Communications Program** involved promotion of planned Soil Wealth ICP events and updates in the AUSVEG Weekly Update to expand the project's reach. The Soil Wealth ICP team also contributed regular articles to the quarterly Vegetables Australia magazine on project activities and technical information.
Development of a **partnership network** involved regular connection and collaboration with agricultural retailers, agricultural suppliers and research organisations to strengthen information made available and activities conducted. This was to aid the extension of the latest soil and integrated crop management developments.

Collaboration with **other industry representatives** such as advisors, agricultural retailers, agricultural suppliers and research organisations helped to strengthen information made available, expand the reach of the project, and ultimately encourage practice change adoption.

5: M&E and project management

The project used a Measurement, Evaluation, Review and Improvement (MERI) approach to plan, implement, and evaluate the project's activities. The Soil Wealth ICP team met monthly to discuss plans and progress of project activities, which was recorded in an online tool called Smartsheet. Feedback from attendees was gathered following each event to identify successes and areas for improvement, which was used to refine future project plans. The targeted intermediate and end-of-project outcomes were measured through completion of a mid-term review (MTR, Appendix 2), end of project survey (Appendix 3), one-on-one interviews with growers and industry members (Appendix 4), ongoing Monitoring and Evaluation (M&E) data and the development of grower practice change case studies. The data collected helped to gauge the impact of the project's activities in encouraging growers to try and adopt new practices and to identify aspects of the project working well and opportunities for improvement. Project progress towards the planned outputs and outcomes were summarised in six-monthly milestone reports submitted to Hort Innovation.

Results and discussion

Phase two of the Soil Wealth ICP project delivered: 48 webinars; 19 podcasts; 31 videos; 32 factsheets; 35 case studies; 11 global scans; 4 best practice guides; 6 posters; 9 core demonstration sites; 8 case study sites; 26 field days and farm walks; 25 workshops and seminars; 3 masterclasses; 1 website; 14 social media accounts; 61 e-bulletins; 4 pest, disease and disorder ute guides; 30 Soil Wealth ICP articles; 13 partnership network articles; 1,147 industry articles; 6 industry events and 4 radio interviews (Appendix 1).

The two end-of-project outcomes were **achieved** and were measured through completion of a mid-term review (MTR), end of project survey, one on one interviews with growers and service providers, ongoing M&E and the development of grower practice change case studies.

End of project outcome 1:

- **Target:** 25% of vegetable levy paying businesses have adopted, are adopting, trialling or intending to adopt soil and ICP practices which improve farm productivity and profitability sustainably.
- **Actual:** 75% of participating growers had or were intending to change practice to improve soil health and/or crop protection on their farm, partly because of the project (Figure 1).

End of project outcome 2:

- **Target:** 25% of agronomists and advisors we have engaged with during the term of the project, include a focus on soil and ICP practices which improve farm productivity and profitability sustainably in the work with their clients.
- **Actual:** 29% of participating advisors had or were intending to incorporate soil health and/or crop protection into advice with their clients, partly because of the project (Figure 2).

The end of project 2022 survey results (Appendix 3) of all respondents (growers, advisors and other industry representatives) indicated the majority (83%) of respondents had or were intending to change practice, but this change was more attributable to Soil Wealth ICP – with 49% partly or 2% definitely because of the project (Figure 3). Furthermore, 74% respondents increased knowledge, either partly (60%) or mainly (14%) because of the Soil Wealth ICP project, up from 70% in the MTR (Figure 4).

For attendees who completed the survey after Soil Wealth ICP training and events, 57% of respondents indicated they would change farm practices following the event. In addition, 76% of respondents indicated they had an improved ability to make more informed decisions about the topic following the event, and an average rating of 3.7/5, demonstrating attendees changed their knowledge and confidence on the topic after attending the event. The training and events on average consisted of 42% growers, 15% advisors, 9% researchers, 9% industry associations, 6% government and 18% others (e.g. agri-chemical, machinery, extension staff).

Five grower practice change case studies have also been prepared to demonstrate the benefits of adoption of improved practices and the subsequent benefits they have observed on farm after their involvement as a demonstration site grower. See more details in the outputs section and quotes from these growers below:

"The harvest from the demo site this year [2020] was so uniform. It was really noticeable when it was coming off the block. It was a fantastic result – it beat the best crop off the farm." – Grower, VIC

"The strip-till machine paid itself off within the first year, given the time and fuel we saved from reducing tillage. The changes we have made have been beneficial not only to the success of our vegetable crops, but also to the health of our livestock." – Grower, WA

"For me, seeing was believing. Despite my original scepticism, after half an hour of trying strip tillage in different cover crop scenarios [at the site], we were all quite blown away by how it could convert the cover crop to an area ready for planting vegetables. We purchased the machine on the spot, and the trial went from a few hectares to being adopted across the 200 hectares destined for growing corn. After using strip tillage, the corn crop was the most even I've ever seen it in my 17 years of farming, despite the gullies through the paddock and uneven beds. We saved costs on in-crop herbicides, fuel and labour hours." – Farm Manager, Vic

The project contributed to the two vegetable industry **Strategic Investment Plan (2017-2021) outcomes** *Improved Farm Productivity* and *Improved industry capabilities for innovation and adoption*, achieved through numerous project outputs and activities that:

- Offered best practice guidance to pest and disease management to reduce crop waste; (Appendix 1)
- Demonstrated solutions to combat the rising cost of inputs such as the use of legumes as alternative nitrogen sources and adoption of precision agriculture systems (Appendix 1);
- Improved practices to improve farming environmental sustainability such as the use of cover crops in replacement of plastic mulch, Integrated pest management and communications on carbon (Appendix 1);
- Demonstrated the use of advanced technologies such as precision agriculture and weed management tools (Appendix 1)
- Delivered communication and extension efforts in a clear, concise and relevant way; diverse methods of communication and extension to drive engagement and accommodate for different learning styles; enhanced outcomes through collaboration with other industry representatives (Appendix 1);
- Focused on innovation through establishment of demonstration sites with champion growers; collaboration with agribusiness suppliers and technology providers (Appendix 1).

Relevant quotes include:

"Identified unsustainable practices and received support and advice regarding strategies for mitigating crop losses." – Grower / Agribusiness service provider, Tasmania

"The strip tiller lets us prepare the soil for planting in one pass, which has also helped to retain moisture. We're saving so much fuel and time with strip-till. We should've bought a machine like this years ago" – Grower, NSW

"Creating healthier soils led to more resilient and healthier crops, better moisture retention, better nutrient availability and retention, less compaction, [with] reduced [machinery] horsepower requirement." – Grower, Queensland

"I've seen 5-6 growers interested in cover cropping, soil microbes and biofumigation after being introduced to them through Soil Wealth ICP" – Advisor

"I am a new agronomist and am now at the stage where I am looking to develop knowledge on this topic to help advise growers. This webinar was a great introduction and I am keen to follow up by accessing all of the available information on the Soil Wealth website." – Agronomist

"Soil Wealth ICP consistently provides relevant information backed up by relevant practical case studies in Australian commercial practice." – Grower/ Agribusiness service provider, Tasmania

"I've taken more notice of paddock history, lowering the risk of problems arising and increasing my knowledge on management practices. Haven't had a major issue since, half due to biofumigants, half due to increased knowledge and risk management" – Grower

"It (granular compost) has improved soil structure… plants are not getting stressed. The flood should have wiped out our crops, but they bounced back. Yearly crops are getting better, the only thing that has changed is the initial input and soil preparation." – Grower

The COVID-19 pandemic presented significant challenges with activities requiring in-person presence such as the establishment and maintenance of demonstration sites, and delivery of field days, farm walks and workshops. During this time, growers experienced new challenges including the rising cost of inputs such as fertilisers and fuel, and new invasive pests. The project remained adaptive and innovative to overcome these industry challenges and continued to drive engagement.

Some key learnings and feedback received during the project include the importance of face-to-face interactions and the impact that demonstration sites can have on engaging growers and advisors and further encouraging them to try or recommend improved practices. Furthermore, the diverse nature of project outputs and topics helped to engage the target audience and offer something different for everyone's preferred learning styles.

Figures

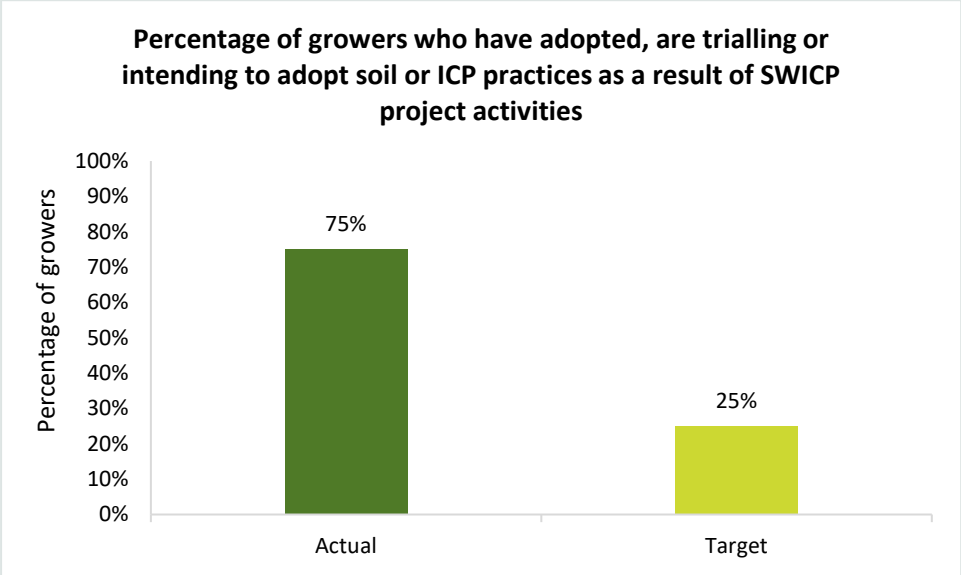


Figure 1: Percentage of growers who have adopted, are trialling or intending to adopt soil and ICP practices as a result of SWICP project activities.

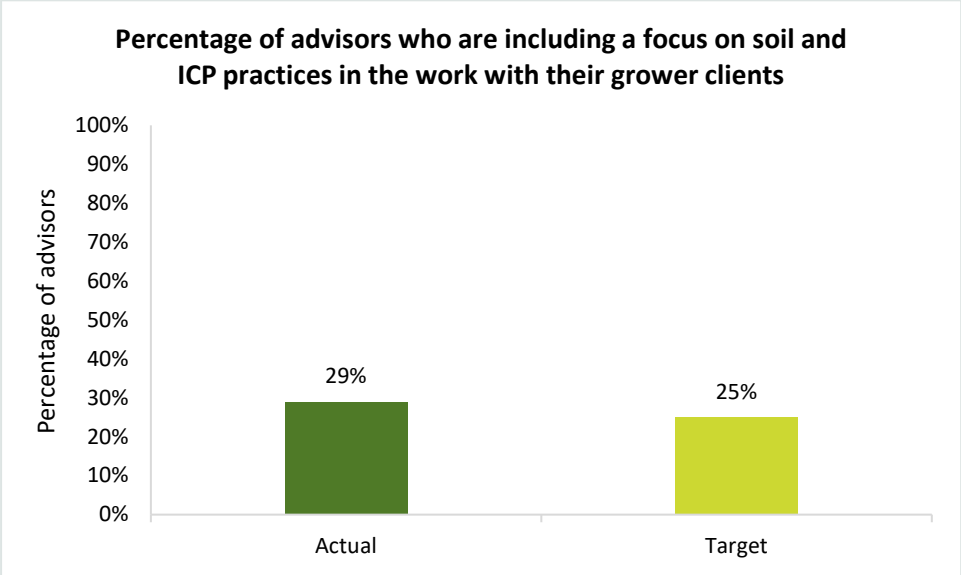


Figure 2: Percentage of advisors who are including a focus on soil and ICP practices in the work with their grower clients as a result of SWICP project activities.

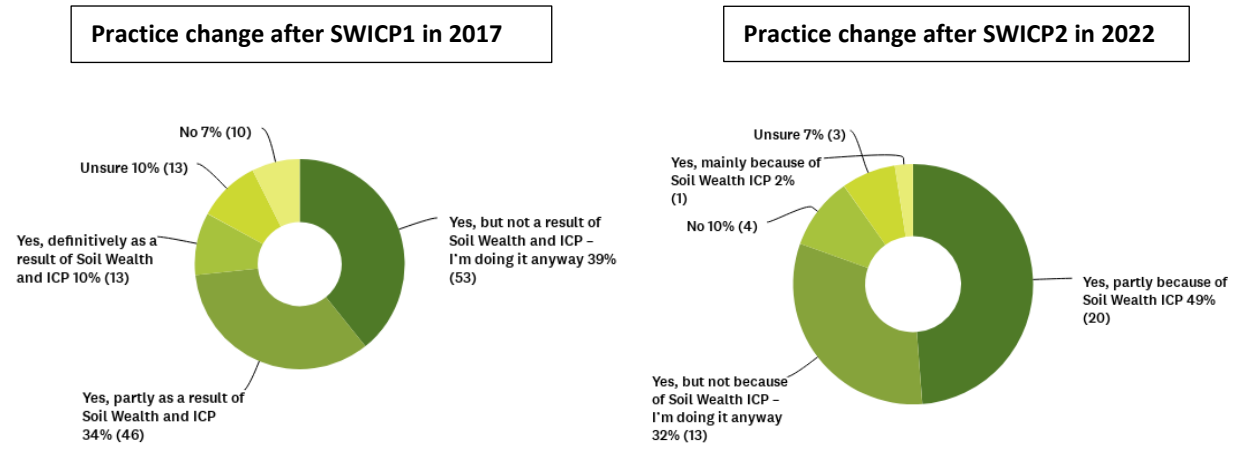


Figure 3: Percent of all survey respondents who had or were intending to **change practice** because of the Soil Wealth ICP project from 2017 (left) to 2022 (right, Appendix 2 & 3).

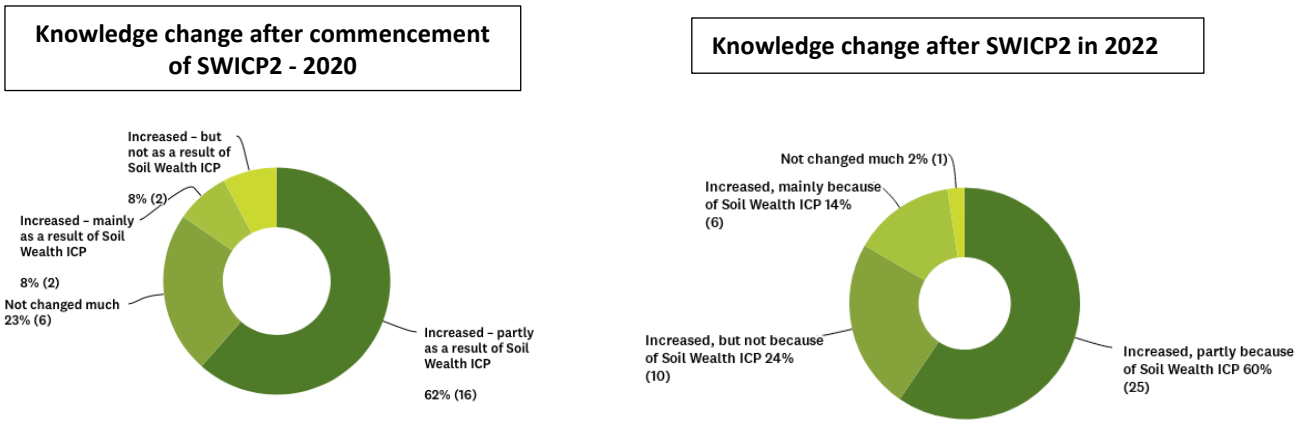


Figure 4: Percent of all survey respondents who had a **change in knowledge** of soil management and crop protection from 2020 (left) to 2022 (right, Appendix 2 & 3).

Outputs

Table 1. Output summary

Outputs have been described in the methodology section, and further detail provided in Appendix 1.

Output	Target Number	Number Delivered	Detail
Webinars	25	**48** webinars See Appendix 1 for more detail	Webinars were delivered and recorded live, with the recordings uploaded to the Soil Wealth ICP website. Webinars typically went for a duration of 30 minutes to 1 hour each, were facilitated by a project team member and had technical content delivered by an expert in the chosen topic. Each webinar received on average 44 registrants, 21 attendees live and 290 recording views each. All webinars achieved a combined total 26,268 recording views over the life of the project (Figure 5). Attendees consisted of an average of 46% growers, 16% advisors and the remainder a combination of researchers, government, and industry associations.
Podcasts	0	**19** podcasts See Appendix 1 for more detail	Podcasts were recorded with growers or technical experts on topics outlined in the methodology section. They were published via SoundCloud and uploaded to the Soil Wealth ICP website for easy access. On average, each podcast received 126 plays, and 142 page views on the Soil Wealth ICP website, reaching a total of 8,223 people (some repeated viewers, Figure 5).
Videos	5	**31** videos See Appendix 1 for more detail	Videos were typically recorded in the field to on topics outlined in the methodology section. They were uploaded to YouTube and then linked on the Soil Wealth ICP website for easy access. On average, videos received between 100-500 views on YouTube, however some were more popular. This video on Buckwheat as a cover crop received 24,901 views and this video on the Advantages of Sunn Hemp as a cover crop received 6,413 views (Figure 5). A Soil Wealth ICP Achievements video has been produced for phase two, see here.
Factsheets	20-25	**32** factsheets See Appendix 1 for more detail	Factsheets were developed by project team members, in collaboration with or reviewed by technical experts. They were then uploaded to the Soil Wealth ICP website. In total, through phase two of the project, all factsheets combined were viewed 47,597 times on the website (Figure 5).
Case Studies	12-15	**35** case studies See Appendix 1 for more detail	Case studies were developed in collaboration with growers and were uploaded to the Soil Wealth ICP website. In total, through phase two of the project, all case studies combined were viewed 15,076 times on the website (Figure 5).
Global Scans	15-25	**11** Global scans See Appendix 1 for more detail	Global scans were produced from reviewing a range of reputable sources developed locally and internationally and were uploaded to the Soil Wealth ICP website. They were viewed a total of 5,617 times during phase two of the project (Figure 5).
Best Practice Guides	5	**4** Guides See Appendix 1 for more detail	Best practice guides were developed in collaboration with industry experts in their field. The guides were uploaded to the Soil Wealth ICP website. One of the

Output	Target Number	Number Delivered	Detail
			four guides, on Nutrition products is in a final draft form, undergoing technical review, see here.
Posters	0	**6** posters See Appendix 1 for more detail	Posters were developed by project team members, in some cases through collaboration with other Hort Innovation funded projects. The posters were uploaded to the Soil Wealth Website and with some printed as a hard copy for distribution at project and industry events. The posters have received 1,909 views on the website (Figure 5), with over 200 distributed as a hard copy.
Demonstration sites	Core sites – 6 Case study sites – 12-15	**9** Core sites **8** Case study sites See Appendix 1 for more detail	Demonstration sites were established through the relationships of the project team and collaboration with other industry representatives. More details about the process for deciding locations and topics of the sites can be found in the methodology section.
Field Days & Farm Walks	30	**26** field days/farm walks See Appendix 1 for more detail	Field days and farm walks were typically established in association with demonstration sites, on topics aligned to the site and projects' technical focus areas. Each event on average received 28 attendees, reaching approximately 700 people (some repeated attendees) during phase two of the project.
Workshops & Seminars	10-15	**25** workshops or seminars See Appendix 1 for more detail	Workshops and seminars were held in key growing regions across Australia on topics aligned to the site and projects' technical focus areas and regional priorities. The duration of the workshops ranged from a few hours to a full day and were occasionally held in association with field events. Each workshop on average received 45 attendees, reaching approximately 1,080 people (some repeated attendees) during phase two of the project.
Masterclasses	5	**3** masterclasses See Appendix 1 for more detail	Masterclasses were predominantly held in-person and were transitioned to an online format where COVID restrictions applied. They were typically delivered over two days and provided an in-depth session on a specific topic. Each masterclass on average received 42 attendees, reaching 126 people (some repeated attendees) during phase two of the project. Attendees consisted of an average of 20% growers, 33% advisors and the remainder a combination of researchers and industry associations. An outstanding Soil Biology Masterclass has been planned for 17 & 18 April 2023.
Website	1	**1** website See Appendix 1 for more detail	The Soil Wealth ICP website was used as the central location for industry to access all resources and communications about the project. It was updated at minimum on a weekly basis with new resources, articles and information about upcoming project and other industry activities. The website received 107,216 sessions with an average session duration of 2 minutes 48 seconds. It had 73,024 users, of which 87.9% were new and 12.1% were returning visitors, and 234,442 page views. The website also retained all resources developed through phase one of the project, which continued to be accessed during phase two. There were 159,914 total resource page views

Output	Target Number	Number Delivered	Detail
			over phase two.
Social Media	2	**2** Twitter accounts, **12** Facebook accounts. See Appendix 1 for more detail	The Twitter and Facebook social media platforms established in phase one of the project continued to be a source of communicating project activities and resources with growers and the broader industry. The project reached 2521 twitter followers, up 768 followers from the start of the phase, and 3151 combined Facebook followers across the demonstration site pages, up 1989 followers from phase one.
E-Bulletins	60	**61** E-Bulletins See Appendix 1 for more detail	Soil Wealth ICP delivered a monthly e-newsletter called the E-Bulletin to over 2,200 subscribers, which increased from 1,800 since phase one of the project. The newsletter served to update the project's target audience on upcoming events, new resources available and other relevant industry information. The E-Bulletin had an average open rate of 24-51%, which is above the average for the agriculture industry of 20%.
Articles & Publications	0	**30** SWICP articles **13** Partnership network articles **1147** Industry articles See Appendix 1 for more detail	Articles and publications produced during the project offered an effective method of communicating with growers and other industry representatives on a regular basis. These articles were distributed through a combination of email newsletters (e.g. AUSVEG Weekly Update, VegNET e-newsletters and the Vegetables WA e-newsletter) and articles in hard copy magazines (e.g. Vegetables Australia and Vegetables WA). The articles and publications uploaded to the Soil Wealth ICP website were viewed 31,537 times through the life of the project (Figure 5).
Industry Events	0	**6** industry events See Appendix 1 for more detail	Attendance of project team members at industry events demonstrated an effective way to build and strengthen relationships with growers and other industry members. Participation at events also enabled the project team to stay up to date on the latest information and relevant industry happenings.
Radio Interviews	0	**4** radio interviews See Appendix 1 for more detail	Radio interviews were conducted when the opportunities arose and were focused on sharing information with listeners on the project and an update on demonstration site activities.
Updated Pest & Disease ute Guides	4	**4** ute guides See Appendix 1 for more detail	Field identification handbooks for pre and postharvest pests, diseases and disorders of brassica, babyleaf, sweet corn and carrots, celery and parsley. The republished guides will be printed, as well as made available electronically on the AHR website. Printing will include 1000 copies of the brassica and babyleaf guides, and 500 copies of the sweet corn and Apiaceae guide. The guides will be promoted to the vegetable industry through AUSVEG and Hort Innovation communication channels, and printed and distributed to growers and agronomists at Hort Connections 2023, VegNET RDO's and via post. The guides are in a final draft form, and changes are in review by the three pest and disease experts. Click here for a link to the final draft versions.

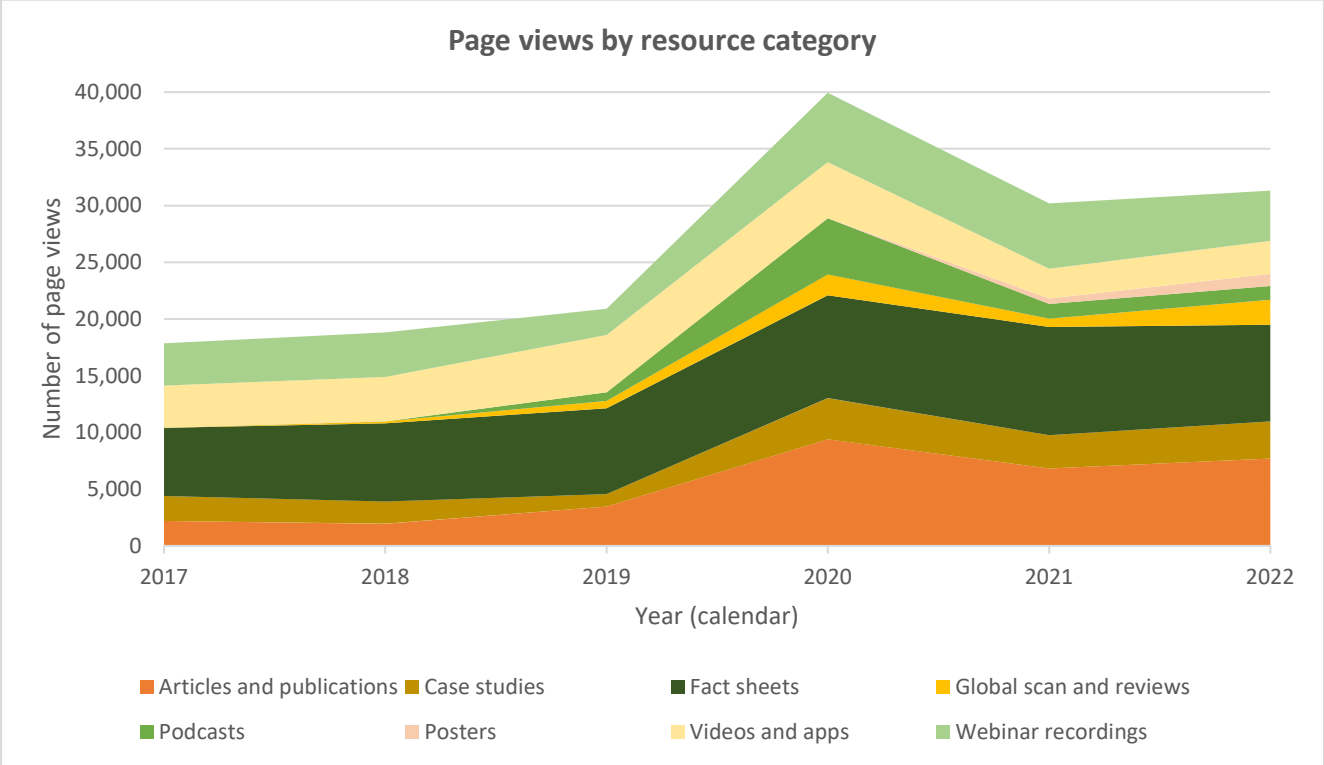


Figure 5: Website page views by resource category

Top 10 most popular resources

Using analytics from the Soil Wealth ICP website, Bulletin e-newsletter, social media and grower feedback, the following 10 resources were the most popular during phase two (Appendix 1).

1. **Biological Product Database**, a tool to help growers navigate the array of biological products currently available to their farming business.
2. **Soil-borne diseases in vegetable crops: A practical guide to identification and control**
   A practical field guide developed to provide information on the identification and control of the major soil-borne diseases for a diverse range of vegetable crops.
3. **Plant analysis for vegetable crops: A practical guide to sampling, analysis and interpretation**
   This guide explains how plant analysis can be used to achieve balanced, site-specific nutrient management. It covers types of plant analyses as well as sampling methods, desirable nutrient concentrations and interpreting results.
4. **Soil Biology in Vegetable Production Masterclass**
   In 2021, the Soil Wealth ICP team introduced the first Soil Biology in Vegetable Production Masterclass, which was run online over two days. A webinar series was developed following the event where growers could access the presentations from experts, growers and industry members.
5. **Strip-tillage for vegetables and potatoes with Steve Peterson (USA) and Ben Pogiolli (Qld)**
   This webinar recording brings together local and international experiences of strip-tillage in the field with Steve Peterson, a fourth-generation farmer and manufacturer of strip-till equipment in the United States and Ben Pogiolli, an experienced strip-till farmer from the Atherton Tablelands in Queensland.
6. **The Carbon Series**
   The Carbon Series breaks down the practicalities of carbon farming for vegetable growers and the benefits of soil carbon management. The series explored the following topics and provided links to further information and project resources.
   - Part 1: Carbon farming and its relevance to Australian vegetable growers
   - Part 2: Soil carbon and carbon sequestration
   - Part 3: Carbon emissions in vegetable production
   - Part 4: Carbon accounting and the Emissions Reduction Fund.
   - Podcast: Developing carbon neutral sweet corn in Queensland (Mulgowie Farming Company)

- Webinar recording: Carbon management on vegetable farms – emissions, sequestration and beyond.

7. **Ag-tech trial turns up the heat on weeds**
   This case study investigated the effect of a prototype unit from Growave which aims to reduce herbicide use within the horticulture industry using microwave technology. The Australian-first trial of the technology was held at the Soil Wealth ICP Koo Wee Rup demonstration site in Victoria and captured the interest of many growers.
8. **Cover crops for Australian vegetable growers poster**
   With so many cover crop species available, this double-sided A3 poster provides a strong starting point for growers to choose a cover crop to suit their farming operation, climate and cover crop objectives.
9. **Integrated weed management: Nutgrass, oxalis and volunteer potatoes**
   The integrated weed management (IWM) fact sheet provides a range of control strategies on nutgrass. Similar fact sheets were also developed for oxalis (Oxalis spp.) and volunteer potatoes (Solanum tuberosum).
10. **Maximising IPM practices in protected cropping wrap-up**
    In 2022, a group of vegetable growers and industry members visited Family Fresh Farms in New South Wales for a Soil Wealth ICP event focusing on how growers can incorporate integrated pest management (IPM) practices in protected cropping. For those who missed the event, this wrap-up shared the key discussion points on the fundamentals of IPM and ways to improve IPM practices.

Outcomes

Table 2. Outcome summary

End of Project Outcomes	Alignment to fund outcome, strategy and KPI	Description	Evidence
Practice Change – Growers 25% of vegetable levy paying businesses have adopted, are adopting, trialling, or intending to adopt soil and ICP practices which improve farm productivity and profitability sustainably.	The project contributed to Strategic Investment Plan (2017-2021) outcome three – *Improved Farm Productivity*, by: • Providing growers with best practice guidance to **pest and disease management** ultimately helping to improve **produce quality** and reduce waste. • Demonstrating solutions to combat **rising cost of inputs**, including the use of use of legumes as an alternative nitrogen source, precision agriculture and the principles behind nutrition management to target nutrients when and where they are needed. • Demonstrating improved practices to support growers to improve their **environmental sustainability**. Examples include the use of cover crops for weed management in replacement of plastic mulch, Integrated Pest Management to reduce chemical inputs, strategies for nutrient resource use efficiency and communications on carbon. • Demonstrating practices to improve **soil and water**	The project undertook activities on a regular basis which built trust with the growers and drove their engagement. Content delivery through a range of formats including in-person activities, virtual activities, and the development of a bank of resources, helped to meet the different learning styles of growers. However, the most impactful activity was the establishment and support of the demonstration sites, as this allowed growers to see improved practices firsthand and learn through grower to grower interactions. As new growers expressed interest in the practices, new case study sites were established, which provided the grower with support to navigate challenges that arose.	**Practice Change** This end-of-project outcome has been **achieved** and measured through completion of a mid-term review (MTR), end of project survey, one on one interviews with growers and service providers, ongoing M&E and the development of practice change case studies. The 2022 survey results indicate that 75% of grower respondents had or were intending to change practice, partly because of the project. The main activities respondents had or planned to change practice included: • Cover cropping • Improved soil testing and management • Compost • Trials • Reduced input use. Furthermore, 57% of respondents who attended Soil Wealth ICP training and events indicated they would change farm practices following the event. 42% of attendees were growers. Five grower practice change case studies have been developed to demonstrate the benefit of adopting new practices in collaboration with Soil Wealth ICP on the health of their crops, soils and finances. These include: 1. Schruers & Sons – Koo Wee Rup, Vic Adam Schruers - "The harvest from the demo site this year [2020] was so uniform. It was really noticeable when it was coming off the block. It was a fantastic result – it beat the best crop off the farm," Adam explained during the

End of Project Outcomes	Alignment to fund outcome, strategy and KPI	Description	Evidence
	quality including how to choose, grow and terminate cover crops and reduced tillage practices like strip till. • Demonstrating the use of **advanced technologies** such as precision agriculture tools and physical weed management tools that maintain soil health (e.g. strip till, finger weeder, ripper mulcher). The project contributed to Strategic Investment Plan (2017-2021) outcome five – *Improved Industry capabilities for innovation and adoption*, by: • Implementing **communication and extension** strategies that are clear, concise and relevant; diverse, to accommodate for different learning styles and maximum uptake; are targeted to regional needs; and are achieved through collaboration with other projects such as VegNET. • Focused on **innovation**, through the establishment of demonstration sites with industry leading, 'champion growers' to support them in trying and adopting new and innovative practices. The development of case studies also helped to highlight best practices and give confidence to		trial. Improved yield and crop uniformity contributed to increased gross profitability of $53,000, or $5,000 per hectare, largely driven by reduced costs from post-harvest labour efficiencies in cleaning, grading and packing produce. 2. Three Ryans – Manjimup, WA Jake Ryan - "The strip-till machine paid itself off within the first year, given the time and fuel we saved from reducing tillage," Jake Ryan said. "The changes we have made have been beneficial not only to the success of our vegetable crops, but also to the health of our livestock." 3. Mulyan Farms – Cowra, NSW 4. Mulgowie Farming Company – Maffra, Vic Michael Evans - "For me, seeing was believing. Despite my original scepticism, after half an hour of trying strip tillage in different cover crop scenarios [at the Maffra site], we were all quite blown away by how it could convert the cover crop to an area ready for planting vegetables," said Michael Evans, the former farm manager of the site. "We purchased the machine on the spot, and the trial went from a few hectares to being adopted across the 200 hectares destined for growing corn. After using strip tillage, the corn crop was the most even I've ever seen it in my 17 years of farming, despite the gullies through the paddock and uneven beds. We saved

End of Project Outcomes	Alignment to fund outcome, strategy and KPI	Description	Evidence
	other growers to consider trying something new and suitable to their operations. • Actively involved the younger generation of farmers for their **professional development** and to target activities where practice change is more likely to occur.		costs on in-crop herbicides, fuel and labour hours." 5. Thorndon Park Produce – Adelaide Plains, SA The **intermediate outcome** of the project (75% of vegetable growers have **increased soil and ICP knowledge** to support improved farm productivity and sustainability), was also **achieved.** The 2022 survey results indicate that 83% of grower respondents increased knowledge partly because of the Soil Wealth ICP project. 76% of respondents who attended Soil Wealth ICP training and events indicated they had an improved ability to make more informed decisions about the topic following the event, which also returned an average rating of 3.7/5, indicating attendees changed their knowledge and confidence on the topic after attending the event. On average, 42% of attendees were growers.
Practice change – Advisors 25% of agronomists and advisors we have engaged with during the term of the project, include a focus on soil and ICP practices which improve farm productivity and profitability sustainably in the work with their clients.	Advisors play an important role in supporting growers to improve their farm productivity and profitability. They are often engaging with growers on a one-on-one basis and are considered by growers as a primary source of information. The project contributed to Strategic Investment Plan outcome three – *Improved Farm Productivity*, by: • Providing advisors with best practice guidance to **pest and disease management**	Almost all project activities and resources have been open and accessible to advisors and agribusiness service providers. Considering this, the same principles apply to drive engagement with advisors, as with growers. The project undertook activities on a regular basis which built the relationships with advisors, driving	This end-of-project outcome has been **achieved** and measured through completion of a mid-term review (MTR), end of project survey, one on one interviews with service providers, and ongoing M&E. The reach of advisors and agribusiness service providers is not to be underestimated. With each advisor servicing around 20 grower clients, project communication and extension activities with these advisors has the potential to engage with a number of growers, thus amplifying the reach and impact of the Soil Wealth ICP project. The 2022 survey results indicated that 29% of advisor respondents had or were

End of Project Outcomes	Alignment to fund outcome, strategy and KPI	Description	Evidence
	ultimately helping to improve **produce quality** and reduce waste. • Demonstrating solutions to combat **rising cost of inputs**, including the use of use of legumes as an alternative nitrogen source, precision agriculture and the principles behind nutrition management to target nutrients when and where they are needed. • Demonstrating improved practices to aid advisors with examples to connect with their growers to improve **environmental sustainability**. Examples include the use of cover crops for weed management in replacement of plastic mulch, Integrated Pest Management to reduce chemical inputs, strategies for nutrient resource use efficiency and communications on carbon. • Demonstrating practices to improve **soil and water quality** including how to choose, grow and terminate cover crops and reduced tillage practices like strip till. • Demonstrating the use of **advanced technologies** such as precision agriculture tools and physical	their engagement. Content delivery through a range of formats including in-person activities, virtual activities, and the development of a bank of resources, helped to meet the different learning styles of advisors.	intending to change advice with their clients, partly because of the project. Furthermore, 57% of respondents who attended Soil Wealth ICP training and events indicated they would change farm practices following the event. On average, 15% of attendees were advisors. See their feedback below. • "I am a new agronomist and am now at the stage where I am looking to develop knowledge on this topic to help advise growers. This webinar was a great introduction and I am keen to follow up by accessing all of the available information on the Soil Wealth website." • "Have really appreciated the program over the past few years and am keen to share learning with veg growers." • "In my role as an advisor I will be more like discussing with my customers about regular monitoring of their soil used for growing potatoes & water primarily used for irrigation & spray application." • "Make sure customers are more well advised on what Biologicals actually offer them." • "Confidence in cause of symptoms and would suggest to clients specialists to diagnose" • "Remind growers to scout and remove infected plants" • "Promote/initiate conversations with NT Vegetable growers" • "Working with veg growers on a soil management plan to boost soil health and productivity"

End of Project Outcomes	Alignment to fund outcome, strategy and KPI	Description	Evidence
	weed management tools that maintain soil health (e.g. strip till, finger weeder, ripper mulcher). The project contributed to Strategic Investment Plan outcome five – *Improved Industry capabilities for innovation and adoption*, by: • Practicing improved **communication and extension** strategies that are clear, concise and relevant; diverse, to accommodate for different learning styles and maximum uptake; are targeted to regional needs; and are achieved through collaboration with other projects such as VegNET. • Focused on **innovation**, by connecting with agribusiness service providers and advisors on new products available. • Actively involving the new advisors/agronomists for their **professional development.**		• "More confidently promote IPM to growers and encourage a regional approach." • "We do this anyway, but try to co-operate with Soil Wealth any chance we get." The **intermediate outcome** of the project (50% of vegetable advisors who participated in the project have **increased soil and ICP knowledge** to support improved farm productivity), was also **achieved.** 2022 survey results indicate that 43% of advisor respondents increased knowledge, either partly (29%) or mainly (14%) because of the Soil Wealth ICP project. 76% of respondents who attended Soil Wealth ICP training and events indicated they had an improved ability to make more informed decisions about the topic following the event, which also returned an average rating of 3.7/5, indicating attendees changed their knowledge and confidence on the topic after attending the event. On average, 15% of attendees were advisors.

Monitoring and evaluation

Table 3. Key Evaluation Questions

Key Evaluation Question	Project performance	Continuous improvement opportunities
Effectiveness To what extent has the project achieved its expected outcomes?	As outlined in the Outcomes section, the project has exceeded its expected outcomes. 2022 survey results (Appendix 3) indicated an increase in knowledge and awareness. Almost half (44%) of respondents felt well informed about the latest advancements in soil management and crop protection in the vegetable industry due to Soil Wealth ICP, with a further 44% feeling somewhat informed. Other improved productivity, profitability, or sustainability benefits from being involved in the project that were highlighted in the survey include: • **Healthier soils with improved moisture retention and plant nutrient availability**. "Creating healthier soils led to more resilient and healthier crops, better moisture retention, better nutrient availability and retention, less compaction, [with] reduced [machinery] horsepower requirement." – Grower, Queensland • **Improved crop health and resilience and reduced losses** through less insect and disease pressure. "Identified unsustainable practices and received support and advice regarding strategies for mitigating crop losses." – Grower / Agribusiness service provider, Tasmania • **Reduced input use and costs, including insecticides, fertiliser and diesel**. "Cover cropping has reduced reliance on fumigants and pesticides." – Industry association, Western Australia "The strip tiller lets us prepare the soil for planting in one pass, which has also helped to retain moisture. We're saving so much fuel and time with strip-till. We should've bought a machine like this years ago" – Grower, NSW	Respondents in the 2022 survey (Appendix 3) indicated: • Uncertainty and potential further support for trialling new practices or technology, for example selection of different cover crop species, calculating seed and pesticide rates, managing secondary pest, and weed issues (slugs, snails) • The need for consistent and proactive monitoring and this fitting with the whole farm operation, for example both insect monitoring for IPM and regular soil testing for nutrition management • Investigating, quantifying, and planning for different costs in changing practices or technology for different crop types and/or soils, for example direct drilling and strip tillage • Continuing to be open to collaboration with a variety of stakeholders across the value chain, including multi-national chemical companies.

Key Evaluation Question	Project performance	Continuous improvement opportunities
	• **Improved soil health and crop health driving resilience to natural disasters.** "It (granular compost) has improved soil structure… plants are not getting stressed. The flood should have wiped out our crops, but they bounced back. Yearly crops are getting better, the only thing that has changed is the initial input and soil preparation." The interviews conducted in 2022 (Appendix 4) indicated that growers felt encouraged to change practices around soil biology through cover cropping, biofumigation, tillage practices, and composting approaches. This uptake was associated with the obvious improvement seen in the visual health of crops and yield.	
Relevance How **relevant** was the project to the needs of intended beneficiaries?	The project places a high degree of importance on providing scientifically sound and timely services and communication relating to soil management and crop protection. The majority (87%) of respondents of the 2022 survey (Appendix 3) found the support and information provided through Soil Wealth ICP quite useful (62%) or very useful (26%). Attendees at Soil Wealth ICP webinars on average rated the relevance of the content to their business 4.2/5, while events and training returned an average rating of 4/5. • "Soil Wealth ICP consistently provides relevant information backed up by relevant practical case studies in Australian commercial practice." – Grower/ Agribusiness service provider, Tasmania • "Project has been very well communicated and chosen highly relevant topics, excellent use of a levy funded project." – Industry association, Western Australia • "You can always pick up information you thought you knew when you hear it in a different way." – Grower, Queensland • "I've seen 5-6 growers interested in cover cropping, soil microbes and	Respondents of the 2022 interviews (Appendix 4) highlighted the following: • More information and guidance on implementing and managing compost • Addressing issues associated with climate change and extreme weather events • "[The project] needs to keep evolving - can't keep regurgitating the same information." • IPM of soil pathogens, nematodes, and diseases • Testing and management of soil microbes • How to improve the effectiveness and efficiency of inputs

Key Evaluation Question	Project performance	Continuous improvement opportunities
	biofumigation after being introduced to them through Soil Wealth ICP"	
Process appropriateness How well have intended beneficiaries been **engaged** in the project?	The 2022 survey results (Appendix 3) show a high level of engagement with growers and advisors, with 48% of respondents indicating that they had attended webinar live, 45% attended a workshop and 38% attended field day/farm walk. In relation to project resources, 72% of respondents accessed factsheets, 60% accessed webinar recordings, 50% indicated they had received or accessed the e-bulletin and 47% accessed case studies. As outlined in Outputs section, the project achieved a total 26,268 webinar recording views, 700 people at field days and farm walks, 1,080 people at workshops and seminars and 126 people at masterclasses and 107,216 sessions on the Soil Wealth ICP website.	Most participants of the 2022 interviews (Appendix 4) expressed the need for materials targeted towards the challenges facing their region. Some interviewees also expressed a desire for the program to deliver workshops and materials for regions that they felt had been less of a focus. Other areas for continued support highlighted by interviewees included: • Focusing on implementation of knowledge and encouraging best practice through practical training • Increased input from researchers and experts • Tackling local problems
Process appropriateness To what extent were **engagement processes appropriate** to the target audience of the project?	Attendees at training and events returned an average rating of 4.3/5 for the appropriateness of the topic, content, and delivery. Most people involved in the 2022 interviews (Appendix 4) noted the outstanding feature of the program was the on-the-ground support and expert advice given by the project team, which was key to the project's success. The field days and trial sites were the standout deliverable by the project in the eyes of growers. The opportunity to meet like-minded growers, pursue new technology and ideas, and see practical examples that they could take home was considered key to engaging growers in the program. Growers also valued knowing they could 'reach out' to the project team for access to relevant R&D information when they needed it, even if they had had minimal contact with the project to date. They found using the Soil Wealth ICP website easy and accessible when looking for specific information. The resources delivered by the project	Respondents of the 2022 survey (Appendix 3) and interviews identified the following types of events and materials that would be most useful to them and their business in the next phase: • Field days catered to growers, linked to demonstration sites, with the ability to visit different regions and learn how similar problems and opportunities have been addressed. "Field trips to visit different areas to see how they have dealt with similar problems." – Grower, Queensland • Focus on farm and production system management resources: that are succinct, easy to access (both online and hard copy) and provide practical guidance. Respondents suggested these could cover topics such as carbon mitigation, salt management, nutrient cycling, nutrient and water use efficiency, and plant nutrition and how this relates to disease and insect pressure. • Webinars offering both the flexibility to attend live and watch the recording. "Webinars-recorded for watching at a

Key Evaluation Question	Project performance	Continuous improvement opportunities
	helped to inform and support decisions made by growers, giving them more confidence in improving their soil health and crop protection practices.	convenient time." – Advisor, New South Wales • Webinars with experts on the topic. One service provider said "Personally, I like the webinars with experts or those with experience in a subject – I learn a lot and then pass on to growers when I can. For growers, trial sites, mentoring, regular contact with experts, opportunities to discuss with other growers to see what is happening." • Workshops with practical training and grower to grower interactions. "It would be good to have programs where growers are more inclined to learn - more practical training. Encourage getting together with other growers to share what works and what doesn't work." • Workshops that provide access to new information, emerging issues and tailored to local growers and production systems. "More emerging theory and data and less time spent on workshops on basic things such as water management which people already have easy access to information online and with tools." – Grower, Victoria • Research both providing access to on-farm demonstration site and applied research results, as well as ensuring material is evidenced based. • Developing more in-field resources (handbooks, identification tools). • Focus on building the capacity of agronomists and advisors to increase the reach of the project. • Engaging with the more forward-thinking growers and utilise the networks they have within the industry
Efficiency What efforts did the project make to improve efficiency?	Through the life of the project, partnerships with other Hort Innovation funded projects and advisors was recognised as an important process for improving efficiencies and engagement with growers. As advisors typically engage with growers one-on-one and are considered by growers as a primary	It was recognised that the process of collecting M&E data could be improved across communication and extension projects to reduce time and survey fatigue. This has been addressed in part through a meeting to discuss a portfolio approach to vegetable, potato and onion extension and

Key Evaluation Question	Project performance	Continuous improvement opportunities
	source of information, they have the potential to influence a number of growers and amplify the reach of the project, so play an important role in supporting them to improve farm productivity and profitability. Collaboration with other industry groups involved co-delivery of events (for example the New Technology Forum at Hort Connections in 2019) and extended promotion of upcoming events and new resources. Details on the Partnership Network and collaboration with other projects has been outlined in the Methodology section.	communication with Hort Innovation and other delivery partners in Melbourne on 10 November 2022.

Recommendations

The project team, in collaboration with Hort Innovation, vegetable growers and other industry representatives attended a workshop in August 2022 to co-design phase three of the Soil Wealth ICP project. Four project themes were identified by vegetable industry stakeholders and the project team through the phase two MTR (Appendix 2). The themes identified were **Soil Health, Crop Health, Input Use, and Climate & Carbon**. These themes were discussed at the workshop, with further topics identified in association with each theme. The topics were prioritised, and the top two to four ranked topics in each theme were examined further to identify sub-topics, enablers, barriers and what success would look like. A one-page summary of the Themes, Topics, and Subtopics can be found in Appendix 5.

Feedback on specific topics of interest were also received from respondents of the end of project survey. Particular interest was raised for the below topics, for consideration in the development of phase three of the project:

- IPM of soil pathogens, nematodes and diseases
- Testing and management of soil microbes
- Addressing issues associated with climate change and extreme weather events
- How to improve the effectiveness and efficiency of inputs.

Further improvements identified by evaluations throughout the project include:

- Ongoing support to growers trialling new practices or technology
- Investigating, quantifying and planning for different costs in changing practices or technology for different crop types and/or soils, for example direct drilling and strip tillage
- Continued collaboration with industry stakeholders
- Project needs to keep evolving- new information, emerging issues
- Targeted activities and materials for challenges specific to growing regions
- Practical training to encourage implementation of best practice
- Increased input from researchers and experts
- Field trips to visit different areas to see how similar problems are dealt with elsewhere
- Develop more in-field resources
- Continue to build capacity of agronomists and advisors.

Improvements for future project communications include:

- Investigate updating the project website and content management system (CMS), resource templates, logo and e-newsletter to refresh project branding and continue keeping growers engaged with the project
- Maintain Facebook Community of Practice page, retire Facebook demonstration site pages and consider alternative communications options to promote updates from the demo sites (e.g. videos, Immersive Ag virtual site tours and results platform)
- Consolidate @SoilWealth and @ProtectingCrops Twitter accounts, preferably into @SoilWealthICP to ensure applicability of content to users
- Continue promoting content through a range of communications channels to increase reach and engagement and investigate alternative platforms such as Instagram
- Continue targeting specific industry publications (such as state peak industry bodies and VegNET Regional Development Officers) to increase coverage of the project.

The resources developed during phases one and two of the project will continue to be available on the Soil Wealth ICP website as a legacy resource, accessible by growers and other industry representatives.

Refereed scientific publications

Blaesing, D., Lucas, D., Tesoriero, L., Rogers, G., 2018. RD&E prioritisation of soilborne diseases affecting Australian vegetable crops. In Gupta, V.V.S.R., Barnett, S., Kroker, S., Proceedings of the 0th Australasian Soilbrone Disease Symposium. 2018. pp. 73-74

Larsen, C., 2019. Learn, Experience, Connect – Continuing to drive innovation in extension in the Australian vegetable industry. In Australasia-Pacific Extension Network Conference proceedings, Darwin · Sep 1, 2019

Larsen, C., Kyriakou, D., Montagu, K., Grigg, S., Dawson, B., 2022. Virtual Field days – Lessons from forced transition. In Australasia-Pacific Extension Network conference 9-11 February 2022, pp. 40

Larsen, C., Montagu, K., Lucas, D., Blaesing, D., Boland, A.M., Rogers, G., 2018. Evaluating the effectiveness of an integrated extension delivery approach in the Australian vegetable industry. Rural Extension & Innovation Systems Journal 14(1), 124-129

Lucas, D., Blaesing, D., Larsen, C., Montagu, K.,2018. Farm demonstration sites – can we get over the learning hump?. In Hulugalle, N., Biswas, T., Greene, R., Bacon, P., (Eds.), Proceedings of the National Soils Conference Canberra, ACT, Australia, 18-23 November 2018, pp. 52-53

Montagu, K., Hingerager, M., Tesoriero, L., Wilson, C., 2022. Cover crops for managing soilborne diseases in vegetable production – the good, the bad and the ugly. In 11th Australasian Soilborne Disease Symposium. pp.11

Montagu, K., Long, D., Van Nieuwenhuyse, P., Rogers, G., 2022. Coaching clinics as an effective extension tool bringing researchers and growers together. In Australasia-Pacific Extension Network conference 9-11 February 2022, pp. 33

Rogers, G., Boland, A.M., Van Nieuwenhuyse, P., Larsen, C., 2022. Soil Wealth and Integrated Crop Protection vegetable industry extension project: A new and effective way of delivering extension. In Australasia-Pacific Extension Network conference 9-11 February 2022, pp. 30-31

References

Not applicable

Intellectual property

Not applicable

Acknowledgements

The Soil Wealth ICP project team would like to acknowledge the time and efforts of demonstration site and case study site growers as well as industry experts who have provided technical guidance during the development of resources and extension activities. The project would also like to acknowledge the involvement of growers and advisors at industry training and events, as well as other industry representatives who collaborated with the project throughout phase two.

Appendices

1. Full resources, communications, events and training list
2. Mid-term review summary of survey and interview findings; Report November 2020
3. Soil Wealth ICP Phase 2 Impact Survey; Report November 2022
4. Soil Wealth ICP – Phase 2 Interviews; Report November 2022
5. Soil Wealth ICP Phase 3 Development Workshop Summary

Appendix 1 – Full resources, communications, events and training list

Resource development (soilwealth.com.au/resources)

4 best practice guides

- Plant analysis for vegetable crops – A practical guide to sampling, analysis and interpretation
- Managing sodicity in vegetable crops
- Managing salinity in vegetable crops
- Crop nutrition products – A guide to product types, properties and uses

35 case studies

- Strip till and cover cropping transform Three Ryans' farm system
- Reducing tillage and improving soil health at Mulgowie Farming Company, Maffra VIC
- Making sure change works for your business at Cowra, NSW
- Compost boosts soil health on the Adelaide Plains, South Australia
- Understanding spatial variability in Tasmanian potato crops
- Healthy soils, healthy profit from precision ag trial at Koo Wee Rup, VIC
- Persistence and attention to detail pay off in IPM approach at Braham Produce
- Improving phosphorus uptake efficiency of potatoes
- Demonstration site trial full report: Richmond, Tasmania
- Demonstration site update: Richmond, Tasmania
- Boosting mycorrhizal fungi in vegetable crops
- Cover crops for weed control and single-use plastic elimination
- Ag-tech trial turns up the heat on weeds
- Irrigation monitoring in potatoes shows varietal differences in Cowra, NSW
- Warren Improvement Group: Young growers with a fresh focus in Western Australia
- Managing soil health in Werribee South
- Organic soil amendments put to the test in Tasmania
- Cover crops for cucurbits growers in Katherine, NT: Results of 2020 demo site
- Inter-row ryegrass cover crop – a winner in snow pea production
- Recycled organics compost – on a Sydney spinach farm
- Benefits of a cover crop + strip-till combination
- Effect of a coal-based soil amendment on carrots grown in sandy soil
- Lessons from the field: Translating precision agriculture at Fresh Select, Werribee South
- Irrigation monitoring in potatoes Part 1: Practical use of IrriSAT and soil moisture sensors
- Irrigation monitoring in potatoes Part 2: Practical use of satellite information
- Precision ag pays off in bumper celery crop - Koo Wee Rup, VIC demonstration site
- Cowra cover crop and strip-till a winning combination for soil health
- IWM on a Bathurst pumpkin farm: Advantages and drawbacks of ground cover use, tillage and residual herbicides
- Cover crops before potatoes – Trial update, Kindred, Tasmania
- South Australian grower compost trial
- Cover crop + rolled ground cover plus strip-till = record farm cucumber yield
- Chilli spacing trial: summary report
- Exploring the application of precision agriculture: Koo Wee Rup demonstration site case study
- The effect of custom-made composts on carrots and soil health (in conjunction with VG15010)
- Damping-off in spinach; Best bet fungicides and biologicals – trial 2016-2017

32 fact sheets

4 crop management

- Summary of Resources: Handy hints and where to find useful information (Phase 2) – November 2017 to February 2023
- Effective R&D support when face to face isn't possible
- Farm trial design; What to consider (fact sheet in conjunction with the VG150510 project)

- Irrigation management in sweet corn

11 pest and disease management

- Rhizoctonia Solani anastomosis groups and their hosts
- Better managing soilborne diseases with pathogen DNA testing
- Pink rot fact sheet
- Beet cyst nematode on vegetables
- Managing the risk of redback spiders in broccoli crops
- Managing fusarium diseases in vegetable crops (fact sheet in conjunction with the VG150510 project)
- Clubroot management in brassica vegetables (fact sheet in conjunction with the VG150510 project)
- Sclerotinia rot of green beans
- Sclerotinia rot of vegetable crops (fact sheet in conjunction with the VG150510 project)
- Winter crane fly (*Trichocera annulata*)
- Spinach crown mite

14 soil, nutrition and compost

- Biochar – what is its potential for vegetable production?
- How do you know your soil is healthy? Top tips for vegetable growers
- What you need to know about soil microbiology
- Recycled organics compost for vegetable growers
- Nutrition management resources
- Taking soil samples
- Nitrate field test
- Soil phosphorus - The basics
- Calcium cyanamide fertiliser in carrots: Economics
- Erosion control machinery - Harvest Moon, TAS case study demonstration site
- Getting soil pH right - Lime quality and application rates
- Strip-till in Tasmania vegetable crops
- Soil health and water use efficiency
- Labile carbon

3 weed management

- Integrated weed management: Oxalis (Oxalis spp.)
- Integrated weed management: Volunteer potatoes (*Solanum tuberosum*)
- Integrated weed management: Nutgrass (*Cyperus rotundus*)

11 global scan and reviews

- The Carbon Series, including
  - The Carbon Series part 1: Carbon farming and its relevance to vegetable growers
  - The Carbon Series part 2: Soil carbon and carbon sequestration
  - The Carbon Series part 3: Carbon emissions in vegetable production
  - The Carbon Series part 4: Carbon accounting and the Emissions Reduction Fund
  - Podcast (see below): The Carbon Series: Developing carbon neutral sweet corn
  - Webinar (see below): Carbon management of vegetable farms – emissions, sequestration and beyond
- Biological Products Database (released in December 2019 and updated in May 2020, August 2021 and May 2022)
  - Sorted by trade name
  - Sorted by Product type and trade name
  - Sorted by APVMA registration, type and trade name
- What changes to expect – Integrated Crop Protection
- A guide to preventing leaf and stem diseases
- Remote sensing
- Veg and tech: Science fiction or the future of farming?
- Technology for controlling weeds
- Organic soil amendments

19 podcasts

- The Carbon Series: Developing carbon neutral sweet corn

- Saving time and money with strip-till in WA
- The drone is no longer a toy: Rules, regulations, risks, and responsibilities to be considered by drone growers
- Cover crops used for weed suppression in snow pea production (7 minutes)
- Soil biology and biological products; an introduction (30 minute listen)
- Integrated Weed Management, using cover crops and strip-till (6 minutes)
- Benefits of cover crops and strip-till for pumpkin production – interview with Michael Camenzuli from Bathurst (6 minutes)
- Cover crop trial at Cowra, NSW with Marc Hinderager (6 minutes)
- Mixed cover crops trial for soil health: Soil First demonstration site podcast (14 min listen)
- Precision ag pays off in bumper celery crop: Koo Wee Rup demonstration site podcast (15 min listen)
- Potato soft rot podcast (9 min listen)
- Growing Matters - #1 Basics of cover cropping with Dr Kelvin Montagu (9 min listen)
- Growing Matters - #2 Link between soil wealth and cover cropping with Dr Kelvin Montagu (12 min listen)
- Cover crops with Harvest Moon
- Compost trial Virginia, SA
- Controlled traffic farming with Harvest Moon
- The ripper mulcher in Tasmania
- Developing a fertiliser program for vegetable crops (webinar recording)
- How to manage sclerotinia in vegetables crops with Dr Len Tesoriero (webinar recording)

6 posters

- Cover crop termination guide
- Cover crop herbicide guide
- Cover crops for Australian vegetable growers
- Variable rate application – is it right for your farm?
- Time to rejig your rig? Five simple steps in spray rig calibration
- A guide to estimating wind speed for spraying agricultural chemicals

30 videos

- Finger weeder demonstration
- Soil Wealth ICP grower panel discussion – 2022 Annual Vegetable Industry Seminar
- Informing irrigation decisions with remote weather stations at Koo Wee Rup
- The benefits of cover crops and reduced tillage: Koo Wee Rup
- Taking soil samples? We'll show you how it's done at Koo Wee Rup
- A breezy video update from Koo Wee Rup demonstration site
- Innovations from John Deere at Hort Connections 2021
- Innovations from Growave at Hort Connections 2021
- Managing saline-sodic soils virtual farm walk: Werribee South VIC demonstration site
- Precision ag in celery and leeks virtual farm walk: Koo Wee Rup VIC demonstration site
- Uniformity of nutrient availability continues to improve in 2020
- Soil health a big winner from precision ag trial (Koo Wee Rup VIC demonstration site)
- Cover crops – the advantages of Sunn hemp
- Yuri Wolfert: Tasmanian cover crop trial update
- Agri-chemical trials and insights from the East Gippsland Vegetable Innovation Days via Facebook Live
- Seed trials and insights from the East Gippsland Vegetable Innovation Days via Facebook Live (Parts 1 and 2)
- Cover crop trial discussion from the East Gippsland Vegetable Innovation Days
- Lessons from continued innovation in weed management in Clyde, Victoria
- Lyndon Orpwood discusses the benefits of strip-tillage to Simplot Australia
- Ed Fagan explains why his initial reservations about strip-till and cover crops were dispelled
- Strip-till for corn production - Reducing erosion, building robust soils
- Strip tillage in the field - Jeff McSpedden, NSW case study
- Strip-till in Tasmania; A reduced till faming system (in conjunction with project VG15046)
- Soil Borne Disease Series: Summer Root Rot (in conjunction with the VG150510 project)

- Soil Borne Disease Series: Club Root (in conjunction with the VG150510 project)
- Soil Borne Disease Series: Bottom Rot (in conjunction with the VG150510 project)
- Soil Borne Disease Series: Black Rot (in conjunction with the VG150510 project)
- Soil Borne Disease Series: Big Vein (in conjunction with the VG150510 project)
- Soil Borne Disease Series: Basal Plate Rot (in conjunction with the VG150510 project)
- Cover crop spotlight on buckwheat (in conjunction with the VG16068 project)

48 webinar recordings

- AWM webinar mini-series #1: In control – managing cucurbit viruses for profitable vegetable production
- AWM webinar mini-series #2: In control – managing capsicum viruses for profitable vegetable production
- AWM webinar mini-series #3: In control – managing lettuce viruses for profitable vegetable production
- At the cutting edge – Area wide management of insect-vectored viral and bacterial diseases
- Nitrogen fertiliser price and supply: management options in difficult conditions
- Soil Biology Master Class 2021 (9-part short video series):
    - Soil biology in vegetable production – basic principles
    - Breakdown of organic matter and agrochemicals in vegetable soil
    - Nitrogen availability
    - Soil structure
    - Soil fumigation – chemical and biological il biological communities
    - Disease suppression
    - Biological products
    - Panel discussion on soil biology testing
    - Grower success story: Andrew Braham (SA capsicum grower)
- Carbon management of vegetable farms – emissions, sequestration and beyond
- Virtual shed walk: microwave technology for control of weeds, diseases and pests
- At the cutting edge: Advancements in biopesticides for profitable vegetable production
- Soil Biology Masterclass 2021 (Day 1 full recording)
- Using drones to generate farm insights – drone basics and operations including weed mapping
- Soil organic matter, biology and mineralisation – The challenges and complexity of estimating mineralisation rates
- Compost calculator: Knowing the value of organic amendments in your vegetable nutrition program in Victoria
- Integrated weed management (Webinar 1 of 3): A practical approach for vegetable growers
- Integrated weed management (Webinar 2 of 3): How cover cropping can improve its use for vegetable growers
- Integrated weed management (Webinar 3 of 3): The future of integrated weed management in vegetable farming
- Cover crops and strip tillage in organic production – Koo Wee Rup Grower Group
- Biological products and new phosphorus fertiliser technology for potato productivity
- At the cutting edge: Advancements in integrated crop protection for profitable vegetable production
- Adoption of precision systems technology in vegetable production
- Postharvest management of broccoli
- Using cover crops to manage mycorrhizal fungi in vegetable crops
- Salinity and potato production (Part 1 of 4): Monitoring for improved management
- Salinity and potato production (Part 2 of 4): Know your salts to better manage potato nutrition
- Salinity and potato production (Part 3 of 4): Managing hydrophobic soils in potato production
- Salinity and potato production (Part 4 of 4): Organic soil amendments, biologicals and biostimulants
- Cover crops and soil biology in vegetable soils
- New tools to manage irrigation in potatoes
- East Gippsland Vegetable Innovation Days - Cover crops and strip-tillage live webinar panel discussion
- Brown etch on butternut pumpkins – Beauty is more than skin deep
- Redback spiders in vegetable crops – Why? And what to do about it!
- Biofumigation cover crops Part 1: What variety and when?
- Biofumigation cover crops Part 2: Pest and diseases and impact on soil-borne diseases
- Managing salinity in vegetable crops
- Technology for controlling weeds in vegetable production

- Recycled organics (compost) in vegetable production
- Strip-tillage for vegetables and potatoes with Steen Peterson (USA) and Ben Pogiolli
- Managing redback spiders in broccoli
- The role of soil DNA testing in managing the risk of soilborne diseases – how is it being used and what can it do?
- Fusarium wilt management in vegetables with Dr Len Tesoriero

Pest, disease and disorder ute guides

- Pests, diseases and disorders of babyleaf
- Pests, diseases and disorders of brassicas
- Pests, diseases and disorders of sweet corn
- Pests, diseases and disorders of carrots

30 articles and publications

- Growers share experiences at IPM masterclass in South Australia
- Cover crops, strip-till and biofumigation on show in the west
- Maximising IPM practices in protected cropping
- Top End field walk showcases soil health improvements
- IPM in practice: A new approach to release beneficials
- Soil Wealth ICP demo site growers share innovations at 2022 Annual Vegetable Industry Seminar
- An update from our Sydney Basin demonstration site
- Supporting the next generation of Tassie researchers
- Soil health trial leads to better quality capsicums in SA
- Nitrogen fertiliser price and supply: A good reason to look at cover crops
- Selecting a sorghum cover crop for integrated crop protection
- New NT demo site: Protecting soil in the north with Jeremy Trembath
- Introducing the Mulgowie Farming Company Queensland demonstration site
- Seasonal climate outlook for vegetable growing regions – February to April 2021
- Crop management: Advancement of drone applications in Bundaberg, Qld
- Long-awaited 2020 Precision Ag Expo delights Tassie farmers
- Wet end to 2020 – Seasonal climate outlook for vegetable growing regions (October – December 2020)
- 2020 Vegetable Crop Nutrition Masterclass an online success
- Cover crops for weed suppression in snow peas
- Evaluation of postharvest treatments for the control of bacterial soft rot in potatoes – Research report
- Seasonal rainfall outlook for vegetable growing regions (January – March 2020)
- Soilborne disease management in greenhouse capsicums demonstration report – North Adelaide Plains, Virginia, South Australia
- Cover crops and strip-tillage is helping Bathurst pumpkin grower to save water
- Improving irrigation efficiency for potatoes
- Should you be making hay from your cover crop?
- Damping off in spinach: Best bet fungicide and biological trial 2016/17
- Can calcium cyanamide (CA(CN)2) fertiliser affect Pythium spp. and other soilborne diseases in carrots – findings of an on-farm demonstration
- Soil borne diseases in vegetable crops – A practical guide to identification and control
- Soil moisture the real winner in a hot, dry summer at the Cowra demonstration site, NSW
- Make this the year you have a serious look at strip-till

13 Partnership Network articles

- Soil CRC shines the spotlight on soil health
- The regenerative agriculture approach at Kalfresh
- Harnessing science to nurture plants and optimise yield
- Feed your soils to feed the world: Supporting soil health in vegetable production
- Strength in collaboration and shared learning benefits growers
- Environmental stewardship in your own backyard
- Weathering the storm with precision ag

- Sustainable vegetable production in Australia: What's next?
- Drone applications make light work of tough jobs in Bundaberg
- Get prepared: Irrigation scheduling tips for summer
- Use of remote sensing technology in vegetable weed control and yield prediction
- Using mycorrhizae to boost vegetable crop quality and yield
- Importance of beneficial biological organisms in soil for vegetable crops

Top 10 most popular resources

Using analytics from the Soil Wealth ICP website, Bulletin e-newsletter, social media and grower feedback, the following 10 resources were the most popular during Phase 2.

1. **Biological Products Database**
   The most popular Soil Wealth ICP resource every year since it was published was the Biological Product Database. This is a tool to help growers navigate the array of biological products currently available to their farming business. The database is regularly updated and available in three different formats for ease of use:

   - Biological products sorted by trade name
   - Biological products sorted by product type and trade name
   - Biological products sorted by APVMA registration, type and trade name.

Figure 1: Biological Products Database.

2. **Soil-borne diseases in vegetable crops: A practical guide to identification and control**
   Soil-borne diseases present an ongoing challenge to the Australian vegetable industry, with an estimated $120 million in losses annually. A practical field guide was developed to provide information on the identification and control of the major soil-borne diseases for a diverse range of vegetable crops. Each chapter covers:

   - How to identify the most common soil-borne diseases affecting vegetable crops in Australia and conditions which favour disease
   - Summary of the methods available for control
   - Answers to common questions.

Figure 2: Soil-borne diseases in vegetable crops: A practical guide to identification and control.

3. **Plant analysis for vegetable crops: A practical guide to sampling, analysis and interpretation**
Plant analysis allows growers to monitor a crop's nutrient status and identify deficiencies early before yield and quality are reduced. This guide explains how plant analysis can be used to achieve balanced, site-specific nutrient management. It covers types of plant analyses as well as sampling methods, desirable nutrient concentrations and interpreting results.

Figure 3: Plant analysis for vegetable crops: A practical guide to sampling, analysis and interpretation.

4. **Soil Biology in Vegetable Production Masterclass**
In 2021, the Soil Wealth ICP team introduced the first Soil Biology in Vegetable Production Masterclass, which was run online over two days. A webinar series was developed following the event where growers could access the following presentations from experts, growers and industry members.

- Part 1: Introduction and basic principles of soil biology
- Part 2: Breakdown of plant biomass and agrichemicals
- Part 3: Nitrogen availability
- Part 4: Soil structure
- Part 5: Soil fumigation – chemical and biological
- Part 6: Disease suppression
- Part 7: Biological products
- Panel discussion on soil biology testing

- Grower success story: Andrew Braham, SA capsicum grower.

Figure 4: Soil Biology in Vegetable Production Masterclass.

5. **Strip-tillage for vegetables and potatoes with Steve Peterson (USA) and Ben Pogiolli (Qld)**
Growers are constantly on the look-out for farming practices which can protect soils and produce healthier crops. Strip-tillage combines the best of no-till and conventional tillage in the one operation.

   This webinar recording brings together local and international experiences of strip-tillage in the field with Steve Peterson, a fourth-generation farmer and manufacturer of strip-till equipment in the United States and Ben Pogiolli, an experienced strip-till farmer from the Atherton Tablelands in Queensland.


Figure 5: An example of a strip-till machine.

6. **The Carbon Series**
A hot topic for many in agriculture, the Carbon Series breaks down the practicalities of carbon farming for vegetable growers and the benefits of soil carbon management. The series explored the following topics and provided links to further information and project resources.

   - Part 1: Carbon farming and its relevance to Australian vegetable growers
   - Part 2: Soil carbon and carbon sequestration
   - Part 3: Carbon emissions in vegetable production
   - Part 4: Carbon accounting and the Emissions Reduction Fund.
   - Podcast: Developing carbon neutral sweet corn in Queensland (Mulgowie Farming Company)

- Webinar recording: Carbon management on vegetable farms – emissions, sequestration and beyond.

Figure 6: The Carbon Series.

7. Ag-tech trial turns up the heat on weeds

This case study investigated the effect of a prototype unit from Growave which aims to reduce herbicide use within the horticulture industry using microwave technology. The Australian-first trial of the technology was held at the Soil Wealth ICP Koo Wee Rup demonstration site in Victoria and captured the interest of many growers.

Figure 7: The Growave prototype on-farm at Koo Wee Rup.

8. Cover crops for Australian vegetable growers poster

With so many cover crop species available, this double-sided A3 poster provides a strong starting point for growers to choose a cover crop to suit their farming operation, climate and cover crop objectives. You can find plenty of information on the benefits, growth tolerances, soil conditions, sowing and establishment traits for a range of cover crop species. Posters were also developed on cover crop termination and using herbicides with cover crops.

Figure 8: Posters on using cover crops in vegetable production.

9. **Integrated weed management: Nutgrass, oxalis and volunteer potatoes**

Nutgrass (*Cyperus rotundus*), also known as purple nutsedge, Java grass, coco-grass and red nutsedge, is a major problem for the Australian vegetable industry – and its popularity as a Soil Wealth ICP resource is testament to this. The integrated weed management (IWM) fact sheet provides a range of control strategies on nutgrass. Similar fact sheets were also developed for oxalis (*Oxalis spp.*) and volunteer potatoes (*Solanum tuberosum*).

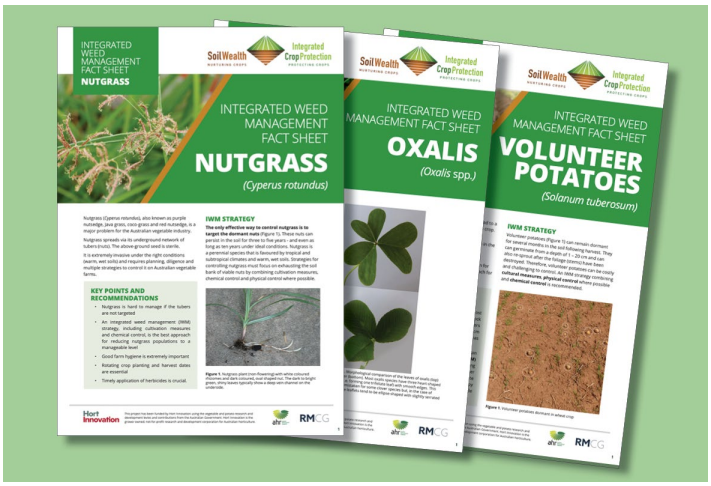


Figure 9: Integrated weed management posters.

10. **Maximising IPM practices in protected cropping wrap-up**

In 2022, a group of vegetable growers and industry members visited Family Fresh Farms in New South Wales for a Soil Wealth ICP event focusing on how growers can incorporate integrated pest management (IPM) practices in protected cropping. For those who missed the event, this wrap-up shared the key discussion points on the fundamentals of IPM and ways to improve IPM practices.

Figure 10: Attendees at the IPM field walk at Family Fresh Farms, NSW.

Training and Events

Demonstration Sites

Site	Type	Year	Details
Richmond, Tas – Harvest Farms	Core	2018-2021	Cover crops and soil amendments in baby leaf production systems to improve soil organic matter
Gin Gin, WA – Centre West	Core	2018	Evaluating Novihum (humus concentrate) on control of soil borne disease (e.g. Pythium and Rhizoctonia sp.) in carrots and effect on organic matter and nutrient holding capacity of soils.
Sydney, NSW – Alandale Produce	Core	2017-2019	Irrigation management in corn with the EM38 survey being used to look at how different soil properties influence irrigation and crop performance.
Koo Wee Rup – Schreurs & Sons	Core	2017-2022	Investigate soil constraints (e.g. waterlogging), variable rate fertiliser and cost:benefit of remote sensing insect pest and beneficial ID vs. manual scouting.
Cowra, NSW – Mulyan Farms	Core	2017-2022	permanent beds/ cover crops/ biofumigants/ robotic weed control/ soil moisture probes/ IPM/ strip tillage/ compost/ Remote sensing (IrriSAT)
Bathurst, NSW – Camenzuli's	Core	2017-2020	Cover crops/permanent beds vs reduced tillage/ strip tillage, finger weeder
Bundaberg, QLD – Swan Ridge Farms	Case Study	2018-2019	Reducing plastic mulch/ cover crops/ biofumigation
Katherine, NT - Jeremy Trembath	Core	2022-2023	Soil health/ soil erosion management/ cover crops (mixed)/ Reduced tillage/ strip tillage/ mycorrhizal inoculants/ finger weeder
Lockyer Valley - Mulgowie	Case Study	2019-2022	IPM/soil biology/ biological products
Lockyer Valley - Gatton	Case Study	2018-2019	IPM/ reduced tillage
Sydney, NSW Wedderburn	Case Study	2020-2023	Cover crops/ reducing plastic mulch

Kemps Creek NSW, - Cambodian grower group	Case Study	2022-2023	Cover crops/ reduced tillage
Canowindra, NSW - Dominic Pace	Case Study	2019-2023	Irrigation
Virginia, SA - Andrew Braham	Core	2022	Organic amendments/ smart fumigation and link to IPM/ICP success
Werribee, VIC -	Core	2017-2021	Variable rate application of fertiliser/ EM field mapping/ compost
Manjimup, WA - Jake Ryan	Case Study	2019-2023	Strip tillage / mycorrhizal application
Maffra, VIC - Mulgowie	Case Study	2019-2020	Strip tillage / cover crops

Field Days and Farm Walks

Event	State	Date
Soil borne disease management with Vietnamese growers (south of Perth)	WA	18-Jan-18
Nutgrass management on-farm discussion (Koo Wee Rup)	VIC	14-Feb-18
Future farming field day	VIC	24-Apr-18
Soilborne Disease (Richmond)	TAS	09-May-18
Cover Crop comparison checkerboard trial (Table Cape)	TAS	01-Jun-18
Irrigation training (Koo Wee Rup)	VIC	15-Aug-18
Irrigation training (Wemen)	VIC	18-Aug-18
Compost on-farm discussion at demonstration site (Koo Wee Rup)	VIC	06-Sep-18
Carrot farm walk at demonstration site with Centre West Export (Gin Gin)	WA	26-Oct-18
Sydney basin farm walk	NSW	05-Dec-18
Precision agriculture field walk at demonstration site (Koo Wee Rup)	VIC	09-Apr-19
Young Growers Group VegWA field walk (Manjimup)	WA	11-Apr-19
SWICP discussion meeting (Richmond)	TAS	15-Apr-19
Sydney basin farm walk	NSW	27-May-19
Soil amendments (Virginia)	SA	11-Jun-19
Cover crops (Myalup)	WA	20-Jun-19
University of Tasmania agronomy students (Richmond)	TAS	07-Oct-19
NSW “Putting R and D into Practice”	NSW	25-Oct-19
SWICP activities & sustainable agriculture at TAS Landcare conference	TAS	26-Oct-19
Tasmanian Landcare conference - field trip (Richmond)	TAS	27-Oct-19
Online farm walk (Richmond)	Online	29-Apr-20
Demonstration site field walk (Katherine)	NT	27-Jun-22
IPM in Protected Cropping with Family Fresh Farms (Peats Ridge)	NSW	17-Aug-22
Cover Cropping & Strip Tillage farm walk (Manjimup)	WA	28-Sep-22
One on one visits with vegetable growers Gingin WA	WA	29-Sep-22

Workshops and Seminars

Event	State	Date
Lettuce necrotic yellows virus workshop (Werribee)	VIC	18-Feb-18
CSIRO Extrusion Demo and Leaf miner workshop	VIC	28-Mar-18
Soil health management - nematodes and soilborne disease (Gin Gin)	WA	01-May-18
Field vegetable (Cucurbits, Solanaceae) workshop (English & Vietnamese, Carnavon)	WA	01-May-18
Leafminer workshop and market information	VIC	02-May-18

Principles of Nutrition Management delivered to Landmark South East Horticulture agronomists	VIC	24-May-18
Principles of Nutrition Management delivered to Roberts CRT agronomists	TAS	31-May-18
Veg Innovations 2018 Regional Roadshow workshop (Melbourne Markets Conference Centre)	VIC	03-Aug-18
2-day Chemical handling course Fragapane Farms	VIC	24-Sep-18
2-day Chemical handling course at Cranbourne Public Hall	VIC	26-Sep-18
Pest and Disease identification workshop at Fresh Select	VIC	23-Oct-18
WA Vegetable Industry Summit 2018	WA	25-Oct-18
Pest and Disease identification workshop at demonstration site (Koo Wee Rup)	VIC	30-Oct-18
Cover crops and soil tissue testing for vegetables (Orrvale)	VIC	07-Nov-18
Principles of Nutrition Management delivered to Landmark South East horticultural agronomists	QLD	19-Feb-19
Spray application workshop held at Boomaroo Nurseries	VIC	10-Apr-19
New technology forum held at Hort Connections	VIC	25-Jun-19
Soil moisture & irrigation in dry conditions (Lockyer Valley)	QLD	17-Sep-19
Strip tillage presentation and panel at Vegetables WA industry summit	WA	17-Oct-19
Vegetables 2040: the future of veg industry in Tasmania	TAS	06-Nov-19
Cover crops and plant testing workshop	VIC	07-Nov-19
Cover Cropping- Building Resilience for Lockyer Valley Grower Group	QLD	25-May-22
Annual Vegetable Industry Seminar 2022 - Grower Panel Hort Connections	QLD	06-Jun-22
Australasian Soilborne Disease Symposium (Cairns)	QLD	02-Aug-22
Organic amendments, smart fumigation, IPM (Virginia)	SA	08-Sep-22
Cover Cropping & Soil Health for Sydney Basin Cambodian Grower Group	NSW	09-Sep-22

Masterclasses

Event	State	Date
Crop Nutrition masterclass (Brisbane)	QLD	17-Oct-18
Crop Nutrition masterclass (Melbourne)	VIC	13-Aug-19
Crop Nutrition masterclass (Online)	Online	01-Aug-20

Industry Events

Event	State	Date
Young Growers Group, SA - soil salinity, sodicity discussions with Vietnamese growers	SA	01-Mar-18
Tasmania Precision Ag Expo - display table used to promote project and tillage machinery footage gathered	TAS	01-Apr-18
VegNET Tour, WA	WA	01-May-18
APEN conference	NT	02-Aug-19
National Soils Conference	QLD	27-Jun-21
Tasmanian Institute of Agriculture Annual Vegetable Research Field Days	TAS	3-Nov-21

External Webinars

Topic	Date
Are you ready? Biosecurity lessons in planning and response for the Australian vegetable industry	22-Mar-18
Spray technology for vegetable growers: a guide to getting it right	24-May-18
Future focus: robotics and intelligent systems in Australian vegetable production systems	23-Aug-18
Integrated Pest Management of vegetable pests: a more sustainable approach	18-Oct-18
Building the best foundation for horticultural crops	28-Jul-20

Communications

The following communications activities were conducted for growers and industry members during Phase 2, from December 2017 to February 2023:

- Project website and branding (soilwealth.com.au)
    - 107,216 sessions with an average session duration of 2 minutes 48 seconds
    - 73,024 users, of which 87.9% were new and 12.1% were returning visitors from the following countries:
        - Australia (56%)
        - United States (16%)
        - India (4%)
        - Germany (2%)
        - Canada (1%)
    - 234,442 page views
    - 55.67% bounce rate[1]
- 61 editions of the Bulletin e-newsletter distributed to 2,200 readers
- 2,500 Twitter followers on @ProtectingCrops and @SoilWealth (up from 1,752 at the start of Phase 2)
- 8 Facebook demonstration site pages with 2,282 combined followers (up from 1,162 at the start of Phase 2) and a Facebook Community of Practice following of 673 (up from 406 at the start of Phase 2)
- Sharing key findings with regional media outlets and conducting 4 radio interviews
- 1,147 Soil Wealth ICP articles in industry publications
- Throughout Phase 2 an effort has been made to share seasonally relevant content for vegetable growers and industry members. As such, outputs from the projects have been strategically promoted through a 'focus topic' each month which links to seasonal topics.

The communication highlights and detailed communications outputs are outlined below.

Communications highlights

Stand outs in project communications during Phase 2 included increased social media activities and interactions, particularly during COVID-19, as well as the successful cross promotion of Phase 2 events, news and resources in AUSVEG newsletters and other industry platforms. An increase in visitors to the website, Bulletin e-newsletter subscribers and social media followers reinforce the value of the project to industry.

Project website and branding

The team maintained and curated content on the project website on a minimum fortnightly basis to ensure currency. Following updates to improve search-ability and organisation of content on the website at the start of Phase 2, the web analytics demonstrate continued strong visitation, session duration and page views, with a good balance of new visitors and returning visitors.

Most users were based in Australia followed by the United States and India. Other locations included Germany, Canada, the United Kingdom, Philippines, New Zealand and Indonesia.

[1] Note: the percentage of single-page sessions in which there was no interaction with the page. A bounced session has a duration of 0 seconds.

The most popular pages on a regular basis were the Home page, Events, Resources, Search function and My Topic (which allows users to access website content through the project's 13 focus topics).

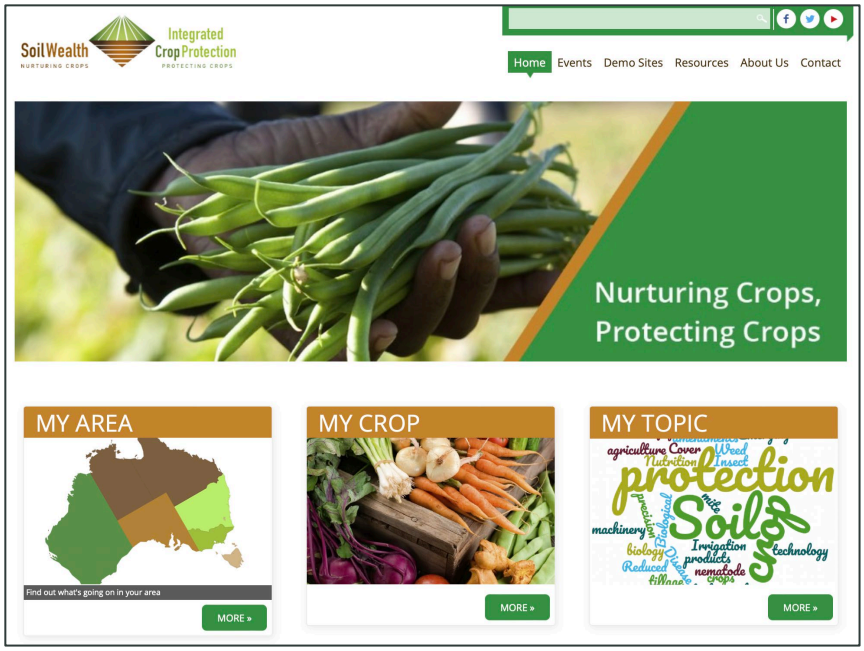


Figure 11: Soil Wealth ICP website home page.

Bulletin e-newsletter

The audience for the Bulletin e-newsletter increased from a base of 1,800 growers and industry members at the start of Phase 2 to more than 2,200 subscribers. This increase was supported by the addition of potato industry stakeholders and event/webinar attendees on a regular basis.

During Phase 2, the project team transitioned the e-newsletter delivery platform from Zoho Campaigns to Mailchimp. A significant visual and structural refresh of the e-news format was conducted to improve readability and interaction with content by readers. The e-newsletter analytics demonstrate good readership and engagement:

- Open rate: 24-51% (above the agriculture industry average of approximately 20%)
    - Click rate: 3.6-22% (usually between 4-8% per edition). Most clicked articles included:
        - Soil-borne diseases in vegetable crops – A practical guide to identification and control (June 2022 edition) – 560 clicks
        - Update to Biological Products Database (June 2022 edition) – 530 clicks
        - Video series on precision agriculture in vegetable production (July 2022 edition) – 501 clicks
        - Masterclass: Soil Biology in Vegetable Production event registration (August 2021) – 443 clicks
        - Potato R&D Forum Recordings Parts 1 and 2 (August 2021) – combined 847 clicks
- Unsubscribes: 3-4 contacts per edition on average.

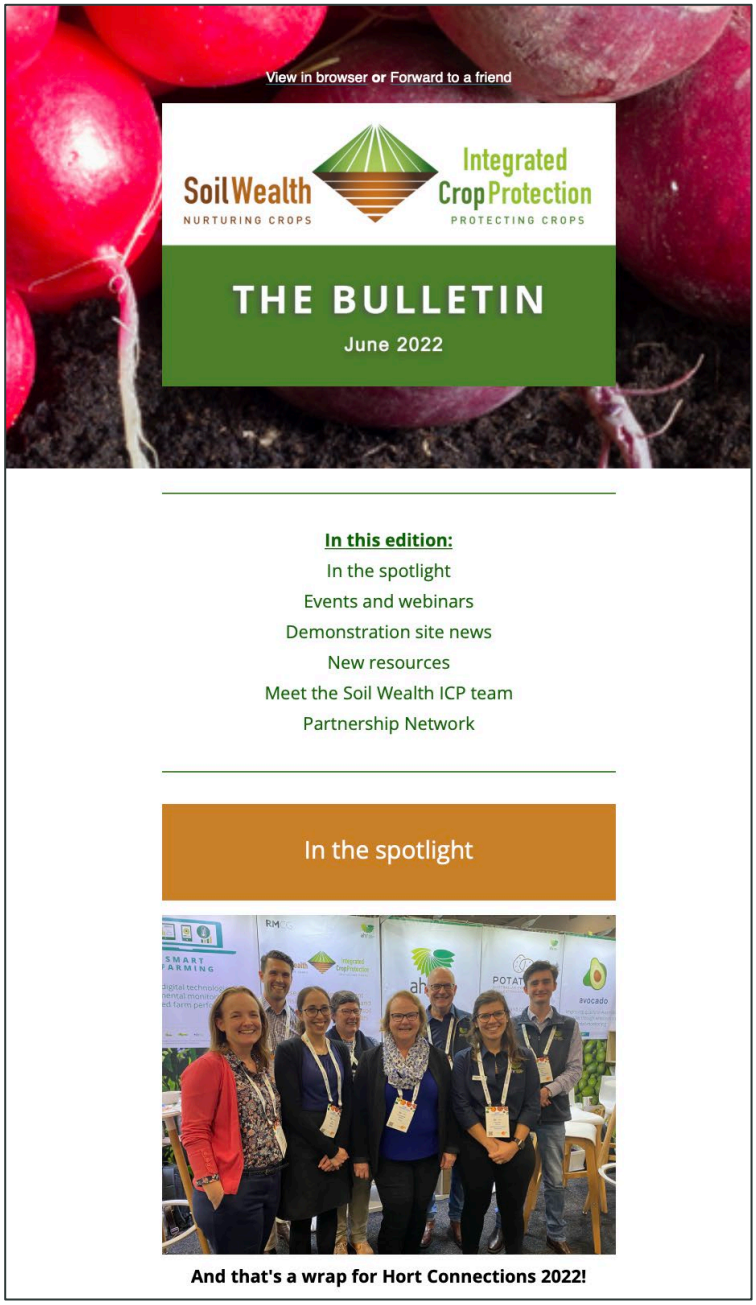


Figure 12: Bulletin e-newsletter (June 2022 edition at Hort Connections).

Social media

Twitter

The project uses two Twitter accounts to tailor specific content to the target audience (@SoilWealth and @ProtectingCrops). The analytics from @ProtectingCrops demonstrate a following of 1,504 at the time of writing (up from 1,178 at the start of Phase 2) with a steady volume of traffic and continued growth and engagement with posts.

The most popular Tweets revolved around informative and topical resources as well as events. Top posts included:

- Cross promotion and closely partnering with the East Gippsland Vegetable Innovation Days (EGVID), which led to a series of top media Tweets during February to May 2020; for example 1,346 impressions promoting the Facebook Live streams and soil health panel discussion webinar one week prior to EGVID
- A webinar recording on spray application tips (1,390 impressions and 61 engagements) and a poster on checking your spray rig (1,044 impressions and 20 engagements)

- Events such as the ‘Soil your undies’ challenge (1,034 impressions, 59 engagements)
- Field identification guides for vegetable pests (1,454 impressions and 56 engagements)
- Videos on precision agriculture in vegetable production (1,817 impressions and 46 engagements)
- Videos on soil-borne diseases (759 impressions, 43 engagements)
- Fact sheet on nutgrass management (1,192 impressions, 34 engagements)
- Vegetable Crop Nutrition Masterclass in April 2020 (2,035 impressions, 30 engagements)
- Partnership Network article with the Soil CRC on research to boost soil health on-farm (1,242 impressions, 29 engagements)
- Fact sheet on legume cover crops during fertiliser shortages (807 impressions, 29 engagements)
- Pink rot fact sheet for potato growers (954 impressions and 20 engagements)
- A virtual farm walk at our Koo Wee Rup demonstration site (2,285 impressions, 20 engagements).

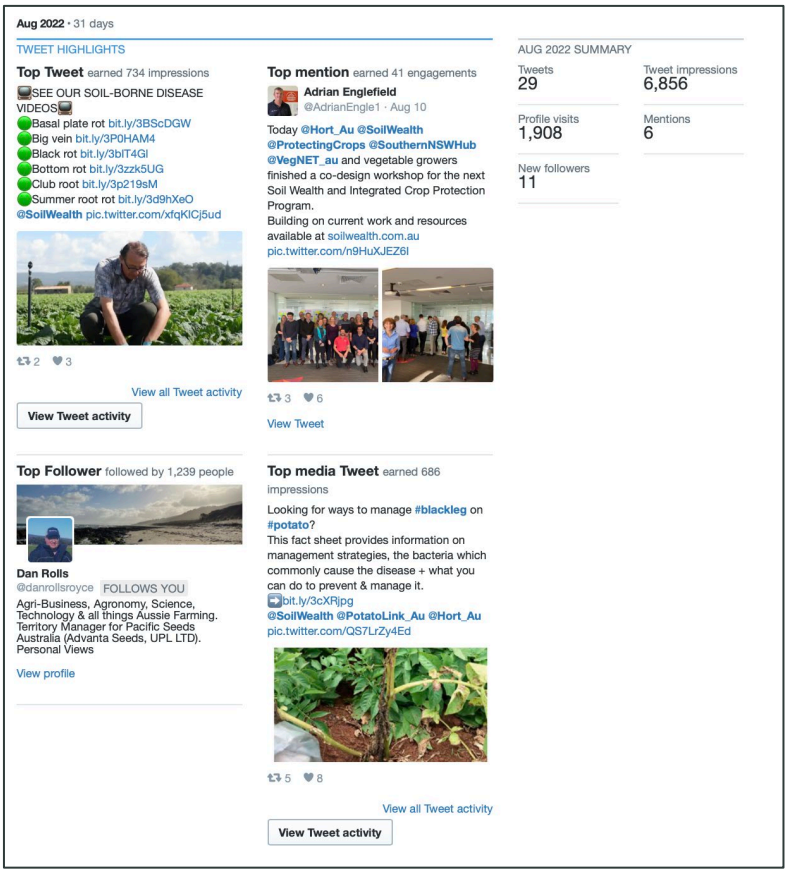


Figure 13: Twitter analytics for @ProtectingCrops – August 2022.

Facebook

The [Soil Wealth and ICP: Community of Practice Facebook page] is an important source of information on project news, events and resources. There has been a concerted effort during Phase 2 to reinvigorate this channel and engage with followers in alternative ways (for example Facebook Live streams).

The most popular Facebook posts include events, useful resources and Bulletin e-newsletter links. Top posts included:

- Promotion of EGVID Facebook Live streams and soil health panel discussion webinar one week prior to the event (1,400 reached, 74 engagements)
- Agri-chemical trial updates from EGVID 2020 Live stream (1,100 reached, 200 engagements) and seed company trials from EGVID 2020: Parts 1 and 2 Live stream (1,020 reached, 170 engagements)
- Resource on using compost safely on-farm (1,215 impressions, 144 engagements)
- Integrated weed management manual for the Australian vegetable industry (829 impressions, 91 engagements)
- Events such as the four-part webinar series on managing salinity in potato and vegetable production (1,520 reached, 75 engagements, 4 shares)

- Advancements in biopesticides webinar (1,300 reached, 30 event responses – boosted post)
- Soil Wealth ICP team member Carl Larsen's award for services to the vegetable industry at the AUSVEG VIC Awards for Excellence (264 impressions, 48 engagements)
- Webinar on nitrogen fertiliser management options in difficult conditions (988 impressions, 17 engagements)
- The Carbon Series global scan and review (368 impressions, 12 engagements)
- Grower profiles, such as the series of five case studies on vegetable grower innovation in South Australia (430 reached, 26 engagements, 3 shares) and a SWAN Systems Partnership Network article and trial results from Harvest Farms, one of our core demonstration sites in Richmond, Tasmania (124 reached, 20 engagements, 1 share)
- Soil Wealth ICP column in Vegetables Australia Winter 2020: 'Mixed species cover crops stand out in Tassie trial' (581 reached, 35 engagements, 4 shares).

The project's Facebook pages were used for the core case study demonstration sites to communicate regular updates, findings, photos and farm walks.

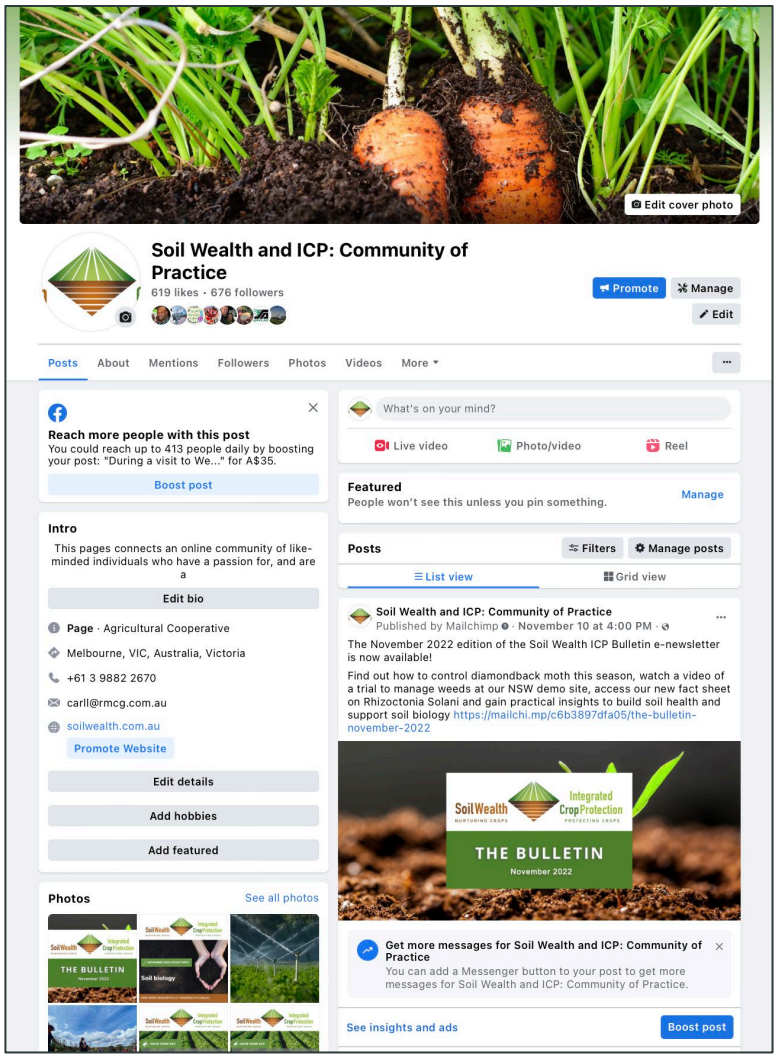


Figure 14: Soil Wealth ICP Community of Practice Facebook page.

Industry articles and publications

A total of 1,147 articles and publications from the Soil Wealth ICP project featured across a range of industry newsletters and publications during Phase 2, including:

- 558 articles in the AUSVEG Weekly Update (almost 50% of total articles)
- 67 articles in other industry e-newsletters and publications
- 44 articles in Vegetables Australia magazine
- 212 articles in VegNET e-newsletters
- 235 articles in the vegetablesWA e-newsletter
- 31 articles in WA Grower magazine.

Radio interviews

- 10 May 2018: ABC Victorian Country Hour radio interview on Phase 2 project with Carl Larsen
- 22 August 2018: ABC Tasmanian Country Hour radio interview on Phase 2 project with Donna Lucas
- 3 December 2019: ABC Tasmanian Country Hour radio interview on SA compost trial
- 11 June 2020: ABC Victorian Country Hour & Rural Report radio interview on the results from a precision agriculture trial at the Koo Wee Rup VIC demonstration site.

Media releases

- 4 June 2020: Precision ag pays off in bumper celery crop (promotion of results from a precision agriculture trial at the Koo Wee Rup demonstration site)
- 18 June 2020: Know your salts to better manage potato and veg production (promotion of a series of four webinars on managing salinity in potato production).

COVID-19 response

The impacts of COVID-19 lockdowns and restrictions across Australia, particularly Victoria and New South Wales, meant communication to industry using online channels was more important than ever.

During the project, growers and industry welcomed the diversification of communications channels and increased output on these channels including social media, e-newsletters and co-promoted articles with AUSVEG and VegNET RDOs.

The inability to deliver face to face farm walks, field days and other training events meant many events were transitioned online where possible or alternative delivery mechanisms were used (e.g. videos, podcasts, Facebook Live stream). These outputs as well as event wrap-ups for those who couldn't attend were developed into resources which are accessible on the project website to further expand the reach of Soil Wealth ICP.

Recommendations for Phase 3

- Investigate updating the project website and content management system (CMS), resource templates, logo and e-newsletter to refresh project branding and continue keeping growers engaged with the project
- Maintain Facebook Community of Practice page, retire Facebook demonstration site pages and consider alternative communications options to promote updates from the demo sites (e.g. videos, Immersive Ag virtual site tours and results platform)
- Consolidate @SoilWealth and @ProtectingCrops Twitter accounts, preferably into @SoilWealthICP to ensure applicability of content to users
- Continue promoting content through a range of communications channels to increase reach and engagement and investigate alternative platforms such as Instagram
- Continue targeting specific industry publications (such as state peak industry bodies and VegNET Regional Development Officers) to increase coverage of the project.

Communications outputs

Bulletin e-newsletter editions

2017/18	2019	2020	2021	2022/23
• December 2017 • January 2018 • February 2018 • March 2018 • April 2018 • May 2018 • June 2018 • July 2018 • August 2018 • September 2018 • October 2018 • November 2018 • December 2018	• February 2019 • March 2019 • April 2019 • May 2019 • June 2019 • July 2019 • August 2019 • September 2019 • October 2019 • November 2019 • December 2019	• January 2020 • February 2020 • March 2020 • April 2020 • May 2020 • June 2020 • July 2020 • August 2020 • September 2020 • October 2020 • November 2020 • December 2020	• January 2021 • February 2021 • March 2021 • April 2021 • May 2021 • June 2021 • July 2021 • August 2021 • September 2021 • October 2021 • November 2021 • December 2021	• January 2022 • February 2022 • March 2022 • April 2022 • May 2022 • June 2022 • July 2022 • August 2022 • September 2022 • October 2022 • November 2022 • December 2022 • February 2023

Social media analytics

Twitter @ProtectingCrops

Month/Year	Tweets	Impressions	Profile visits	Mentions	New followers
2017/18					
December 2017	N/A	3,621	N/A	N/A	8
January 2018	N/A	4,023	N/A	N/A	12
February 2018	8	5,208	234	4	8
March 2018	7	7,343	384	9	4
April 2018	5	5,121	143	7	9
May 2018	9	3,517	208	8	10
June 2018	7	4,228	111	8	7
July 2018	6	2,618	218	10	-1
August 2018	6	4,092	289	7	12
September 2018	3	2,890	165	6	15
October 2018	2	1,116	108	7	2
November 2018	N/A	3,167	N/A	N/A	5
December 2018	N/A	4,010	N/A	N/A	5
2019					
January 2019	N/A	1,725	N/A	N/A	4
February 2019	N/A	1,116	1	1	5
March 2019	3	2,398	127	10	3
April 2019	7	4,306	142	7	5
May 2019	7	3,010	160	8	10
June 2019	8	6,089	183	12	17
July 2019	9	6,802	85	4	5
August 2019	4	3,745	9	6	4
September 2019	4	2,237	27	6	1
October 2019	10	3,107	39	20	10
November 2019	1	1,305	29	7	3
December 2019	11	6,921	37	13	5
2020					

Month/Year	Tweets	Impressions	Profile visits	Mentions	New followers
January 2020	7	4,274	45	3	7
February 2020	4	2,722	10	6	2
March 2020	5	3,150	7	3	2
April 2020	9	6,924	103	4	7
May 2020	6	7,261	64	1	2
June 2020	11	4,359	26	0	10
July 2020	9	5,147	43	3	12
August 2020	6	3,330	37	3	-5
September 2020	18	9,709	124	3	5
October 2020	34	17.1K	144	6	5
November 2020	19	7,926	145	4	3
December 2020	30	10.1K	511	6	-1
2021					
January 2021	21	11.4K	419	2	8
February 2021	15	9,561	715	4	6
March 2021	19	6,170	552	3	2
April 2021	14	7,385	703	5	2
May 2021	18	10.4K	555	0	-2
June 2021	24	11.1K	477	1	7
July 2021	15	9,429	730	6	2
August 2021	22	9,817	874	5	4
September 2021	26	8,351	1,197	4	3
October 2021	19	5,334	1,029	6	4
November 2021	24	6,971	1,488	2	5
December 2021	24	6,973	743	5	3
2022/23					
January 2022	23	6,078	1,099	1	5
February 2022	28	6,533	816	4	10
March 2022	37	7,826	1,967	1	9
April 2022	23	6,695	1,626	5	10
May 2022	30	4,890	1,615	1	5
June 2022	25	4,567	1,802	0	8
July 2022	23	3,826	2,037	4	3
August 2022	29	6,856	1,908	6	11
September 2022	19	2,666	1,106	4	7
October 2022	10	2,340	590	0	9
November 2022	22	3,521	508	1	-1
December 2022	12	3,563	N/A	N/A	-1
January 2023	12	3,220	N/A	N/A	2
February 2023	14	1,615	234	0	4

Facebook pages

Soil Wealth ICP Facebook page	Page likes at Milestone 105 (May 2019)	Page likes and followers at end of Phase 2 (February 2023)
Soil Wealth and ICP: Community of Practice	406 likes	642 likes, 699 followers
Soil Wealth Cowra	442 likes	596 likes, 611 followers
Integrated Crop Protection: Sydney Basin	195 likes	409 likes, 421 followers
Soil Wealth & Integrated Crop Protection: Koo Wee Rup	105 likes	385 likes, 402 followers

Soil Wealth & Integrated Crop Protection: Richmond, TAS	29 likes	338 likes, 360 followers
Soil Wealth: Werribee	197 likes	303 likes, 309 followers
Soil Wealth: Kalbar/Lockyer Valley	113 likes	132 likes, 132 followers
Soil Wealth & Integrated Crop Projection: Manjimup	51 likes	33 likes, 31 followers
Soil Wealth: Bundaberg	30 likes	30 likes, 33 followers

Industry articles and publications

AUSVEG WEEKLY UPDATE (558 ARTICLES)	
Previous editions can be accessed at: ausveg.com.au/weekly-update	
2017/18	• 20171205 AUSVEG WU_Fusarium wilt webinar • 20171205 AUSVEG WU_Reduced till economic case study • 20171219 AUSVEG WU_Spinach mite fusarium and practice change case study resources • 20180109 AUSVEG WU_Bowen demonstration site case study • 20180116 AUSVEG WU_Mt Barker demonstration site case study • 20180123 AUSVEG WU_VA magazine article • 20180130 AUSVEG WU_Koo Wee Rup demo site practice change case study • 20180214 AUSVEG WU_Phase 2 project outline • 20180214 AUSVEG WU_Lettuce aphid new biotype • 20180214 AUSVEG WU_Lettuce aphid new bioptype • 20180214 AUSVEG WU_Phase 2 project outline • 20180220 AUSVEG WU_Phase 1 summary of resources and communication • 20180227 AUSVEG WU_Biopesticides fact sheet • 20180313 AUSVEG WU_Adjuvants fact sheet • 20180327 AUSVEG WU_SW ICP website relaunch • 20180327 AUSVEG WU_Winter cover crops fact sheet • 20180410 AUSVEG WU_Alternatives to metham sodium fact sheet • 20180417 AUSVEG WU_Soilborne disease workshop Gingin and Phase 2 project launch • 20180417 AUSVEG WU_Soilborne disease workshops Carnarvon and Phase 2 project launch • 20180424 AUSVEG WU_Soilborne disease workshops Carnarvon and Phase 2 project launch • 20180508 AUSVEG WU_Hort Connections Horticulture Field Day demo site visit • 20180508 AUSVEG WU_Hort Connections Phase 2 project launch • 20180522 AUSVEG WU_Biofumigation fact sheet.png • 20180522 AUSVEG WU_Hort Connections Horticulture Field Day demo site visit • 20180529 AUSVEG WU_Farm walk Richmond TAS demo site promotion • 20180605 AUSVEG WU_Kalfresh demo site practice change case study • 20180626 AUSVEG WU_Damping off in spinach case study • 20180626 AUSVEG WU_Horticulture Field Day demo site visit • 20180703 AUSVEG WU_Soilborne Disease Master Class promotion • 20180710 AUSVEG WU_DNA soilborne disease webinar promotion • 20180717 AUSVEG WU_Crop nutrition master class promotion • 20180717 AUSVEG WU_DNA soilborne disease webinar promotion • 20180724 AUSVEG WU_DNA soilborne disease webinar promotion • 20180724 AUSVEG WU_Soilborne Disease Master Class promotion • 20180731 AUSVEG WU_DNA soilborne disease webinar promotion • 20180731 AUSVEG WU_Gingin WA demo site compost case study report promotion • 20180814 AUSVEG WU_Cover crop coaching clinic NSW • 20180814 AUSVEG WU_Soilborne disease DNA webinar recording • 20180904 AUSVEG WU_Clubroot management fact sheet • 20180904 AUSVEG WU_Crop Nutrition Master Class promotion • 20180911 AUSVEG WU_Fusarium management fact sheet • 20180918 AUSVEG WU_Farm walk Gingin WA demo site promotion • 20180925 AUSVEG WU_Buckwheat cover crop video • 20180925 AUSVEG WU_Crop Nutrition Master Class promotion

	• 20180925 AUSVEG WU_Farm walk Gingin WA demo site promotion • 20181009 AUSVEG WU_Organic amendments global scan and review • 20181009 AUSVEG WU_SBD video series Basal Plate Rot • 20181016 AUSVEG WU_Forthside Open Day recap • 20181016 AUSVEG WU_IPM webinar promotion • 20181016 AUSVEG WU_Soil Wealth website promotion in potatoes • 20181023 AUSVEG WU_Darwin NT demo site promotion • 20181023 AUSVEG WU_Labile carbon fact sheet • 20181023 AUSVEG WU_SBD video series Big Vein • 20181107 AUSVEG WU_SBD video series Black Rot • 20181120 AUSVEG WU_SBD video series Bottom Rot • 20181120 AUSVEG WU_Sydney Basin NSW demo site farm walk strip-tillage • 20181204 AUSVEG WU_SBD video series Club Root • 20181204 AUSVEG WU_Sydney Basin NSW demo site farm walk strip-tillage • 20181218 AUSVEG WU_InfoVeg podcast on SWICP Phase 2 • 20181218 AUSVEG WU_Soil health and WUE fact sheet • 20181218 AUSVEG WU_Strip-till e-Bulletin article
2019	• 20190115 AUSVEG WU_Strip-till VegNET TAS video • 20190122 AUSVEG WU_SBD video series Summer Root Rot • 20190122 AUSVEG WU_Strip-till VegNET TAS fact sheet • 20190212 AUSVEG WU_Cover crop coaching clinic QLD • 20190212 AUSVEG WU_pH and lime quality and application fact sheet • 20190226 AUSVEG WU_Cover crop coaching clinic QLD • 20190305 AUSVEG WU_Redback spider webinar recording • 20190305 AUSVEG WU_Sclerotinia in green beans fact sheet • 20190305 AUSVEG WU_Sclerotinia in vegetables fact sheet • 20190305 AUSVEG WU_Strip tillage webinar • 20190312 AUSVEG WU_Cover crop coaching clinic QLD • 20190312 AUSVEG WU_Strip tillage webinar • 20190319 AUSVEG WU_Cowra NSW update article • 20190326 AUSVEG WU_Compost webinar promotion • 20190326 AUSVEG WU_Koo Wee Rup demo site farm walk • 20190326 AUSVEG WU_Ripper mulcher podcast and fact sheet promotion • 20190326 AUSVEG WU_Levy-funded case study shows how Harvest Moon controls erosion with ripper mulcher • 20190409 AUSVEG WU_Richmond TAS demo site discussion • 20190409 AUSVEG WU_Weed management fact sheet • 20190409 AUSVEG WU_Weed technology global scan and review • 20190416 AUSVEG WU_Koo Wee Rup demo site farm walk debrief • 20190416 AUSVEG WU_Soil Wealth/ICP trial site helps growers explore precision agriculture technologies • 20190507 AUSVEG WU_Integrated weed management webinar recording • 20190507 AUSVEG WU_Koo Wee Rup demo site case study • 20190507 AUSVEG WU_Metham sodium fact sheet • 20190514 AUSVEG WU_Cover crop field day WA • 20190521 AUSVEG WU_CTF podcast • 20190521 AUSVEG WU_Leaf and sap testing webinar recording • 20190521 AUSVEG WU_New tech forum at Hort Connections • 20190521 AUSVEG WU_Potato RD forum at Hort Connections • 20190521 AUSVEG WU_Strip-till NSW case study video • 20190528 AUSVEG WU_Potato RD forum at Hort Connections • 20190604 AUSVEG WU_National Awards for Excellence Researcher of the Year and Industry Impact nominations • 20190604 AUSVEG WU_New tech forum at Hort Connections • 20190604 AUSVEG WU_Potato RD forum at Hort Connections

	• 20190604 AUSVEG WU_Soil Master Class SA • 20190604 AUSVEG WU_Strip-till in corn reducing erosion building robust soils video • 20190611 AUSVEG WU_Compost trial SA podcast • 20190611 AUSVEG WU_Pesticide resistance webinar recording • 20190611 AUSVEG WU_Potato RD forum at Hort Connections • 20190618 AUSVEG WU_Cover crop podcast Harvest Moon • 20190618 AUSVEG WU_New tech forum at Hort Connections • 20190618 AUSVEG WU_Potato RD forum at Hort Connections • 20190618 AUSVEG WU_Spray rig calibration poster • 20190702 AUSVEG WU_Cover crop webinar recording promotion • 20190702 AUSVEG WU_Potato RD forum at Hort Connections recap • 20190702 AUSVEG WU_Spraying and wind speed poster • 20190702 Potato growers learn about managing pests and diseases at Potato Industry R&D Forum | AUSVEG • 20190709 AUSVEG WU_Developing a fertiliser program webinar recording • 20190709 AUSVEG WU_Vegetable Crop Nutrition Masterclass 2019 • 20190716 AUSVEG WU_Biofumigation cover crops webinar recording • 20190716 AUSVEG WU_HI Growing Matters cover cropping and soil health podcasts with Dr Kelvin Montagu • 20190716 AUSVEG WU_Tech change global scan and review • 20190716 AUSVEG WU_Vegetable Crop Nutrition Masterclass 2019 • 20190723 AUSVEG WU_Vegetable Crop Nutrition Masterclass 2019 • 20190730 AUSVEG WU_Nutrition management and plant disease webinar recording • 20190730 AUSVEG WU_Strip-till video Cowra NSW demo site • 20190730 AUSVEG WU_Vegetable Crop Nutrition Masterclass 2019 • 20190806 AUSVEG WU_Vegetable Crop Nutrition Masterclass 2019 • 20190813 AUSVEG WU_Calcium cyanamide economics fact sheet • 20190813 AUSVEG WU_Compost webinar recording promotion • 20190813 AUSVEG WU_Weed technology webinar • 20190827 AUSVEG WU_GPA resistance management webinar recording • 20190827 AUSVEG WU_Strip-till video Simplot NSW • 20190827 AUSVEG WU_Weed technology webinar • 20190917 AUSVEG WU_Growing Matters cover crop podcasts • 20190917 AUSVEG WU_Nematodes in vegetable soils webinar recording • 20190917 AUSVEG WU_Salinity in vegetable crops webinar • 20190917 AUSVEG WU_Soil borne disease guide • 20190924 AUSVEG WU_Chilli spacing trial summary case study • 20190924 AUSVEG WU_Growing Matters cover crop podcasts • 20190924 AUSVEG WU_Pesticides and insect pest control webinar recording • 20190924 AUSVEG WU_Salinity in vegetable crops webinar • 20191008 AUSVEG WU_Calcium cyanamide demo site report • 20191008 AUSVEG WU_Fusarium wilt webinar recording • 20191008 AUSVEG WU_Salinity in vegetable crops webinar • 20191008 AUSVEG WU_Seasonal rainfall outlook for veg growing regions news item • 20191008 AUSVEG WU_VegNET NSW R&D Forum guest speaker slot • 20191015 AUSVEG WU_VegNET NSW R&D Forum guest speaker slot • 20191022 AUSVEG WU_Cover crop rolled ground cover strip-till Cowra NSW case study • 20191022 AUSVEG WU_Making hay from cover crops article • 20191022 AUSVEG WU_Soil DNA and soilborne disease webinar recording • 20191022 AUSVEG WU_VegNET NSW R&D Forum guest speaker slot • 20191029 AUSVEG WU_VegNET NSW R&D Forum guest speaker slot • 20191106 AUSVEG WU_Bathurst NSW demo site machinery demo day • 20191106 AUSVEG WU_IPM webinar recording • 20191106 AUSVEG WU_Managing salinity in vegetable crops webinar • 20191106 AUSVEG WU_Remote sensing global scan

	• 20191106 AUSVEG WU_Soil First Group TAS demo site Landcare Tasmania award winners • 20191119 AUSVEG WU_Biofumigant cover crop webinar • 20191119 AUSVEG WU_Managing salinity fact sheet and webinar recording • 20191119 AUSVEG WU_Spray technology webinar recording • 20191126 AUSVEG WU_Planning for summer irrigation and water management webinar • 20191203 AUSVEG WU_Beet cyst nematode fact sheet • 20191203 AUSVEG WU_Biofumigant cover crop webinar • 20191203 AUSVEG WU_Managing salinity fact sheet and webinar recording • 20191203 AUSVEG WU_Soil borne disease guide • 20191210 AUSVEG WU_Cowra and Bathurst NSW demo site updates • 20191210 AUSVEG WU_Planning for summer irrigation and water management webinar • 20191210 AUSVEG WU Soil Wealth and ICP project update/ December update on demo sites in NSW • 20191217 AUSVEG WU_Bathurst NSW demo site update • 20191217 AUSVEG WU_Cowra NSW demo site update
2020	• 20200121 AUSVEG WU_Vegetable Crop Nutrition Masterclass • 20200121 AUSVEG WU_Weed technology webinar recording • 20200128 AUSVEG WU_Biofumigant cover crops Parts 1 and 2 webinar recording • 20200128 AUSVEG WU_Planning for summer irrigation management webinar recording • 20200128 AUSVEG WU_Soil health and water use efficiency fact sheet • 20200128 AUSVEG WU_Soil phosphorus fact sheet • 20200128 AUSVEG WU_Vegetable Crop Nutrition Masterclass • 20200204 AUSVEG WU_Biofumigant cover crops Parts 1 and 2 webinar recording • 20200204 AUSVEG WU_Managing redback spiders in broccoli webinar recording • 20200218 AUSVEG WU_Biological Product Database global scan and review • 20200218 AUSVEG WU_Compost and reduced irrigation trial and ABC Rural interview • 20200218 AUSVEG WU_Damping off in spinach best bet fungicide demo site report • 20200225 AUSVEG WU_Cover crop coaching clinic WA • 20200225 AUSVEG WU_Plant analysis guide • 20200225 AUSVEG WU_VegNET biosecurity and surveillance RD update guest speaker • 20200303 AUSVEG WU_Area Wide Management guidelines and resources • 20200303 AUSVEG WU_VegNET biosecurity and surveillance RD update guest speaker • 20200310 AUSVEG WU_VegNET RD update guest speaker • 20200317 AUSVEG WU_Biofumigant cover crops Parts 1 and 2 webinar recording • 20200317 AUSVEG WU_Grower compost trial SA case study • 20200317 AUSVEG WU_IWM in pumpkins Bathurst NSW case study • 20200317 AUSVEG WU_Recycled organics for vegetable growers' fact sheets • 20200324 AUSVEG WU_SBD Investigating cavity spot and forking in carrots • 20200324 AUSVEG WU_VegNET RD update guest speaker webinar recording • 20200324 AUSVEG WU Investigating cavity spot and forking in carrots • 20200331 AUSVEG WU_Mulgowie Farms QLD and VIC demo sites case study • 20200331 AUSVEG WU_Redback spider webinar • 20200331 AUSVEG WU_UNE IWM video case studies w SWICP2 and VegNET project team • 20200331 AUSVEG WU Opening the doors to a sustainable farming future • 20200407 AUSVEG WU_Pumpkin brown etch webinar • 20200407 AUSVEG WU_Remote RD support COVID-19 fact sheet • 20200407 AUSVEG WU_Soil testing for vegetable crops webinar recording • 20200414 AUSVEG WU_Follow Soil Wealth ICP demo sites online • 20200414 AUSVEG WU_Pumpkin brown etch webinar • 20200414 AUSVEG WU_Redback spider webinar recording • 20200414 AUSVEG WU_Soil First Tasmania demo site and cover cropping case study • 20200421 AUSVEG WU_EGVID virtual field day support • 20200421 AUSVEG WU_Nitrate field test fact sheet • 20200428 AUSVEG WU_EGVID virtual field day support • 20200428 AUSVEG WU_New tools to manage irrigation in potatoes webinar • 20200428 AUSVEG WU_Taking soil samples fact sheet

	• 20200505 AUSVEG WU_EGVID virtual field day support • 20200505 AUSVEG WU_New tools to manage irrigation in potatoes webinar • 20200505 AUSVEG WU_Potato soft rot podcast • 20200512 AUSVEG WU_Alternatives to metham sodium fact sheet • 20200512 AUSVEG WU_EGVID virtual field day support recap • 20200512 AUSVEG WU_New tools to manage irrigation in potatoes webinar • 20200519 AUSVEG WU_Biofumigation cover crop webinar recording • 20200519 AUSVEG WU_New tools to manage irrigation in potatoes webinar recording • 20200519 AUSVEG WU_Precision ag in veg production podcast and links to Werribee and Koo Wee Rup demo sites • 20200519 AUSVEG WU_Precision ag pays off in bumper celery crop Koo Wee Rup demo site case study • 20200526 AUSVEG WU_ Webinars: Biofumigation and cover crops • 20200526 AUSVEG WU_ InfoVeg Radio: Precision agriculture in veg production • 20200602 AUSVEG WU_ Winter webinar series: Salinity and potato management in SA • 20200602 AUSVEG WU_ Biological Product Database • 20200602 AUSVEG WU_ Jamie Jurgens: Focus on soil sustainability • 20200609 AUSVEG WU_ Webinars: Salinity and potato management in SA • 20200616 AUSVEG WU_ Webinar: Cover crops and soil biology • 20200616 AUSVEG WU_ Podcast: Cover crops • 20200623 AUSVEG WU_ Case study: Cowra cover crop and strip till a winning combination for soil health • 20200623 AUSVEG WU_Using cover crops to manage mycorrhizal fungi for veg crops • 20200630 AUSVEG WU_ Know your salts to better manage potato and veg production • 20200630 AUSVEG WU_ Case study: Managing sodicity in vegetable crops • 20200707 AUSVEG WU_ New podcast on application of precision ag in vegetables • 20200707 AUSVEG WU_ Podcast: Cover crops and strip till for pumpkin production • 20200707 AUSVEG WU_ Using cover crops to manage mycorrhizal fungi for veg crops • 20200714 AUSVEG WU_ Mixed species cover crops stand out in Tassie trial • 20200714 AUSVEG WU_ Vegetable Crop Nutrition Master class • 20200714 AUSVEG WU_ Flashback to key findings from the East Gippsland Vegetable Innovation Days • 20200721 AUSVEG WU_ Tips to manage brown etch on butternut pumpkins • 20200721 AUSVEG WU_ Webinar: Adoption of precision systems technology in veg production • 20200728 AUSVEG WU_ Cover crops for weed suppression in snow peas • 20200728 AUSVEG WU_ Fact sheet: Looking after soils for vegetable production • 20200728 AUSVEG WU_ Using cover crops to manage mycorrhizal fungi for veg crops • 20200804 AUSVEG WU_Keep connected to Soil Wealth ICP project updates • 20200804 AUSVEG WU_Podcast: Integrated Weed Management on a pumpkin farm • 20200804 AUSVEG WU_Webinar: Adoption of precision systems technology in veg production • 20200804 AUSVEG WU_Fact sheet: Taking soil samples • 20200811 AUSVEG WU_ Get support to manage plant nutrition • 20200811 AUSVEG WU_ Postharvest treatments to control bacterial soft rot in potatoes • 20200811 AUSVEG WU_ Lessons from the field: Translating precision agriculture data at Fresh Select • 20200818 AUSVEG WU_Adoption of precision systems technology in vegetable production • 20200818 AUSVEG WU_Vegetable Crop Nutrition Master class reaps online rewards • 20200818 AUSVEG WU_Lessons learnt from Cowra cover crop trials • 20200818 AUSVEG WU_Fact sheet: Weed management in vegetables • 20200818 AUSVEG WU_Podcast: Suppressing weeds in snow peas • 20200825 AUSVEG WU_ Webinar: Internal rot of capsicum • 20200825 AUSVEG WU_ Spray technology for vegetable growers: a guide to getting it right • 20200825 AUSVEG WU_ The 'breakdown' on composts • 20200825 AUSVEG WU_ Global scan and review of technologies for controlling weeds • 20200901 AUSVEG WU_ Using remote sensing for vegetable weed control • 20200901 AUSVEG WU_ Webinar: Internal rot of capsicum • 20200908 AUSVEG WU_ Review the Biological Products Database • 20200908 AUSVEG WU_ Webinar: Technology for controlling weeds in vegetable production

	• 20200908 AUSVEG WU_ Get ready for summer irrigation • 20200908 AUSVEG WU_ Podcast: Take a deep dive into soil biology • 20200915 AUSVEG WU_ Webinar on internal rot of capsicum • 20200915 AUSVEG WU_ Case study: Effect of coal-based soil amendments on carrots grown in sandy soil • 20200915 AUSVEG WU_ Your guide to Soil Wealth ICP resources • 20200915 AUSVEG WU_ Have your say on Soil Wealth ICP! • 20200922 AUSVEG WU_Interactive webinar: Advancements in biopesticides for profitable vegetable production • 20200922 AUSVEG WU_Irrigation management in sweet corn • 20200922 AUSVEG WU_Drone applications make light work of tough jobs in Bundaberg • 20200922 AUSVEG WU_Have your say on Soil Wealth ICP! • 20200929 AUSVEG WU_Irrigation monitoring is out of this world at Bathurst • 20200929 AUSVEG WU_The link between remote sensing, controlling weeds and boosting yield • 20200929 AUSVEG WU_ Irrigation scheduling tips for summer • 20201006 AUSVEG WU_ Seasonal climate outlook for vegetable growing regions • 20201006 AUSVEG WU_Drone applications make light work of tough jobs in Bundaberg • 20201006 AUSVEG WU_Webinar recording: Biopesticides in vegetable production • 20201013 AUSVEG WU_ Spray technology: A guide to getting it right • 20201013 AUSVEG WU_Soil health a big winner from precision ag trial • 20201020 AUSVEG WU_ Fact sheet: Protect your crop from mega pests • 20201024 AUSVEG WU_ Case study: Benefits of cover crop + strip-till combination • 20201024 AUSVEG WU_Variable rate application: Is it right for your farm? • 20201103 AUSVEG WU_ Webinars: Integrated Weed Management for vegetable growers • 20201103 AUSVEG WU_Fact sheet: Beet cyst nematode • 20201103 AUSVEG WU_Resources: Managing pesticide resistance in vegetable crops • 20201103 AUSVEG WU_Soil biology webinar recording • 20201110 AUSVEG WU_Fact sheet: Getting soil pH right • 20201110 AUSVEG WU_Case study: Inter-row ryegrass cover crop - a winner in snow pea production • 20201110 AUSVEG WU_Webinars: IWM for vegetable growers • 20201110 AUSVEG WU_Fact sheet: Soil health and water use efficiency • 20201117 AUSVEG WU_Catching up with… Doris Blaesing • 20201117 AUSVEG WU_The advantages of Sunn hemp in vegetable production • 20201117 AUSVEG WU_Cucurbits meet cover crops in the Top End • 20201117 AUSVEG WU_Webinar: Integrated weed management - a practical approach for veg growers • 20201117 AUSVEG WU_Fact sheet: Soil health and water use efficiency • 20201124 AUSVEG WU_Fact sheet: What you need to know about soil microbiology • 20201124 AUSVEG WU_Video update on precision ag trial at Koo Wee Rup • 20201124 AUSVEG WU_Webinar: IWM - a practical approach for veg growers • 20201201 AUSVEG WU_Fact sheets: Earthworms and your farm • 20201201 AUSVEG WU_Upcoming webinar: How cover cropping can improve IWM for veg growers • 20201201 AUSVEG WU_Webinar recording: Nutrition management and plant disease • 20201201 AUSVEG WU_What's that disease? Find out with field ID guides for veg crops • 20201208 AUSVEG WU_ Upcoming webinar: How cover cropping can improve IWM for veg growers • 20201208 AUSVEG WU_ Managing irrigation requirements over the Victorian summer using soil moisture tech • 20201215 AUSVEG WU_Integrated weed management: Nutgrass • 20201215 AUSVEG WU_A practical guide to soil-borne diseases in vegetable crops • 20201222 AUSVEG WU_Crop management: Advancement of drone applications in Bundaberg, Qld • 20201222 AUSVEG WU_Video: Integrated weed management – a practical approach for vegetable growers • 20201222 AUSVEG WU_Managing irrigation requirement over the Victorian summer using soil moisture tech
2021	• 20210105 AUSVEG WU_Helpful resources to manage damping off in spinach • 20210105 AUSVEG WU_Fact sheet: Get on top of foliar diseases this summer

	• 20210105 AUSVEG WU_Video: How cover cropping can improve IWM use for veg growers • 20210112 AUSVEG WU_Chilli spacing trial summary report • 20210112 AUSVEG WU_Pathogen DNA testing for soilborne diseases • 20210119 AUSVEG WU_A3 posters – cover crops for vegetable growers • 20210119 AUSVEG WU_Podcast: A ripper solution to control erosion • 20210119 AUSVEG WU_Seasonal climate outlook for vegetable growing regions – Feb to April • 20210127 AUSVEG WU_Upcoming webinar: The future of IWM in vegetable farming • 20210127 AUSVEG WU_Young guns in WA grower group to revitalise veg production • 20210202 AUSVEG WU_Podcasts: Controlled traffic farming with Harvest Moon, Tasmania • 20210202 AUSVEG WU_Case study: Managing soil health in Werribee South • 20210202 AUSVEG WU_Upcoming webinar: The future of IWM in vegetable farming • 20210209 AUSVEG WU_Webinar: Compost calculator to highlight value of organic soil amendments • 20210209 AUSVEG WU_Podcast: The use of drones in the horticulture industry • 20210209 AUSVEG WU_Managing insect contaminants in processed leafy veg • 20210209 AUSVEG WU_A global review of organic soil amendments • 20210216 AUSVEG WU_IWM webinar series recording #3: The future of IWM in veg farming • 20210216 AUSVEG WU_Integrated weed management – volunteer potatoes • 20210216 AUSVEG WU_Webinar recording: Pesticides and insect pest control in vegetables • 20210216 AUSVEG WU_How can I control pests? Field ID guides for veg crops • 20210223 AUSVEG WU_ Fact sheet: Integrated weed management – Oxalis • 20210223 AUSVEG WU_Ag tech trial turns up the heat on weeds • 20210302 AUSVEG WU_Irrigation impacts potato varieties at Cowra, New South Wales • 20210302 AUSVEG WU_Is your soil healthy? See these top tips for growers • 20210309 AUSVEG WU_Webinar recording: Compost calculator measures value of organic amendments • 20210309 AUSVEG WU_Adelaide industry field day: Pest and disease management – are you prepared? • 20210309 AUSVEG WU_The best winter cover crops for your needs • 20210316 AUSVEG WU_A guide to brassica biofumigant cover crops • 20210316 AUSVEG WU_Cover crops: A game changer • 20210316 AUSVEG WU_Video: A grower's perspective of cover crops in vegetable production • 20210316 AUSVEG WU_Adelaide industry field day: Pest and disease management – are you prepared? • 20210316 AUSVEG WU_Webinar: Spent mushroom compost as casing soil • 20210323 AUSVEG WU_Don't miss a cover crop coaching clinic in Manjimup, WA • 20210323 AUSVEG WU_From cover crop to cash crop: Managing residues in veg production • 20210323 AUSVEG WU_Adelaide industry field day: Pest and disease management – are you prepared? • 20210330 AUSVEG WU_Don't miss a cover crop coaching clinic in Manjimup, WA • 20210330 AUSVEG WU_What is a cover crop actually worth? • 20210330 AUSVEG WU_Save the date for a virtual farm walk at Koo Wee Rup, VIC • 20210406 AUSVEG WU_Don't miss a cover crop coaching clinic in Manjimup, WA • 20210406 AUSVEG WU_Cover crops coaching clinic in Woodridge, WA • 20210406 AUSVEG WU_Save the date for a virtual farm walk at Koo Wee Rup, VIC • 20210406 AUSVEG WU_Reduced till in vegetable production fact sheet and video • 20210406 AUSVEG WU_Webinar: Soil organic matter, biology and mineralisation • 20210406 AUSVEG WU_Webinar recording: Strip-tillage for vegetables and potatoes • 20210413 AUSVEG WU_Save the date for a virtual farm walk at Koo Wee Rup, VIC • 20210413 AUSVEG WU_Pest and disease management in focus at SA workshop • 20210413 AUSVEG WU_Webinar: Soil organic matter, biology and mineralisation • 20210413 AUSVEG WU_Werribee South virtual farm walk on managing saline-sodic soils • 20210420 AUSVEG WU_Cover crops coaching clinic in Woodridge, WA • 20210420 AUSVEG WU_Join an upcoming virtual farm walk at Koo Wee Rup • 20210420 AUSVEG WU_Reducing tillage in vegetable crops: is it worthwhile? • 20210420 AUSVEG WU_Webinar: Soil organic matter, biology and mineralisation • 20210420 AUSVEG WU_Video: Strip-till in action in Tasmania • 20210420 AUSVEG WU_Werribee South virtual farm walk on managing saline-sodic soils • 20210427 AUSVEG WU_Cover crops coaching clinic in Woodridge, WA

	• 20210427 AUSVEG WU_Webinar: Soil organic matter, biology and mineralisation • 20210427 AUSVEG WU_Werribee South virtual farm walk on managing saline-sodic soils • 20210504 AUSVEG WU_Catch up on the virtual farm walk at Koo Wee Rup • 20210504 AUSVEG WU_Global scan and review of organic soil amendments • 20210504 AUSVEG WU_Webinar: Soil organic matter, biology and mineralization • 20210511 AUSVEG WU_Compost use in vegetable production: A grower's perspective • 20210511 AUSVEG WU_Webinar recording: Developing a fertiliser program for vegetable crops • 20210511 AUSVEG WU_Webinar: Soil organic matter, biology and mineralization • 20210518 AUSVEG WU_Boosting mycorrhizal fungi in vegetable crops • 20210518 AUSVEG WU_Case study and podcast: SA grower compost trial • 20210518 AUSVEG WU_Catch up on a virtual farm walk in Werribee South • 20210525 AUSVEG WU_Case study: What is compost worth? • 20210601 AUSVEG WU_Webinar recording: Soil organic matter, biology & mineralisation – the challenges and complexity of estimating mineralisation rates • 20210610 AUSVEG WU_The effect of custom made composts on the performance of a carrot crop and soil health • 20210615 AUSVEG WU_Soil Wealth ICP on show at Hort Connections 2021 • 20210615 AUSVEG WU_Video: Technology for controlling weeds in vegetable production • 20210622 AUSVEG WU_New release: Vegenotes 81 available online (EGVID collaboration) • 20210622 AUSVEG WU_Remote sensing: Global scan and review • 20210622 AUSVEG WU_Feed your soils to feed the world: Supporting soil health in vegetable production • 20210622 AUSVEG WU_Save the date for a pest & disease workshop in the Atherton Tablelands, Qld • 20210629 AUSVEG WU_Lessons from the field: Translating precision agriculture data at Fresh Select • 20210629 AUSVEG WU_Video: Adoption of precision systems in technology in vegetable production • 20210629 AUSVEG WU_Soil Biology in Vegetable Production Masterclass • 20210706 AUSVEG WU_Fact sheet: Biopesticides in Australia • 20210706 AUSVEG WU_Webinar: Know how to use drones safely – legal compliance • 20210706 AUSVEG WU_Soil biology in vegetable production masterclass • 20210706 AUSVEG WU_Podcast: An introduction to soil biology and biological products • 20210713 AUSVEG WU_Webinar: Know how to use drones safely – legal compliance • 20210713 AUSVEG WU_Organic soil amendment trial: update from Richmond, Tas • 20210720 AUSVEG WU_A guide to preventing leaf and stem diseases • 20210720 AUSVEG WU_Using biological products and phosphorus fertiliser technology for potato productivity • 20210720 AUSVEG WU_The impact of fungicides and biologicals on damping off in spinach: Trial report • 20210727 AUSVEG WU_Why are beneficial biological organisms important in soil for vegetable crops? • 20210727 AUSVEG WU_Salinity and potato production: Using organic soil amendments, biologicals and biostimulants • 20210803 AUSVEG WU_Using drones to generate farm insights – drone basics and operations including weed mapping • 20210803 AUSVEG WU_Fact sheet: Weed management in vegetables • 20210803 AUSVEG WU_Webinar recording: IWM for the Australian vegetable industry • 20210810 AUSVEG WU_Upcoming webinar: Advancements in ICP for profitable veg production • 20210810 AUSVEG WU_IWM: Nutgrass (Cyperus rotundus) • 20210817 AUSVEG WU_IWM webinar: A practical approach for vegetable growers • 20210824 AUSVEG WU_New additions to the Biological Products Database • 20210824 AUSVEG WU_Video: Lessons from continued innovation in weed management in Clyde, Vic • 20210824 AUSVEG WU_Webinar reminder: Advancements in ICP for profitable veg production • 20210831 AUSVEG WU_Compost trial: Full report now available from Richmond, Tas • 20210831 AUSVEG WU_2021 Soil Biology Masterclass recording & resources • 20210831 AUSVEG WU_Spray technology for vegetable growers: A guide to getting it right • 20210907 AUSVEG WU_Fact sheets to combat 'mega pests' in your veg crop • 20210907 AUSVEG WU_The future of integrated weed management in vegetable farming • 20210907 AUSVEG WU_Webinar recording: Managing pesticide resistance in the vegetable industry

	• 20210914 AUSVEG WU_Advancements in ICP for profitable veg production • 20210914 AUSVEG WU_What changes can Aussie growers expect in ICP? • 20210921 AUSVEG WU_Tips to control high priority pests in veg crops • 20210921 AUSVEG WU_Advancements in ICP for profitable veg production • 20210921 AUSVEG WU_Virtual field walk: Microwave weeding technology demo, NSW • 20210928 AUSVEG WU_Advancements in ICP for profitable veg production (spinach crown mite) • 20210928 AUSVEG WU_Webinar recording: Green peach aphid resistance management • 20211005 AUSVEG WU_Field walk recording: Microwave weeding technology demo, NSW • 20211012 AUSVEG WU_Webinar recordings: Soil Biology Masterclass 2021 • 20211012 AUSVEG WU_Guide to soil testing and interpretation for vegetable crops • 20211019 AUSVEG WU_Fact sheet: Nutrient element functions in vegetable crops • 20211019 AUSVEG WU_Go-to guide for nutrition management resources • 20211026 AUSVEG WU_Collection of practical fact sheets to master plant nutrition • 20211026 AUSVEG WU_Leaf and sap testing to manage vegetable crop nutrition • 20211026 AUSVEG WU_Webinar recording: Nutrition management and plant disease • 20211103 AUSVEG WU_A breezy video update from Koo Wee Rup • 20211110 AUSVEG WU_Video: Soil Biology in Vegetable Production Masterclass • 20211117 AUSVEG WU_Soil Biology Masterclass: Complete video series • 20211117 AUSVEG WU_From health to wealth: Looking after soils • 20211124 AUSVEG WU_Get the facts on soil microbiology • 20211124 AUSVEG WU_Fact sheet: Soil health and water use efficiency • 20211130 AUSVEG WU_Biochar: What is its potential for vegetable production? • 20211130 AUSVEG WU_Soil Wealth resource: Soil biology and structure in veg production • 20211130 AUSVEG WU_Protecting soil in the NT with Jeremy Trembath • 20211207 AUSVEG WU_Soil Wealth resource: Biological products • 20211207 AUSVEG WU_Guide to identify and control soil-borne diseases in veg crops • 20211214 AUSVEG WU_Managing fusarium diseases in vegetable crops • 20211214 AUSVEG WU_Soil Biology Masterclass video series: Panel discussion & case study • 20211214 AUSVEG WU_Video: The benefits of cover crops & reduced tillage • 20211221 AUSVEG WU_How to control pythium in vegetable crops • 20211221 AUSVEG WU_Fact sheet: Managing clubroot in brassicas
2022/23	• 20220111 AUSVEG WU_Focus topics unveiled for Soil Wealth ICP in 2022 • 20220111 AUSVEG WU_What you need to know when selecting a sorghum summer cover crop • 20220111 AUSVEG WU_Five simple steps in spray rig calibration • 20220111 AUSVEG WU_Webinar recording: Soil fumigation – chemical and biological • 20220118 AUSVEG WU_The regenerative agriculture approach at Kalfresh • 20220118 AUSVEG WU_Webinar recording: Grower success story with Andrew Braham, SA capsicum grower • 20220125 AUSVEG WU_Saving time and money with strip-till in WA • 20220125 AUSVEG WU_Video: The benefits of cover crops & reduced tillage • 20220201 AUSVEG WU_Introducing the Carbon Series for Aussie vegetable growers • 20220201 AUSVEG WU_Veg and tech: Science fiction or the future of farming? • 20220208 AUSVEG WU_ IPM: A more sustainable approach for veg pests • 20220208 AUSVEG WU_ Nitrogen fertiliser shortage? A good reason to look at legume cover crops • 20220208 AUSVEG WU_ Informing irrigation decisions with remote weather stations • 20220215 AUSVEG WU_ Webinar: Cover crops for fresh market and processing potatoes in Australia • 20220215 AUSVEG WU_Implementing IPM on-farm around Australia • 20220215 AUSVEG WU_Managing insect pests in greenhouses • 20220222 AUSVEG WU_Webinar: Cover crops for fresh market and processing potatoes in Australia • 20220222 AUSVEG WU_Tips to protect beneficial insects in an IPM program • 20220222 AUSVEG WU_Soil health trial leads to better quality capsicums in SA • 20220222 AUSVEG WU_Save the date: Nitrogen fertiliser webinar • 20220301 AUSVEG WU_Guide to managing insect contaminants • 20220301 AUSVEG WU_Webinar recording: Advancements in biopesticides for profitable veg production

	• 20220308 AUSVEG WU_Getting started with cover crops • 20220315 AUSVEG WU_Winter is coming: Preparing your farm with cover crops • 20220315 AUSVEG WU_Cover crop videos: Buckwheat and sunn hemp • 20220322 AUSVEG WU_On-farm tips to manage high nitrogen fertiliser prices and limited supply • 20220322 AUSVEG WU_Mixed cover crops trial for soil health in Tasmania • 20220329 AUSVEG WU_Posters: Cover crop herbicide guide & termination guide • 20220329 AUSVEG WU_Supporting the next generation of Tassie researchers • 20220405 AUSVEG WU_Why choose reduced till and how to use it in veg production • 20220405 AUSVEG WU_Trial tests cover crops for NT cucurbit growers • 20220412 AUSVEG WU_Strip-till: A closer look at the benefits and challenges • 20220419 AUSVEG WU_NSW case study: Strip-till in the field • 20220419 AUSVEG WU_Tas case study: Practical considerations for strip-till • 20220426 AUSVEG WU_Annual Vegetable Industry Seminar returns to Brisbane for 2022 • 20220426 AUSVEG WU_Webinar recording: Strip-tillage for vegetables and potatoes • 20220510 AUSVEG WU_2022 Annual Vegetable Industry Seminar (AVIS) • 20220510 AUSVEG WU_Reducing tillage: Is it worthwhile? • 20220517 AUSVEG WU_2022 Annual Vegetable Industry Seminar (AVIS) • 20220517 AUSVEG WU_Effect of a coal-based soil amendment on carrots grown in sandy soil • 20220517 AUSVEG WU_Getting the best out of compost in veg production • 20220517 AUSVEG WU_2022 AUSVEG VIC Awards for Excellence winners • 20220524 AUSVEG WU_2022 Annual Vegetable Industry Seminar • 20220524 AUSVEG WU_Soil CRC shines the spotlight on soil health • 20220531 AUSVEG WU_Improving phosphorus uptake efficiency in potatoes • 20220531 AUSVEG WU_Hear from the Soil Wealth ICP demo site growers at the Annual Vegetable Industry Seminar • 20220609 AUSVEG WU_Calcium cyanamide fertiliser put to the test in a carrot crop • 20220609 AUSVEG WU_Case study: Long-term benefits of using compost on plant & soil health • 20220621 AUSVEG WU_New updates to the Biological Products Database! • 20220621 AUSVEG WU_Soil Wealth ICP demo site growers share innovations at AVIS • 20220621 AUSVEG WU_Northern Territory demo site farm walk • 20220628 AUSVEG WU_Managing salinity in potato production using biologicals and biostimulants • 20220628 AUSVEG WU_Save the date: Area-wide management of insect-vectored diseases webinar • 20220705 AUSVEG WU_Save the date: Area-wide management of insect-vectored diseases webinar • 20220712 AUSVEG WU_Precision ag trial case study resources, VIC • 20220712 AUSVEG WU_Save the date: Area-wide management of insect-vectored diseases webinar • 20220712 AUSVEG WU_Hort leadership opportunities abound • 20220719 AUSVEG WU_Variable rate application: Is it right for your farm? • 20220719 AUSVEG WU_Podcast: The drone is no longer a toy • 20220726 AUSVEG WU_How satellite imagery provides on-farm insights • 20220726 AUSVEG WU_Benefits of ryegrass ground cover at Soil Wealth ICP Sydney Basin demo site • 20220802 AUSVEG WU_Remote sensing for your vegetable farm • 20220802 AUSVEG WU_Top End field walk showcases soil health improvements • 20220802 AUSVEG WU_Area wide management for cucurbit viruses webinar • 20220802 AUSVEG WU_IPM in protected cropping, Peats Ridge NSW • 20220809 AUSVEG WU_2022 Annual Vegetable Industry Seminar video recordings • 20220809 AUSVEG WU_Fact sheet: Managing blackleg in potatoes • 20220809 AUSVEG WU_Guide to identify and control soil-borne diseases in veg crops • 20220809 AUSVEG WU_IPM in protected cropping, Peats Ridge NSW • 20220816 AUSVEG WU_2022 Annual Vegetable Industry Seminar video recordings • 20220816 AUSVEG WU_Getting an etch on butternut pumpkins • 20220816 AUSVEG WU_Catch up on AWM webinar to control insect-vectored viral and bacterial diseases • 20220816 AUSVEG WU_IPM in protected cropping, Peats Ridge NSW • 20220816 AUSVEG WU_AWM webinar: In control - managing capsicum viruses for profitable veg production

	• 20220823 AUSVEG WU_Fact sheet: Clubroot management in brassicas • 20220823 AUSVEG WU_Knowledge gained at protected cropping workshop, Peats Ridge • 20220823 AUSVEG WU_AWM webinar: In control - managing capsicum viruses for profitable veg production • 20220830 AUSVEG WU_AWM webinar: In control - managing capsicum viruses for profitable veg production • 20220830 AUSVEG WU_Protected cropping grower day, Virginia SA • 20220906 AUSVEG WU_Pest management: what are the options? • 20220906 AUSVEG WU_AWM webinar: In control - managing capsicum viruses for profitable veg production • 20220906 AUSVEG WU_Protected cropping grower day, Virginia SA • 20220913 AUSVEG WU_Using pesticides in an IPM program to protect beneficials • 20220920 AUSVEG WU_IPM in practice: A new approach to release beneficials • 20220920 AUSVEG WU_Field walk: Cover cropping and strip-tillage, Manjimup WA • 20220927 AUSVEG WU_AWM webinar mini-series #3: Lettuce viruses • 20220927 AUSVEG WU_Managing insect pests in greenhouses • 20220927 AUSVEG WU_Implementing IPM on-farm in Werribee South • 20220927 AUSVEG WU_Field walk: Cover cropping and strip-tillage, Manjimup WA • 20220927 AUSVEG WU_In-person event: Soil Wealth ICP - Soil Biology, Gingin WA • 20221004 AUSVEG WU_Maximising IPM practices in protected cropping • 20221004 AUSVEG WU_Persistence and attention to detail pay off in IPM approach at Braham Produce • 20221004 AUSVEG WU_AWM webinar: In control - managing lettuce viruses for profitable veg production • 20221011 AUSVEG WU_Survey: Share your thoughts on Soil Wealth ICP Phase 2 • 20221018 AUSVEG WU_Share your thoughts on Soil Wealth ICP Phase 2 • 20221018 AUSVEG WU_Mega Pests fact sheet: Managing foliar diseases • 20221018 AUSVEG WU_A guide to preventing leaf and stem diseases • 20221018 AUSVEG WU_Implementing IPM on-farm: Houston's Farm, TAS • 20221025 AUSVEG WU_Case study: Irrigation monitoring in potato crops • 20221025 AUSVEG WU_Cover crops, strip-till and biofumigation on show in the west • 20221102 AUSVEG WU_AWM webinar mini-series #3: Lettuce viruses • 20221102 AUSVEG WU_Growers share experiences at IPM masterclass in South Australia • 20221102 AUSVEG WU_Implementing IPM on-farm in Werribee South • 20221122 AUSVEG WU_A practical guide to soil testing and interpretation • 20221122 AUSVEG WU_Stay in control of diamondback moth this season • 20221129 AUSVEG WU_Video series: Soil Biology Masterclass • 20221129 AUSVEG WU_How to boost mycorrhizal fungi in vegetable crops • 20221206 AUSVEG WU_New fact sheet: Rhizoctonia solani • 20221213 AUSVEG WU_Soil Wealth ICP: Where to find nutrition management resources • 20221220 AUSVEG WU_Nitrogen fertiliser price and supply: Management options in difficult conditions • 20230110 AUSVEG WU_Developing a fertiliser program for your vegetable crops • 20230117 AUSVEG WU_Leaf and sap testing to manage vegetable crops • 20230124 AUSVEG WU_Healthy soils, healthy profit from precision ag trial at Koo Wee Rup, VIC • 20230124 AUSVEG WU_Latest InfoVeg R&D podcasts – Soil Wealth • 20230131 AUSVEG WU_Fact sheet on managing cover crop residues on in vegetable production • 20230207 AUSVEG WU_Get back to basics with spray application • 20230214 AUSVEG WU_Time to rejig your rig? Five steps to spray rig calibration • 20230221 AUSVEG WU_Machinery trial says goodbye to weeds
OTHER INDUSTRY E-NEWSLETTERS AND PUBLICATIONS (67 ARTICLES)	
2018	• 20180209 Gippy Agchat_Koo Wee Rup practice change case study • 20180520 Good Fruit & Vegetables_WA growers inspect leafy veg trials • 20180611 Good Fruit & Vegetables_Project to deliver practical veg information • 20181204 Gippy Agchat_SBD video series
2019	• 20190214 Mirage News_Agronomist & Two Aussie Veggie Growers picked to fly from the 'Farm Gate' to the 'Golden Gate'

	• 20190401 Gippy Agchat_KWR demo site farm walk promotion • 20210619 AUSVEG VIC_ Potato R&D Forum at Hort Connections • 20190902 The Onion Project e-news_Managing salinity in vegetable crops fact sheet • 20190921 Farm Biosecurity News_Soil borne disease guide • 20191025 The Onion Project e-news_Remote Sensing global scan • 20191008 FreshPlaza_Seasonal rainfall outlook for vegetable growing regions Australia • 20191030 AgVic Soil COP Update_Making hay from cover crops • 20191030 AgVic Soil COP Update_Remote sensing global scan • 20191111 Good Fruit & Vegetables_Greater Sydney LLS puts research into practice with VegNET NSW • 20190901 Vegenotes Issue 74_VG16078 – Soil Wealth ICP Phase 2 • 20190915 Potatoes Australia_Introducing Soil Wealth/ICP to Potatoes Australia • 20191216 Farm Biosecurity News_Soilborne disease in vegetable crops guide • 20191218 The Onion Project Annual Magazine_Managing soil health in onions • 20191218 The Onion Project Annual Magazine_Tackling soilborne disease in onion production • 20191218 The Onion Project Annual Magazine_Tasmanian onion growers gather to discuss industry needs
2020	• 20200228 AgVic Soil COP update_Biologicals database • 20200313 The Onion Project e-news_Plant analysis guide • 20200313 The Onion Project e-news_Vegetable Crop Nutrition Masterclass • 20200327 Farmers Weekly_Getting to the bottom of cavity spot mysteries • 20200327 Research For Agriculture_ Carrot disease culprits identified • 20200404 TFGA Fast News_Spray workshop • 20200406 Research for Agriculture_Integrated Weed Management case study • 20200416 Good Fruit & Vegetables_East Gippsland Vegetable Innovation Days to livestream event • 20200422 Good Fruit & Vegetables_Harvest Farms SWAN Irrigation Systems • 20200526 Good Fruit & Vegetables_Veg field days embrace digital front and social media • 20200605 AUSVEG VIC_Schreurs & Sons case study: Precision ag pays off in bumper celery crop • 20200615 The Onion Project_Grower resource: Updated Biological Products Database • 20200615 The Onion Project_Save the date: Vegetable Crop Nutrition Master class – now online! • 20200803 AUSVEG VIC_Flashback to key findings from the East Gippsland Vegetable Innovation Days • 20200828 Good Fruit & Vegetables_Managing vegetable weeds the focus for online resources from Applied Horticultural Research • 20200914 HortiDaily_Webinar on internal rot of capsicum • 20200916 FreshPlaza_AU: Precision ag pays off with bumper celery crop (headline of newsletter) • 20200928 AgTecH Harvest_Precision ag pays off in bumper celery crop • 20200929 Irrigation Australia_Precision agriculture shows promise for vegetable production • 20201006 FreshPlaza_Australia: It will be a wet end to 2020 • 20201008 HortiDaily_Australia: It will be a wet end to 2020 • 20201009 Good Fruit & Vegetables_Vegetable growers showered with irrigation info • 20201009 North Queensland Register_Vegetable growers showered with irrigation info • 20201218 Farm Biosecurity News_A practical guide to soil-borne diseases in vegetable crops
2021	• 20210114 HortiDaily_Australia: Chilli spacing trial summary report • 20210115 TFGA FastNews_Soil borne diseases in vegetable crops guide • 20210129 AUSVEG VIC_Seasonal climate outlook for vegetable growing regions – Feb to April • 20210228 AUSVEG VIC_Webinar recording: Compost calculator measures value of organic amendments • 20210228 AUSVEG VIC_Case study: Managing soil health in Werribee South • 20210228 AUSVEG VIC_How can I control pests? Field ID guides for veg crops • 20210312 The Front Line_Industry field day: Pest and disease management (South Australia) • 20210404 Future Farming Australia_Precision ag pays off in bumper celery crop • 20210430 FreshPlaza_Australian vegetable industry preparing to renew its Strategic Investment Plan for the next five years (references Soil Wealth ICP) • 20210705 AUSVEG VIC_Catch up on the virtual farm walk at Koo Wee Rup • 20210906 AUSVEG VIC_Video: Lessons in continued innovation in weed management in Clyde, VIC

	• 20210909 Onions Australia e-newsletter_Webinar now available on advancements in Integrated Crop Protection • 20210909 Onions Australia e-newsletter_Soil Biology Master Class Webinar • 20211108 IAgrM_Are you a vegetable producer who is carbon farming? Promote your good work • 20210913 Irrigation Australia_Irrigation monitoring in potatoes • 20211126 HortiDaily_Biochar: What is its potential for vegetable production? • 20211214 HortiDaily_Managing fusarium disease in vegetable crops
2022/23	• 20220114 Farm Table e-news_Soil Wealth podcasts • 20220228 FreshPlaza_Regenerative agriculture approach paying off for veg growing operation • 20220317 The Land_What cover crop is best for vegie production? • 20220602 The Onion Project_List of SWICP resource relevant for onions • 20220714 Fruit Growers Tasmania_Area-wide management of insect-vectored diseases webinar • 20220722 Growing Innovation_Hort leadership opportunities abound • 20230207 AUSVEG VIC_Get back to basics with spray application
VEGETABLES AUSTRALIA MAGAZINE (44 ARTICLES)	
2017/18	• 2017 Nov-Dec: Masterclasses and More in Store for Veg Industry Members • 2017 Nov-Dec: Science Takes Centre Stage at Plant Health Conference • 2018 Jan-Feb: Heading west, and controlling insects with the best • 2018 Mar-Apr: R&D extension project enters new phase to meet veg industry demands • 2018 May-Jun: Crop variability, pest management and cover crops: what can drones tell us? • 2018 Jul-Aug: Spotlight on soil health – disease management, biofumigation and reduced till • 2018 Sep-Oct: Cover crop special edition – Managing residues and demonstration site updates • 2018 Sep-Oct: Andrew Braham – Setting the pace for industry innovation • 2018 Nov-Dec: Shedding a practical light on challenging soilborne diseases
2019	• 2019 Jan-Feb: IPM and precision technology: updates and designing your own trial • 2019 Mar-Apr: Strip-till feature – what is it, and how can you benefit? • 2019 May-Jun: From Tasmania to the USA – tillage, erosion and weed management innovations • 2019 Jul-Aug: Getting the dirt on soil microbes and compost • 2019 Jul-Aug edition: Estimating the cost of managing soilborne diseases • 2019 Spring: How has your strip-till New Year's resolution progressed? • 2019 Spring: Gaining a wealth of knowledge around healthy soils (Cowra NSW demonstration site case study) • 2019 Summer: Opening the doors to a sustainable farming future • 2019 Summer: Commodity profile: Chilli - Three chilli spacing treatments were examined as part of a trial for project VG15010 – A multi-faceted approach to soil-borne disease management • 2019 Summer: A new weapon for growers in the battle against soil-borne diseases
2020	• 2020 Autumn: 2020: The year of soil biology and integrated weed management • 2020 Autumn: Cover cropping pioneer aiming to educate others • 2020 Winter: Mixed species cover crops stand out in Tassie trial • 2020 Spring: Precision ag pays off in bumper celery crop • 2020 Spring: The show goes on: Innovation Days given green light • 2020 Spring: Extension update: Full steam ahead for South Australia • 2020 Summer: A look back on the year of soil biology and integrated weed management • 2020 Summer: Vegetable Crop Nutrition Masterclass reaps online rewards
2021	• 2021 Autumn: Young growers bring a fresh focus to veg production in WA • 2021 Autumn: Focus topics announced for Soil Wealth ICP in 2021! • 2021 Winter: NSW grower trials cover crops to eliminate single-use plastic mulch and control weeds • 2021 Winter: A trio of integrated weed management fact sheets now available • 2021 Winter: Cover crops and strip-till a winner in the west • 2021 Spring: Feed your soils to feed the world: Supporting soil health in vegetable production • 2021 Spring: Check out the latest resources from the Soil Wealth ICP project • 2021 Summer: Sustainable farming practices put to the test at demonstration sites • 2021 Summer: New resources from the Soil Wealth ICP project
2022	• 2022 Autumn: Introducing the Carbon Series for Aussie vegetable growers • 2022 Autumn: New focus topics underway for Soil Wealth ICP in 2022!

	• 2022 Winter: Nitrogen fertiliser price and supply: A good reason to look at legume cover crops • 2022 Winter: Passion for soils leads to hosting Top End demonstration site • 2022 Winter: Seminar aiming to educate and inspire veg growers • 2022 Spring: Demonstrating innovations in vegetable production • 2022 Spring: New resources on area wide management of insect-vectored viral and bacterial diseases • 2022 Summer: Top 10 grower resources from Soil Wealth ICP Phase 2
VEGNET E-NEWSLETTERS (212 ARTICLES)	
2017/18	• 20171211 VegNET TAS e-news_EnviroVeg soil and nutrition management webinar recording • 20171211 VegNET TAS e-news_Spinach mite fact sheet • 20180116 BFVG e-news_Mega Pests chewing and biting insects • 20180214 VegNET N W SE VIC e-news_New lettuce aphid biotype • 20180228 VegNET TAS e-news_New lettuce aphid biotype • 20180313 BFVG e-news_Mt Barker demo site practice change case study • 20180313 BFVG e-news_Phase 1 summary of resources and communication • 20180314 VegNET N W SE VIC e-news_Calcium cyanamide fertiliser fact sheet • 20180521 VegNET TAS e-news_Buckwheat cover crop video • 20180615 VegNET Gippsland e-news_SBD Master Class promotion • 20180628 VegNET TAS e-news_Kalfresh compost case study video • 20180628 VegNET TAS e-news_Richmond TAS demo site promotion • 20180718 BFVG e-news_Crop nutrition master class promotion • 20180718 BFVG e-news_DNA soilborne disease webinar promotion • 20180723 VegNET TAS e-news_DNA soilborne disease webinar promotion • 20180828 VegNET TAS e-news_DNA soilborne disease webinar recording • 20180828 VegNET TAS e-news_Nutrition Master Class promotion • 20180911 BFVG e-news_Clubroot fact sheet • 20181106 VegNET TAS e-news_Reduced till video • 20181120 BFVG e-news_Various fact sheets and ID guides
2019	• 20190115 BFVG e-news_Make 2019 the year you have a serious look at strip-till • 20190125 VegNET TAS e-news_Strip-till in Tasmania video • 20190308 VegNET TAS e-news_SBD video series Club Root • 20190308 VegNET TAS e-news_Spray application workshop TAS • 20190312 BFVG e-news_Cover crop coaching clinic Bundaberg QLD • 20190312 BFVG e-news_Demo site trials x2 and strip-till article • 20190312 BFVG e-news_Strip-till in TAS video promotion • 20190405 VegNET TAS e-news_Richmond TAS demo site meeting • 20190405 VegNET TAS e-news_Spray application workshop TAS • 20190415 VegNET Gippsland e-news_Partnership Network call for membership • 20190508 BFVG e-news_Soil testing for vegetable crops webinar recording and presentation • 20190514 VegNET TAS e-news_Erosion control machinery case study • 20190719 VegNET TAS e-news_Vegetable Crop Nutrition Masterclass 2019 • 20190730 VegNET Gippsland e-news_Vegetable Crop Nutrition Masterclass 2019 • 20190814 VegNET N W SE VIC e-news_Soil pH and liming fact sheet • 20190814 VegNET N W SE VIC e-news_Weed technology webinar • 20190819 VegNET TAS e-news_Compost fact sheets • 20190819 VegNET TAS e-news_Remote sensing global scan and review • 20190819 VegNET TAS e-news_Salinity fact sheet • 20190819 VegNET TAS e-news_Weed technology webinar • 20190911 VegNET N W SE VIC e-news_Growing Matters cover crop podcasts • 20190911 VegNET N W SE VIC e-news_Soilborne disease guide • 20190913 BFVG e-news_Growing Matters cover crop podcasts • 20190913 BFVG e-news_Phase 2 project outline fact sheet • 20190920 VegNET Gippsland e-news_Salinity in vegetable crops webinar • 20190920 VegNET Gippsland e-news_Soil borne disease guide • 20190923 VegNET TAS e-news_Richmond TAS demo site new strip till equipment • 20190923 VegNET TAS e-news_Richmond TAS demo site visit and salinity webinar

	• 20190923 VegNET TAS e-news_Soil borne disease guide • 20191009 VegNET N W SE VIC e-news_Managing salinity in vegetable crops webinar • 20191009 VegNET N W SE VIC e-news_Spotlight on article • 20191009 VegNET N W SE VIC e-news_Weed management webinar recording • 20191024 VegNET TAS e-news_Managing salinity in vegetable crops webinar • 20191024 VegNET TAS e-news_Soil borne disease guide • 20191113 VegNET N W SE VIC e-news_Managing salinity webinar • 20191113 VegNET N W SE VIC e-news_Planning for summer irrigation and water management webinar • 20191113 VegNET N W SE VIC e-news_Precision ag and ICP farm walk Werribee VIC demo site • 20191120 VegNET TAS e-news_Landcare Tasmania Conference delegates at Richmond TAS demo site • 20191120 VegNET TAS e-news_Managing salinity webinar recording • 20191120 VegNET TAS e-news_Soil borne disease guide • 20191211 VegNET N W SE VIC e-news_Managing salinity in vegetable crops fact sheet and webinar • 20191211 VegNET N W SE VIC e-news_Planning for summer irrigation and water management webinar • 20191211 VegNET N W SE VIC e-news_Soil health and WUE fact sheet • 20191211 VegNET N W SE VIC e-news_UNE IWM videos w VegNET • 20191217 VegNET TAS e-news_Soil borne disease guide • 20191217 VegNET TAS e-news_Compost case study SA on ABC Radio story • 20191220 VegNET TAS e-news_Bathurst NSW demo site article • 20191231 VegNET Gippsland e-news_EGVID and 10th International Spinach Conference sponsorship
2020	• 20200108 VegNET N W SE VIC e-news_Planning for summer irrigation management webinar recording • 20200108 VegNET N W SE VIC e-news_Soil phosphorus fact sheet • 20200108 VegNET N W SE VIC e-news_Soilborne disease guide • 20200114 VegNET TAS e-news_Biological Crop Products global scan database • 20200114 VegNET TAS e-news_IWM video podcasts and soilborne disease guide • 20200114 VegNET TAS e-news_Soil First TAS demo site farm walk • 20200114 VegNET TAS e-news_Soil test interpretation guide • 20200114 VegNET TAS e-news_Vegetable Crop Nutrition Masterclass • 20200131 VegNET Gippsland e-news_Biofumigant webinar Parts 1 and 2 recording • 20200131 VegNET Gippsland e-news_Rainfall outlook Jan-Mar 2020 • 20200212 VegNET N W SE VIC e-news_Biofumigation webinar recording Parts 1 and 2 • 20200212 VegNET N W SE VIC e-news_Managing redback spiders in broccoli webinar recording • 20200212 VegNET N W SE VIC e-news_VegNET RD Updates incl. SWICP2 presentation • 20200217 VegNET TAS e-news_Soil First demo site farm walk • 20200229 VegNET Gippsland e-news_Plant analysis guide • 20200418 VegNET Gippsland e-news_EGVID digital field day assistance from SWICP2 team • 20200507 BFVG e-news_Potato soft rot podcast • 20200507 BFVG e-news_Pumpkin brown etch webinar recording • 20200806 VegNET N W SE VIC e-news_Irrigation and water management • 20200806 VegNET N W SE VIC e-news_ Interested in different soil management techniques? • 20200814 Lockyer Valley Growers e-news_Crop Nutrition – Soil Wealth Fertiliser Program • 20200917 VegNET N W SE VIC e-news_Irrigation scheduling • 20200917 VegNET N W SE VIC e-news_Brown etch in pumpkins • 20200917 VegNET N W SE VIC e-news_Internal rot of capsicum • 20200917 VegNET N W SE VIC e-news_Precision ag pays off • 20200917 VegNET N W SE VIC e-news_Soil borne disease in leeks • 20200917 VegNET N W SE VIC e-news_Controlling high priority pests in brassica leafy vegetables and celery • 20200917 VegNET N W SE VIC e-news_Translating precision ag data • 20200917 VegNET N W SE VIC e-news_Want information on recycled water in vegetable production? • 20201022 VegNET N W SE VIC e-news_Soil borne diseases in vegetable crops – a practical guide to identification and control in carrots and pumpkins • 20201022 VegNET N W SE VIC e-news_What you need to know about soil microbiology • 20201022 VegNET N W SE VIC e-news_Reducing transplant shock in lettuce • 20201022 VegNET N W SE VIC e-news_Management of blindness in lettuce

	• 20201203 VegNET N W SE VIC e-news_Benefits of cover crops and strip-till for pumpkin production • 20201203 VegNET N W SE VIC e-news_Summer cover crops fact sheet • 20201203 VegNET N W SE VIC e-news_Daniel Fragapane IPM case study • 20201203 VegNET N W SE VIC e-news_Webinar: Managing irrigation requirements over the Victorian summer • 20201203 VegNET N W SE VIC e-news_Redbacks in broccoli video • 20201203 VegNET N W SE VIC e-news_Managing salinity in vegetable production – lessons for drier years • 20201221 VegNET TAS e-news_Webinar: Integrated weed management – its future in vegetable farming • 20201221 VegNET TAS e-news_Integrated weed management webinar series recordings • 20201221 VegNET TAS e-news_Implementing precision ag technologies case study
2021	• 20210129 Lockyer Valley Growers Newsfeed_Time to rejig your rig poster • 20210129 Lockyer Valley Growers Newsfeed_Webinar: Spray technology • 20210225 VegNET N W SE VIC e-news_Organic soil amendments webinar recording • 20210225 VegNET N W SE VIC e-news_Cover crops poster • 20210225 VegNET N W SE VIC e-news_Integrated weed management fact sheet: Nutgrass • 20210225 VegNET N W SE VIC e-news_Microwave weed technology trial update Koo Wee Rup • 20210225 VegNET N W SE VIC e-news_Pest and disease ID field guide – white blister • 20210303 VegNET TAS e-news_Cover crops poster • 20210303 VegNET TAS e-news_Integrated weed management webinar recording • 20210303 VegNET TAS e-news_Integrated weed management fact sheets: Oxalis and volunteer potatoes • 20210303 VegNET TAS e-news_Managing blackleg in potatoes fact sheet • 20210303 VegNET TAS e-news_Minimising hillslope erosion fact sheet • 20210415 VegNET N W SE VIC e-news_Clubroot fact sheet • 20210415 VegNET N W SE VIC e-news_How to control pythium in vegetable crops webinar recording • 20210415 VegNET N W SE VIC e-news_Koo Wee Rup virtual farm walk • 20210415 VegNET N W SE VIC e-news_Integrated weed management fact sheet: Oxalis • 20210415 VegNET N W SE VIC e-news_Werribee South virtual farm walk • 20210512 VegNET Gippsland e-news_Koo Wee Rup demonstration site case study and virtual farm walk • 20210512 VegNET Gippsland e-news_Soil health and water use efficiency fact sheet • 20210512 VegNET Gippsland e-news_Soil organic matter, biology and mineralisation webinar • 20210524 VegNET Bundaberg e-news_Developing a fertiliser program for vegetable crops • 20210524 VegNET Bundaberg e-news_Soil biology in vegetable production masterclass • 20210524 VegNET Bundaberg e-news_Reducing tillage in vegetable crops: is it worthwhile? • 20210524 VegNET Bundaberg e-news_Lyndon Orpwood discusses the benefits of strip-tillage to Simplot Australia • 20210524 VegNET Bundaberg e-news_Boosting mycorrhizal fungi in vegetable crops • 20210524 VegNET Bundaberg e-news_Benefits of cover crops and strip-till for pumpkin production – interview with Michael Camenzuli from Bathurst • 20210524 VegNET Northern Territory_Soil biology in vegetable production masterclass • 20210527 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210603 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210611 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210615 VegNET N W SE VIC e-news_Biological Products Database • 20210615 VegNET N W SE VIC e-news_Trade Show interviews with John Deere and Growave • 20210615 VegNET N W SE VIC e-news_Area wide management and biopesticides resources • 20210617 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210625 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210701 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210709 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210715 NT Farmers News_Soil Biology in Vegetable Production Masterclass

	• 20210715 VegNET N W SE VIC e-news_Webinar on the safe use of drones • 20210715 VegNET N W SE VIC e-news_Limited places left for a masterclass in soil biology! • 20210715 VegNET N W SE VIC e-news_A guide to preventing leaf and stem diseases • 20210722 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210730 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210702 BFVG e-news - Implementing IPM on-farm – experiences from leading growers: Scheurs & Sons, Clyde VIC • 20210702 BFVG e-news_Webinar: Know how to use drones safely – legal compliance • 20210702 BFVG e-news_Webinar: Managing insect pests in greenhouses with Andy Ryland • 20210702 BFVG e-news_Global scan and reviews: Remote sensing • 20210702 BFVG e-news_Soil biology in Vegetable Production Masterclass 2021 – spaces still available • 20210726 VegNET TAS e-news_Demo site update: Richmond Tas • 20210726 VegNET TAS e-news_Leaf and stem disease prevention guide • 20210726 VegNET TAS e-news_Soil biology in vegetable production masterclass • 20210812 VegNET N W SE VIC e-news_Advancement in ICP for profitable veg production • 20210812 VegNET N W SE VIC e-news_Using compost safely fact sheet • 20210813 NT Farmers News_Soil Biology in Vegetable Production Masterclass • 20210825 BFVG e-news_Database: Biological Products Database update August 2021 • 20210825 BFVG e-news_Webinar recording: Spray technology – a guide to getting it right • 20210825 BFVG e-news_Webinar recording: Integrated Weed Management (Webinar 2 of 3) – how cover cropping can improve its use for vegetable growers • 20210825 BFVG e-news_Webinar recording: Integrated Weed Management (Webinar 3 of 3) – the future of integrated weed management in vegetable farming • 20210825 BFVG e-news_Podcast: Soil biology and biological products – an introduction podcast • 20210825 BFVG e-news_Fact sheet: Biopesticides in Australia • 20210825 BFVG e-news_Article: The Importance of beneficial biological organisms in soil for vegetable crops • 20210825 BFVG e-news_Implementing IPM on farm: Experiences from leading growers – Schreurs & Sons, Clyde VIC • 20210915 VegNET N W SE VIC e-news_Biological Products Database • 20210915 VegNET N W SE VIC e-news_Trade show interviews with John Deere and Growave • 20210915 VegNET N W SE VIC e-news_Area wide management and biopesticides resources • 20211021 BFVG e-news_Webinar recording: Soil Biology Master Class 2021: Nitrogen availability • 20211021 BFVG e-news_Fact sheet: Nitrate Field Test • 20211021 BFVG e-news_Fact sheet: Making the most of your nitrogen • 20211021 BFVG e-news_Fact sheet: Soil phosphorus – the basics • 20211021 BFVG e-news_Fact sheet: Labile carbon • 20211021 BFVG e-news_Fact sheet: Getting soil pH right – Lime quality and application rates • 20211021 BFVG e-news_Fact sheet: Managing salinity in vegetable crops • 20211021 BFVG e-news_Fact sheet: Managing sodicity in vegetable crops • 20211021 BFVG e-news_Webinar recording: Soil Biology Masterclass 2021 – Basic principles • 20211021 BFVG e-news_Webinar recording: Soil Biology Masterclass 2021 – Breakdown of plant biomass and agrochemicals • 20211021 BFVG e-news_Fact sheet: From Health to Wealth – Looking after soils for vegetable production • 20211021 BFVG e-news_A guide: Soil Testing and Interpretation for Vegetable Crops • 20211021 BFVG e-news_Fact sheet: Nutrition management resources • 20211021 BFVG e-news_Fact sheet: Nutrient element functions in vegetable crops • 20211021 BFVG e-news_Webinar recording: Developing a fertilizer program for vegetable crops with Bruce Scott & Doris Blaesing • 20211021 BFVG e-news_Webinar recording: Leaf and sap testing for managing vegetable crop nutrition with Bruce Scott, Doris Blaesing and Gordon Rogers • 20211021 BFVG e-news_Webinar recording: Nutrition management and plant disease with Dr Len Tesoriero • 20211214 BFVG e-news_Carbon management on vegetable farms – emissions, sequestration and beyond

	• 20211214 BFVG e-news_Soil biology & biological products – an introduction podcast • 20211223 VegNET Gippsland_Optimising plant nutrition
2022/23	• 20220204 NT Farmer News_Pests Factsheet • 20220211 NT Farmer News_Pests Factsheet • 20220419 BFVG e-news_Nitrogen fertiliser price and supply: Management options in difficult conditions • 20220419 BFVG e-news_Spray technology for vegetable growers: A guide to getting it right • 20220419 BFVG e-news_Cover crops in vegetable production – a grower's perspective • 20220419 BFVG e-news_Winter cover crops • 20220419 BFVG e-news_Cover crops in the Wide Bay Burnett • 20220419 BFVG e-news_Reducing tillage in vegetable crops • 20220419 BFVG e-news_Managing Fusarium diseases in vegetable crops • 20220419 BFVG e-news_Spray application basics • 20220419 BFVG e-news_Nitrogen fertiliser prices and supply: a good reason to look at legume cover crops • 20220419 BFVG e-news_Post-harvest management of vegetables • 20220419 BFVG e-news_The future of integrated weed management in vegetable farming • 20220513 NT Farmer News_Annual Vegetable Industry Seminar (Soil Wealth ICP grower panel) • 20220624 NT Farmer News_Soil Wealth and ICP field walk • 20220803 VegNET NSW_Farm Walk – IPM in Protected Cropping • 20221017 VegNET NSW_Cover crops workshop • 20230125 NT Farmer News_Australian Vegetable Industry Seminar 2022 – Vietnamese and Punjabi translation • 20230201 NT Farmer News_Australian Vegetable Industry Seminar 2022 – Vietnamese and Punjabi translation • 20230215 NT Farmer News_Industry news links to Bulletin e-newsletter archives
VEGETABLESWA E-NEWS (235 ARTICLES)	
2018	• 20180323 VWA e-news_Soilborne disease masterclass Carnarvon and Gingin • 20180329 VWA e-news_Soilborne disease masterclass Carnarvon and Gingin • 20180329 VWA e-news_Soilborne disease masterclass Gingin • 20180406 VWA e-news_Soilborne disease masterclass Carnarvon and Gingin • 20180406 VWA e-news_Soilborne disease masterclass Gingin • 20180413 VWA e-news_Soilborne disease masterclass Carnarvon and Gingin • 20180420 VWA e-news_Soilborne disease masterclass Carnarvon and Gingin • 20180420 VWA e-news_Soilborne disease masterclass Carnarvon • 20180420 VWA e-news_Soilborne disease masterclass Gingin • 20180501 VWA e-news_Soilborne disease masterclass Carnarvon and Gingin • 20180501 VWA e-news_Soilborne disease masterclass Gingin • 20180504 VWA e-news_Soilborne disease masterclass Gingin recap • 20180921 VWA e-news_Gingin demo site farm walk promotion • 20180928 VWA e-news_Gingin demo site farm walk promotion • 20181005 VWA e-news_Gingin demo site farm walk promotion • 20181012 VWA e-news_Gingin demo site farm walk promotion • 20181016 vegetablesWA Industry Summit - Speakers Announced! • 20181019 VWA e-news_Gingin demo site farm walk promotion • 20181019 VWA e-news_Industry Summit speaker slot Doris Blaesing • 20181214 VWA e-news_Soil health and WUE fact sheet
2019	• 20190322 VWA e-news_Compost webinar promotion • 20190322 VWA e-news_Strip-till webinar recording promotion • 20190418 VWA e-news_Myalup cover crop field day • 20190503 VWA e-news_Myalup cover crop field day • 20190510 VWA e-news_Myalup cover crop field day • 20190524 VWA e-news_Myalup cover crop field day

	• 20190531 VWA e-news_Myalup cover crop field day • 20190607 VWA e-news_Myalup cover crop field day • 20190614 VWA e-news_Myalup cover crop field day • 20190628 VWA e-news_Myalup cover crop field day and presentation slides • 20190705 VWA e-news_Cover crop webinar promotion • 20190712 VWA e-news_Weed technology webinar • 20190719 VWA e-news_Weed technology webinar • 20190726 VWA e-news_Vegetable Crop Nutrition Masterclass 2019 • 20190809 VWA e-news_Weed technology webinar • 20191004 VWA e-news_Industry Summit and Grower Tour speaker slot • 20191011 VWA e-news_Industry Summit and Grower Tour speaker slot • 20191011 VWA e-news_Managing salinity in vegetable crops webinar • 20191025 VWA e-news_Industry Summit and Grower Tour speaker slot • 20191122 VWA e-news_Managing salinity in vegetables webinar recording • 20191122 VWA e-news_Spray technology webinar recording • 20191206 VWA e-news_Soilborne disease guides • 20191206 VWA e-news_UNE IWM videos Clyde VIC • 20191227 VWA e-news_New Cowra NSW demo site on potatoes and irrigation
2020	• 20200124 VWA e-news_Biofumigation webinar recording Parts 1 and 2 • 20200207 VWA e-news_Biofumigation webinar recording Part 2 • 20200207 VWA e-news_Technology for controlling weeds webinar recording • 20200221 VWA e-news_Plant analysis guide • 20200313 VWA e-news_Cover Crops Coaching Clinic • 20200403 VWA e-news_Pumpkin brown etch webinar • 20200403 VWA e-news_Red back spider webinar recording • 20200410 VWA e-news_Pumpkin brown etch webinar • 20200410 VWA e-news_Vegetable Crop Nutrition Master Class • 20200417 VWA e-news_Redback spider webinar recording • 20200501 VWA e-news_Fact sheet - taking soil samples • 20200501 VWA e-news_Facebook Live streams – EGVID • 202005015 VWA e-news_Vegetable Crop Nutrition Masterclass • 202005015 VWA e-news_Webinar: How to manage sclerotinia in vegetable crops • 202005015 VWA e-news_Webinar: How to control Pythium in vegetable crops • 202005015 VWA e-news_Webinar: Nutrition management and plant disease • 202005015 VWA e-news_Webinar: Fusarium wilt management in vegetables • 202005015 VWA e-news_Biological Products Database • 202005022 VWA e-news_Cover crops and strip tillage live webinar panel session • 202005022 VWA e-news_Biofumigation cover crops in vegetable production • 20200529 VWA e-news_Cover crops and soil biology in vegetable soils • 20200612 VWA e-news_Precision ag pays off in bumper celery crop • 20200612 VWA e-news_Vegetable Crop Nutrition Master class – now online • 20200612 VWA e-news_#1 Basics of cover cropping with Dr Kelvin Montagu • 20200612 VWA e-news_#2 Link between soil wealth and cover cropping • 20200619 VWA e-news_Using cover crops to get the most from mycorrhizal fungi vegetable crops • 20200626 VWA e-news_Know your salts to better manage potato and veg production • 20200704 VWA e-news_Postharvest management of broccoli • 20200710 VWA e-news_Application of precision ag in vegetables • 20200710 VWA e-news_Cover crops and strip till for pumpkin production • 20200717 VWA e-news_ Postharvest management of broccoli • 20200717 VWA e-news_Vegetable Crop Nutrition Master class • 20200717 VWA e-news_Adoption of precision systems technology in vegetable production • 20200814 VWA e-news_Technology for controlling weeds in vegetable production • 20200814 VWA e-news_Spray technology for vegetable growers: A guide to getting it right • 20200821 VWA e-news_Cover crops for weed suppression in snow pea production • 20200828 VWA e-news_Internal rot of capsicum - update on causes and management techniques

	• 20200911 VWA e-news_Effect of coal-based soil amendments on carrots grown in sandy soil • 20200911 VWA e-news_Summary of Soil Wealth and Integrated Crop Management resources • 20200911 VWA e-news_Planning for summer: Irrigation and water management • 20200911 VWA e-news_Technology for controlling weeds in vegetable production • 20200911 VWA e-news_Soil biology and Biological Products: An introduction • 20200918 VWA e-news_Soil biology and biological products; an introduction podcast • 20200918 VWA e-news_Your guide to Soil Wealth ICP resources • 20200925 VWA e-news_Soil Wealth and Integrated Crop Protection Project Survey • 20200925 VWA e-news_Irrigation management in sweet corn • 20201002 VWA e-news_Irrigation scheduling tips for summer • 20201009 VWA e-news_ Drones help in the fight against weeds, inspect pests and disease • 20201009 VWA e-news_ Advancements in biopesticides • 20201009 VWA e-news_ Wet end to 2020 – seasonal climate outlook for vegetable growing regions • 20201030 VWA e-news_Benefits of a cover crop + strip-till combination • 20201127 VWA e-news_Integrated weed management - how cover cropping can improve IWM for vegetable growers • 20201127 VWA e-news_Integrated weed management - its future in vegetable farming • 20201204 VWA e-news_How cover cropping can improve IWM for vegetable growers • 20201204 VWA e-news_Nutrition management and plant disease with Dr Len Tesoriero webinar recording • 20201218 VWA e-news_Soil borne diseases in veg crops: A practical guide to identification and control
2021	• 20210108 VWA e-news_Cover crops for Australian growers • 20210115 VWA e-news_Climate outlook for vegetable growing regions • 20210115 VWA e-news_Spray calibration poster • 20210122 VWA e-news_Integrated weed management: The future of IWM in vegetable farming • 20210212 VWA e-news_IWM webinar series recording #3: The future of IWM in veg farming • 20210212 VWA e-news_Managing insect contaminants in processed leafy veg • 20210219 VWA e-news_How can I control pests? Field ID guides for veg crops • 20210226 VWA e-news_ Ag-tech trial turns up the heat on weeds • 20210226 VWA e-news_Implementing IPM on farm: Experiences from leading growers Schreurs and Sons, Clyde VIC • 20210226 VWA e-news_Practice change at the Mt Barker demonstration site • 20210305 VWA e-news_Basics of cover cropping with Dr Kelvin Montagu (9 min listen) • 20210305 VWA e-news_Cover crops with Harvest Moon (Eps 1-4: 17 min listen) • 20210305 VWA e-news_Is your soil healthy? See these top tips for growers • 202103012 VWA e-news_Compost calculator measures value of organic amendments • 202103012 VWA e-news_The best winter cover crops for your needs • 202103019 VWA e-news_A guide to brassica biofumigant cover crops • 202103019 VWA e-news_Using cover crops to manage mycorrhizal fungi in vegetable crops • 202103026 VWA e-news_Cover crop coaching clinic in Manjimup • 20210402 VWA e-news_Cover crops coaching clinic 2021, Woodridge WA • 20210402 VWA e-news_Cover crops coaching clinic 2021, Manjimup WA • 20210402 VWA e-news_Cover crops in Australian vegetable systems • 20210402 VWA e-news_Soil organic matter, biology and mineralization • 20210409 VWA e-news_Strip till webinar recording • 20210416 VWA e-news_Cover crops coaching clinic 2021, Woodridge WA • 20210416 VWA e-news_Virtual farm walk at Koo Wee Rup, VIC • 20210416 VWA e-news_Strip-till in Tasmania; a reduced till farming system • 20210423 VWA e-news_Ed Fagan explains why his initial reservations about strip-till and cover crops were dispelled • 20210423 VWA e-news_Werribee South virtual farm walk on managing saline-sodic soils • 20210430 VWA e-news_Soil organic matter, biology and mineralization • 20210507 VWA e-news_Virtual farm walk: Koo Wee Rup, Victoria • 20210507 VWA e-news_Global scan and review of organic soil amendments

	• 20210514 VWA e-news_Be prepared: emerging pest threats for onion producers • 20210514 VWA e-news_Compost use in vegetable production: A grower's perspective • 20210514 VWA e-news_Soil organic matter, biology and mineralization • 20210521 VWA e-news_Boosting mycorrhizal fungi in vegetable crops • 20210521 VWA e-news_Developing a fertilizer program for vegetable crops with Bruce Scott and Doris Blaesing • 20210521 VWA e-news_Catch up on a virtual farm walk in Werribee South • 20210528 VWA e-news_The effect of custom made composts on the performance of a carrot crop and soil health • 20210604 VWA e-news_Soil organic matter, biology and mineralization • 20210604 VWA e-news_Using compost safely – a guide to the use of recycled organics in horticulture • 20210611 VWA e-news_Conversation with John Deere and Growave • 20210618 VWA e-news_Technology for controlling weeds in vegetable production • 20210702 VWA e-news_Soil biology in vegetable production • 20210709 VWA e-news_An introduction to soil biology and biological products • 20210709 VWA e-news_Soil biology in vegetable production masterclass • 20210716 VWA e-news_Know how to use drones safely – legal compliance • 20210716 VWA e-news_Soil biology in vegetable production masterclass • 20210723 VWA e-news_A guide to preventing leaf and stem diseases • 20210730 VWA e-news_A guide to preventing leaf and stem diseases • 20210730 VWA e-news_Using drones to generate farm insights • 20210806 VWA e-news_Using drones to generate farm insights • 20210806 VWA e-news_IWM for the Australian vegetables industry • 20210806 VWA e-news_Weed management in vegetables • 20210813 VWA e-news_Advancements in ICP for profitable veg production • 20210820 VWA e-news_Advancements in ICP for profitable veg production • 20210910 VWA e-news_Mega Pest Fact Sheets (Basics on protecting your crop, managing major chewing and biting insects, managing sucking pests) • 20210917 VWA e-news_Mega Pest Fact Sheets (Basics on protecting your crop, managing major chewing and biting insects, managing sucking pests) • 20210924 VWA e-news_Tips to control high priority pests in veg crops • 20211105 VWA e-news_Soil biology in vegetable production masterclass video series • 20211112 VWA e-news_From health to wealth: Looking after soils for profitable veg production • 20211119 VWA e-news_Soil health and water use efficiency fact sheet • 20211203 VWA e-news_Biochar: What is its potential for vegetable production? • 20211203 VWA e-news_A practical guide to identify and control soil-borne diseases
2022/23	• 20220106 VWA e-news_Saving time and money with strip-till in WA • 20220127 VWA e-news_Introducing the Carbon Series for Aussie vegetable growers • 20220203 VWA e-news_Introducing the Carbon Series for Aussie vegetable growers • 20220210 VWA e-news_Tips to protect beneficial insects in an IPM program • 20220210 VWA e-news_Managing insect pests in greenhouses • 20220217 VWA e-news_Advancements in biopesticides for profitable veg production • 20220217 VWA e-news_Guide to managing insect contaminants • 20220310 VWA e-news_Getting started with cover crops • 20220310 VWA e-news_Winter is coming: Preparing your farm with cover crops • 20220324 VWA e-news_On-farm tips to manage high nitrogen fertiliser prices and limited supply • 20220324 VWA e-news_Cover Crop Herbicide Guide and Termination Guide • 20220407 VWA e-news_Why choose reduced till and how to use it in veg production • 20220407 VWA e-news_Strip-till: A closer look at the benefits and challenges • 20220421 VWA e-news_Strip-tillage for vegetables and potatoes • 20220421 VWA e-news_Improving phosphorus uptake efficiency in potatoes • 20220505 VWA e-news_Annual Vegetable Industry Seminar (Soil Wealth ICP grower panel) • 20220519 VWA e-news_Effect of a coal-based soil amendment on carrots grown in sandy soil • 20220519 VWA e-news_Getting the best out of compost in veg production • 20220526 VWA e-news_Soil CRC shines the spotlight on soil health

	• 20220526 VWA e-news_Getting the best out of compost in veg production • 20220602 VWA e-news_Long-term benefits of using compost on plant and soil health • 20220616 VWA e-news_Calcium cyanamide fertiliser put to the test in a carrot crop • 20220616 VWA e-news_Case study: Long-term benefits of using compost on plant & soil health • 20220623 VWA e-news_Soil Wealth ICP demo site growers share innovations at AVIS • 20220623 VWA e-news_New updates to the Biological Products Database! • 20220630 VWA e-news_Area-wide management of insect-vectored diseases • 20220630 VWA e-news_New updates to the Biological Products Database! • 20220707 VWA e-news_Area wide management of insect-vectored diseases • 20220707 VWA e-news_Hort leadership opportunities abound • 20220707 VWA e-news_Emerging technology and precision agriculture • 20220707 VWA e-news_Precision agriculture technology in vegetable production systems • 20220714 VWA e-news_Variable rate application: Is it right for your farm? • 20220714 VWA e-news_Podcast: The drone is no longer a toy • 20220714 VWA e-news_Hort leadership opportunities abound • 20220721 VWA e-news_Precision agriculture in vegetable production • 20220721 VWA e-news_Hort leadership opportunities abound • 20220818 VWA e-news_How satellite imagery provides on-farm insights • 20220818 VWA e-news_Remote sensing for your vegetable farm • 20220818 VWA e-news_2022 AVIS recordings • 20220825 VWA e-news_Webinar mini-series: Area-wide management for key viruses • 20220825 VWA e-news_Top End field walk showcases soil health improvements • 20220901 VWA e-news_Alternative Farming Techniques for Vegetable Growers - What's out there • 20220901 VWA e-news_Save the date: Upcoming Soil Wealth ICP & PotatoLink Events • 20220908 VWA e-news_Manjimip field walk - Cover cropping and strip tillage • 20220908 VWA e-news_Pest management: what are the options? • 20220908 VWA e-news_Using pesticides in an IPM program to protect beneficials • 20220915 VWA e-news_Soil Wealth are visiting Gingin • 20220915 VWA e-news_Manjimip field walk - Cover cropping and strip tillage • 20220915 VWA e-news_IPM in practice: A new approach to release beneficials • 20220930 VWA e-news_vegetablesWA trip to Manjimup - Cover cropping and strip-tillage field walk • 20221006 VWA e-news_Mega Pests: Managing Foliar Diseases • 20221006 VWA e-news_A guide to preventing leaf and stem diseases • 20221013 VWA e-news_Share your thoughts on Soil Wealth ICP Phase 2 • 20221027 VWA e-news_AWM webinar mini-series #3: Lettuce viruses • 20221027 VWA e-news_Case study: Irrigation monitoring in potato crops • 20221110 VWA e-news_How do you know your soil is healthy? Top tips for vegetable growers • 20221110 VWA e-news_Navigating the complex world of soil biology • 20221117 VWA e-news_A practical guide to soil testing and interpretation • 20221117 VWA e-news_Stay in control of diamondback moth this season • 20221123 VWA e-news_Annual Vegetable Industry Seminar – Vietnamese captions • 20221201 VWA e-news_Soil Biology Masterclass video series • 20221201 VWA e-news_How to boost mycorrhizal fungi in vegetable crops • 20221208 VWA e-news_New fact sheet: Rhizoctonia solani • 20221208 VWA e-news_Trial says goodbye to weeds at NSW demo site • 20221208 VWA e-news_Hort Innovation Vegetable Fund update: Cover Cropping • 20221215 VWA e-news_Soil Wealth ICP: Where to find nutrition management resources • 20221215 VWA e-news_Navigating nutrient element functions in vegetable crops • 20221222 VWA e-news_Nutrition management and plant disease webinar recording • 20221222 VWA e-news_Nitrogen fertiliser price and supply: Management options in difficult conditions • 20230105 VWA e-news_Navigating nutrient element functions in vegetable crops • 20230105 VWA e-news_From health to wealth: Looking after your soils for profitable vegetable production • 20230216 VWA e-news_Rejig your rig

WA GROWER MAGAZINE (31 ARTICLES)	
2018	• 2018 Autumn: Can calcium cyanamide (CaCN2) fertiliser affect Pythium spp and other soilborne diseases in carrots? • 2018 Autumn: Soil Wealth and ICP projects (2014-2017) Phase 1; Handy hints and where to find useful information from the project • 2018 Autumn: Soil Borne Disease update (and Phase 2 project outline) • 2018 Winter: Leafy Variety Trial soilborne disease workshop recap • 2018 Winter: The Soil Wealth team visit WA; Update from Carnarvon, Gingin, Myalup • 2018 Summer: Shedding a practical light on challenging soil-borne diseases
2019	• 2019 Autumn: Strip-till feature – what is it and how can you benefit? • 2019 Winter: From Tasmania to the USA – tillage, erosion and weed management innovations • 2019 Spring: Getting the dirt on soil microbes and compost • 2019 Summer: How has your strip-till New Year's resolution progressed? • 2019 Summer: Guide provides new weapon for all growers in ongoing battle against soil-borne diseases
2020	• 2020 Autumn: The year of soil biology and integrated weed management • 2020 Autumn: Butternut pumpkins - beauty below the blemishes • 2020 Winter: Mixed species cover crops stand out in Tassie trial • 2020 Spring: Precision ag pays off in bumper celery crop • 2020 Spring: Soil biology and cover crops: Take a closer look beneath the surface • 2020 Summer: A look back on the year of soil biology and integrated weed management
2021	• 2021 Autumn: Young growers bring a fresh focus to veg production in WA • 2021 Autumn: New cover cropping resource for vegetable growers • 2021 Winter: NSW grower trials cover crops to eliminate single-use plastic mulch and control weeds • 2021 Winter: A trio of integrated weed management fact sheets now available • 2021 Spring: Feed your soils to feed the world: Supporting soil health in vegetable production • 2021 Spring: Check out the latest resources from the Soil Wealth ICP project • 2021 Summer: Sustainable farming practices put to the test at demonstration sites • 2021 Summer: New resources from the Soil Wealth ICP project
2022	• 2022 Autumn: Introducing the Carbon Series for Aussie vegetable growers • 2022 Autumn: New focus topics underway for Soil Wealth ICP in 2022! • 2022 Winter: Nitrogen fertiliser price and supply: A good reason to look at legume cover crops • 2022 Spring: Demonstrating innovations in vegetable production • 2022 Spring: New resources on area wide management of insect-vectored viral and bacterial diseases • 2022 Summer: Top 10 grower resources from Soil Wealth ICP Phase 2

Appendix 2 – Mid-term review summary of survey and interview findings; November 2020

Prepared by Carl Larsen

Introduction

The Soil Wealth and Integrated Crop Protection (SWICP) project provides research and development (R&D) extension services, products and communication on improved soil management and plant health to the Australian vegetable industry.

Phase 2 of the project will complete its third year in November 2020. A mid-term review will inform planning for years four and five, with the aim of continuous improvement and building a legacy. The purpose of this report is to present a summary of the key findings and recommendations from the survey (29 respondents) and from eleven interviews with demonstration site hosts, demonstration site agronomists and other collaborators (11 participants).

This report will be discussed further at the upcoming Project Reference Group meeting on 17 November 2020.

Key findings and recommendations from the survey

In summary, the Soil Wealth ICP project continues to raise awareness and knowledge of participants that engage with the project (70% of respondents). Workshops, field days or farm walks as well as webinars will continue to be important extension channels for the project, while fact sheets, the Bulletin e-newsletter and case studies are important communication platforms to disseminate information. The majority of respondents found the support and information provided through the project useful (84%).

Most respondents were undertaking, or planning to undertake, activities aimed at improving soil health and/or crop protection on their farm or in the advice they provide (87%). However, only a third (33%) is partly attributable to project intervention. A continued focus on promoting, fostering and tracking actual practice change for the remainder of the project should be a priority to ensure maximum impact against the end-of-project outcome: *"By 2022, 25% of vegetable levy paying business, have evaluated, considered and/or are adopting, trialling or intending to adopt soil and ICP practices which improve farm productivity and profitability sustainably. 25% of agronomists and advisers we have engaged with during the term of the project, include a focus on soil and ICP practices which improve farm productivity and profitability sustainably in the work with their clients."*

Topics that could be covered by the Soil Wealth ICP in the final two years of the project that would add value to respondents include:

- Integration of **cover crops** into production systems, including selection to achieve a certain objective (e.g. disease suppression, compaction) and termination (e.g. not relying on broad spectrum synthetic chemicals)
- Guidance on specific aspects of **soil** health, including soil biology, compaction and variety selection (e.g. nutrient removal rates)
- Adapting soil management and plant health practices for to suit specific **crop** types and rotations (e.g. modifying strip-tillage equipment, integration of livestock)
- Maintaining **good** soil biota and biology and how to get the balance right.

Support and information on these topics would most effectively be delivered through:

- Expanded demonstration **trials** and reporting the results back to industry (e.g. fact sheets, brief reports), including where things didn't work (i.e. failures)

- **Field days and farm walks** to get a number of growers and industry participants together to discuss the results in a practical setting (i.e. hands on)
- **Webinars** and online workshops to minimise travel and ensure the resource is available to watch later.

Key opportunities from the interviews

The interviews highlighted a number of opportunities for the Soil Wealth ICP project over the next two years.

Some of the opportunities identified that should be relatively easy (low risk, high reward) to address include:

- **Better connection across the project.** There is a feeling of disconnect across the project, with some saying they don't know much about what's happening at other demo sites. While they receive the newsletters and acknowledge the information on social media, there is a feeling of overwhelm and not being able to keep up with this form of communication. There's a preference for more targeted communication to demo hosts and agronomist. Suggestions include a quarterly briefing ("30 min phone call" to hosts and agronomists), a direct email, a monthly or 6-weekly one-pager with dot points of what's happening at each site.
- **Increased promotion of the project.** There's a general sentiment that the project has produced an abundance of valuable information, but there's a need to get it out to industry more effectively. Opportunities may include virtual field days (such as the East Gippsland event), podcasts, signage at demonstration sites with links to project information, promotion through industry publications e.g. Vegetables Australia.
- **Going virtual should be the new norm.** The virtual East Gippsland Field Day was well received and offers a template for future events even beyond COVID restrictions.
- **Keep the Master Classes running**, even if it means repeating similar content every few years. There is a sentiment that people don't tire of them and it would be valuable for new agronomists with limited experience.
- **Provide access to machinery.** There's interest at the Katherine (NT) site to trial crimp rolling following cover cropping and prior to planting, however they do not have access to a crimp roller. The counter seasons between north and south Australia may make sharing machinery a possibility.
- **Provide information and/or courses to day-to-day farmers.** Feedback indicates that the Soil Wealth project is aimed at agronomist or those with a higher level of understanding. There is a need to provide practical information to farm workers e.g. a "back to basics", practical understanding of what different interventions do to the soil. In-field demonstrations would be preferable to classroom learning.
- **Use local agronomists** to identify potential demonstration hosts, ensure trials are well set up and regularly monitored and communicate results through local networks. Using local people can also contribute to project cost savings, rather than project team members traveling from interstate.

Some of the opportunities that require some further thinking at the project team and PRG meetings include:

- **Consider paying sitting fees for advisory group members**, who currently volunteer their time. Sitting fees would be a recognition of their time and knowledge contribution and be in keeping with other industry committees.
- **Transition case study sites to demonstration sites**. For example, the case study site at Manjimup has dealt with a number of teething issues and is now well placed to establish a trial which monitors the impact of cover crops and strip tillage on yield, water use and number of cuts.

- **Multi-lingual and visual communications.** Vegetable growers in Australia come from a diversity of cultural backgrounds. There have been recommendations for communication material to be provided in Vietnamese and Cambodian languages. Videos have also been recommended due to the high proportion of Cambodian growers (in the NT) that are illiterate.
- **Connecting precision ag to soil health.** There is interest in connecting precision ag technologies to soil health. Technologies that interviewees are keen to learn more about include variable rate mapping, controlled traffic, autonomous tractors, drones, satellite imagery and infra-red.
- **More information about IPM.** There is interest from a number interviewed to learn more about IPM, specifically approaches to reduce insecticide and herbicide reliance.

There were also some location-specific opportunities that related to current demonstration sites that should be considered:

- **Consider supporting a mentor role** for the next generation of growers at Manjimup (WA). The Manjimup Young Growers Group are enthusiastic, but currently lack time, experience and clear direction. A mentor role could help broaden their network and assist with establishing and monitoring trials and communicating results.
- **Controlled traffic and permanent bed trials at Katherine.** This has been identified as an opportunity on the sandy soils at the Katherine demo site where pumpkin crops are being grown.
- **Information specific to the tropics and dry tropics.** Hosts in the Northern Territory are interested in information that is specific to the tropics (especially the monsoon season in Darwin) and the dry tropics (such as at Katherine). Specifically, they are interested in cover crops that could be incorporated into the soil or left to plant around to providing an organic mulch and an alternative to plastic mulching. Lessons from other similar climates, such as India and Pakistan, could have application here.

Potential Year 4 focus topics

There were a number of potential focus topics for the fourth year of project operation identified during the mid-term review. These are presented in the table below alongside the previous three years of focus topics for comparison.

The purpose of the focus topics is to prioritise effort on a needs-based industry issue to inform training and events, resource development and communications over a concerted 12 month time period.

Component	Soil management (SW)	Plant health (ICP)
Previous		
Years 1+2	Strip-tillage	Nutrition management
Year 3	Soil biology	Integrated Weed Management
Potential		
Year 4: Resource development gaps	Soil biology - measuring soil health	Biological crop protection
Year 4: Mid-term review interviews	Precision ag technologies and influence on soil health	Integrated Pest and Weed Management - understanding and fostering beneficials
Year 4: Mid-term review survey	Biofumigant cover crops and disease suppression	Integrated Weed Management - compatibility with organic production systems

Appendix 3 – Soil Wealth ICP Phase 2 Impact Survey; November 2022

Prepared by Carl Larsen

Introduction and purpose

The Soil Wealth ICP project provides R&D extension services, products and communication on improved soil management and plant health to the Australian vegetable industry.

Over the past five years, AHR and RMCG have delivered the extension project on behalf of Hort Innovation, and are consulting with a wide range of growers and industry members to determine its impact and value, including via an industry survey (Phase 2). The project team are also seeking input to the next phase of the project over the coming years (Phase 3).

The survey was open from 26 September to 21 October 2022 and took less than 10 minutes to complete. Participation was voluntary and all responses remained confidential. A total of 47 responses were received. The survey is being complemented by semi-structured interviews and case studies which will further explore practice change and adoption of technology.

This report outlines the key findings and recommendations from the survey.

Findings

Respondent overview

The survey achieved national coverage from a range of vegetable industry stakeholders, which predominately included growers (28%), advisors (17%) and agribusiness service providers (15%). Over half (59%) of the respondents were from either Victoria (21%), New South Wales (19%) or Tasmania (19%), with the remaining 41% from all other states and territories (Figure 1).

The grower respondents grew a wide variety of crops including cucurbits, lettuce, spinach, broccoli, pumpkins, beetroot and potatoes. These crops covered a total area of 5,069 hectares which represents 4% of the national vegetable growing area.

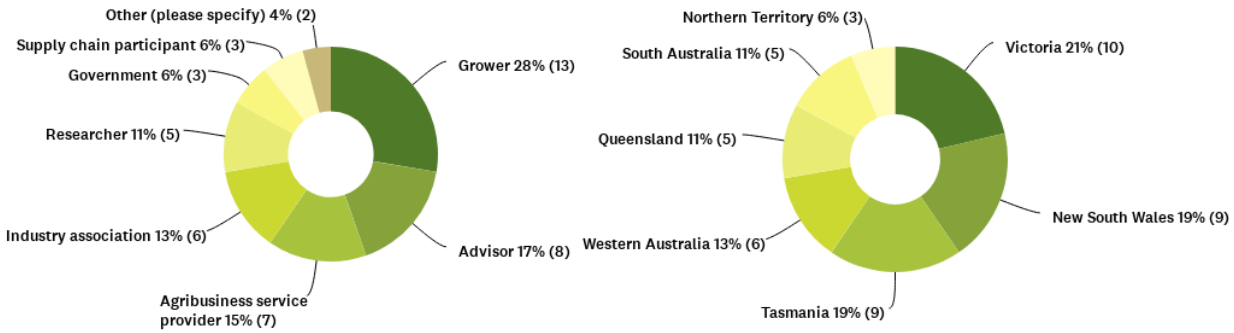


Figure 1: Survey respondent type (left) and location (right) (n = 47)

Awareness and knowledge

Engagement and communication are critical to expanding the reach of research and development (R&D) information and resources by the Soil Wealth ICP project team. The intermediate outcomes of the project are focused on increasing soil and plant health knowledge of vegetable growers (75% of participants) and advisors (50% of participants) to support improved farm productivity.

Soil Wealth ICP has engaged with growers and industry stakeholders in a variety of ways over the past five years. Respondents had predominately participated in a live webinar (48%), attended a

workshop or seminar (45%), or attended a field day or farm walk (38%). One fifth (19%) of respondents had attended the annual Master Class that covered topics such as nutrition, soil biology and soil-borne diseases. The high proportion of webinar and online Master Class participation is likely driven by the COVID-19 pandemic that prevented in person events in most locations between 2020 to 2021. Interestingly, 21% of respondents had not been engaged through any of the events or training provided by the project (Figure 2).

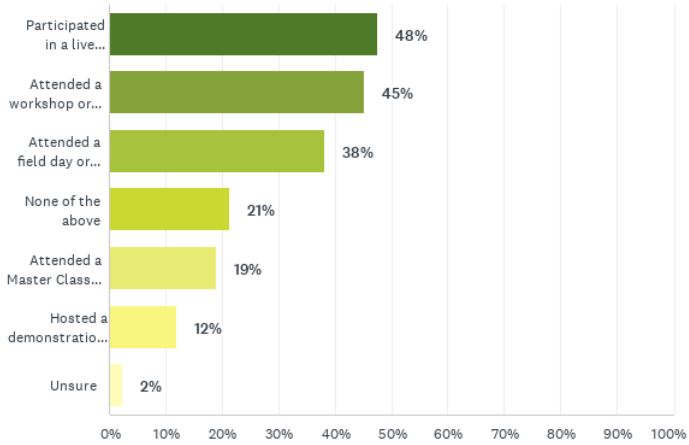


Figure 2: Engagement in Soil Wealth ICP over the past five years (n = 42)

The project develops a range of R&D resources and has multiple communication channels to ensure growers and industry stakeholders can access the right information, at the right time in the right place. Fact sheets continue to be the most popular project resource (72%), followed by webinar recordings (60%), e-newsletter (49%), case studies (47%), and industry articles or publications, such as the AUSVEG Weekly Update or Vegetables Australia magazine (42%). All the project resources can be accessed through the central project website[2]. Emerging audio-visual products such as videos (30%) and podcasts (16%) continue to play an important role in providing R&D information through alternative means. Respondents accessed social media channels, such as Twitter (9%) and Facebook demonstration site pages (12%), the least (Figure 3).

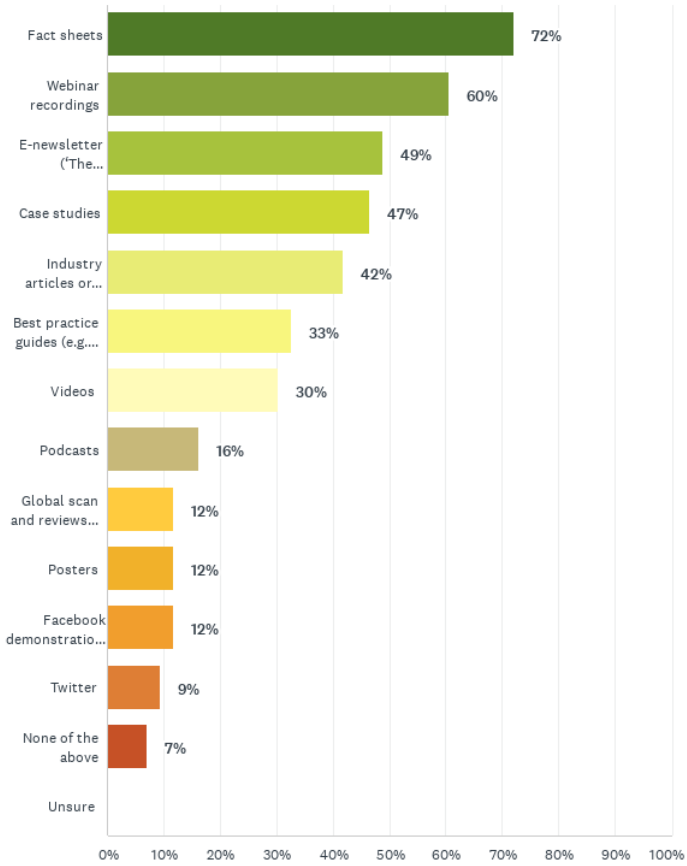


Figure 3: Resource access and communication channels (n = 43)

[2] See: www.soilwealth.com.au

The majority (74%) of respondent's knowledge of soil management and crop protection had increased over the past five years, either partly (60%) or mainly (14%) because of the Soil Wealth ICP project. This is consistent (62% partly, 8% mainly) with the mid-term review findings in October 2020. Almost one quarter (24%) of respondents had improved their knowledge, however this was not attributable to their involvement in the project, which has increased from 8% in 2020. Positively, the proportion of respondents whose knowledge has not changed much has declined from 23% in 2020 to 2% in 2022, which may indicate the expanded reach of the project or increased participation in the project over the past two years (Figure 4).

> *"Very good topics presented well by professional people."* – Agribusiness service provider, Western Australia

> *"You can always pick up information you thought you knew when you hear it in a different way."* – Grower, Queensland

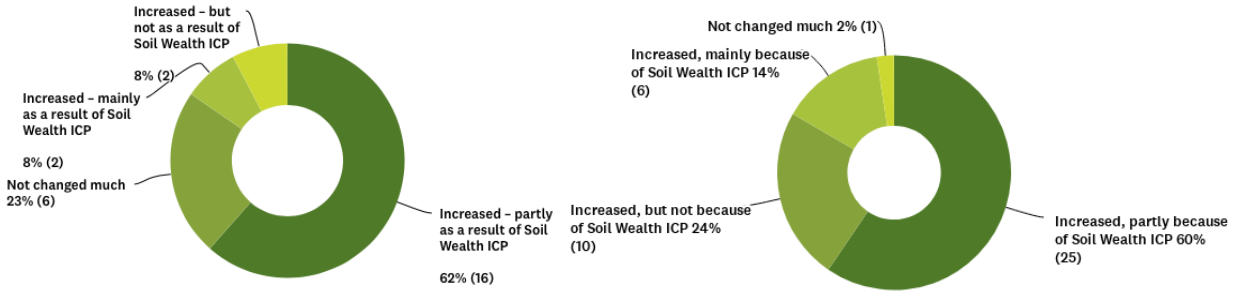


Figure 4: Change in knowledge of soil management and crop protection from 2020 (left, n = 26) to 2022 (right, n = 43)

Practice change or intent to change

With sufficient reach through engagement and communication, the Soil Wealth ICP project end-of-project outcome is to increase the rate of adoption of soil management and crop protection practices with vegetable growers and advisors (25% of participants). This includes growers having either evaluated, considered and/or adopting, trialling or intending to adopt practices and technology that improve profitability and sustainability, or advisors focussing on this in working with clients.

The Soil Wealth ICP has made significant progress in practice change or intent to change over the past five years. In 2017, the majority (83%) of respondents were undertaking, or planning to undertake, activities aimed at improving soil health and/or crop protection on their farm or in the advice they provide, which was partly (34%) or definitely (10%) because of the project intervention. In 2022, the majority (83%) of respondents had or were intending to change practice, but this change was more attributable to Soil Wealth ICP – with 49% partly or 2% definitely because of the project. This represents an increase in adoption of 7% due to Soil Wealth ICP (Figure 5).

> *"Already interested in soil health, resources are succinct and useful to support decision making."* – Industry association, Western Australia

> *"We do this anyway, but try to co-operate with Soil Wealth any chance we get."* – Agribusiness service provider, New South Wales

The main activities of those respondents that had or planned to change practice included:

- **Cover cropping:** including winter and summer cover crops, single and multi-species cover crops, and considering rotation with cash crops (n = 13)
- **Improved soil testing and management:** soil testing more regularly and at different depths and using results to inform decisions, soil moisture monitoring, use of soil amendments, considering chemistry and biology ratios, adding biology to soil to improve nutrient mineralization, and strip tillage (n = 8)
- **Compost:** investigation of different types of compost, making compost (e.g. static pile, teas), incorporating compost into nutrition budgets (n = 6)
- **Trials:** undertaking own trials on farm or with growers to test the validity and return on investment of making changes to practices on farm (n = 4)
- **Reduced input use:** including insecticides and fertiliser (n = 3).

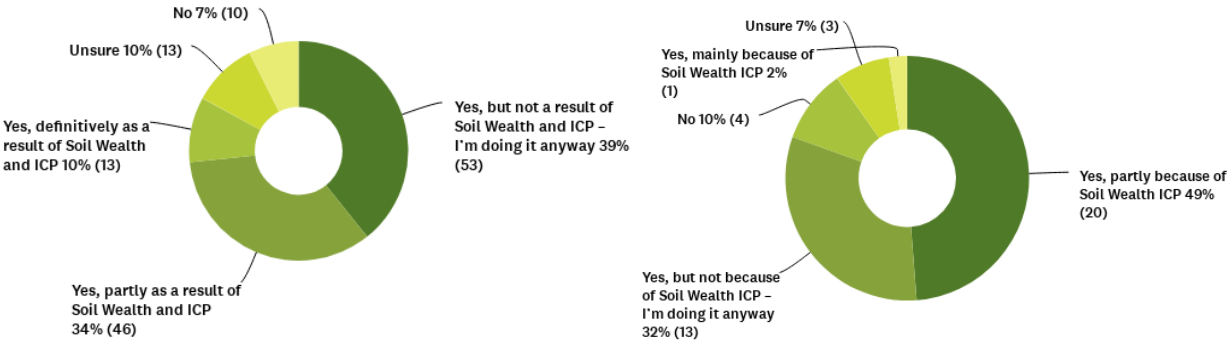


Figure 5: Practice change or intent to change because of the Soil Wealth ICP project from 2017 (left, n = 135) to 2022 (right, n = 41)

It is important to understand the longevity of the changes made on farm to maximise the investment in Soil Wealth ICP. Almost two thirds (62%) of respondents identified that it was very likely they would undertake these activities in the future over the next 2-3 years, with an additional 23% identifying it was quite likely. The minority (3%) of respondents were not likely or were unsure (13%). These results are comparable with 2017, with 69% very likely and 20% quite likely to undertake and sustain practice change in the short-term (Figure 6).

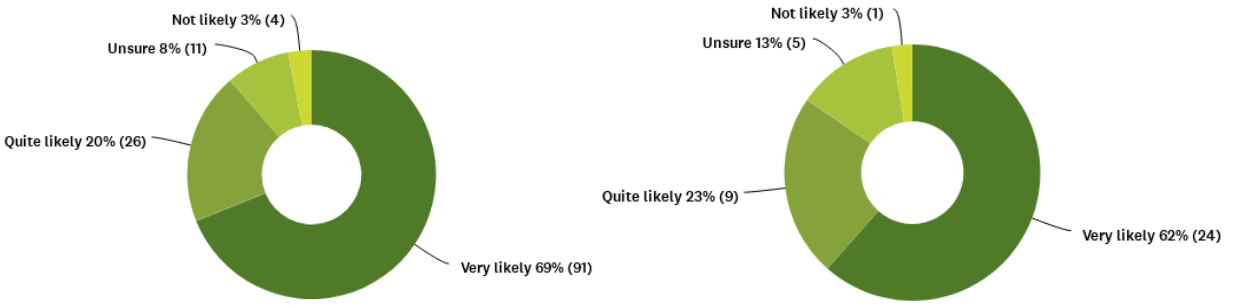


Figure 6: Likelihood change will be undertaken in the future in 2017 (left, n = 132) and 2022 (right, n = 39)

Effectiveness of the project

The effectiveness of Soil Wealth ICP can be analysed by looking at the usefulness, currency and benefits of the support and information provided through the project. The project places a high degree of importance on providing scientifically sound and timely services and communication relating to soil management and crop protection.

The majority (87%) of respondents found the support and information provided through Soil Wealth ICP quite useful (62%) or very useful (26%). This represents an overall increase of 7% from 2017 that found the support and information either quite useful (50%) or very useful (30%). The minority of respondents did not find the support and information useful with 5% in 2022 and 2% in 2017 (Figure 7).

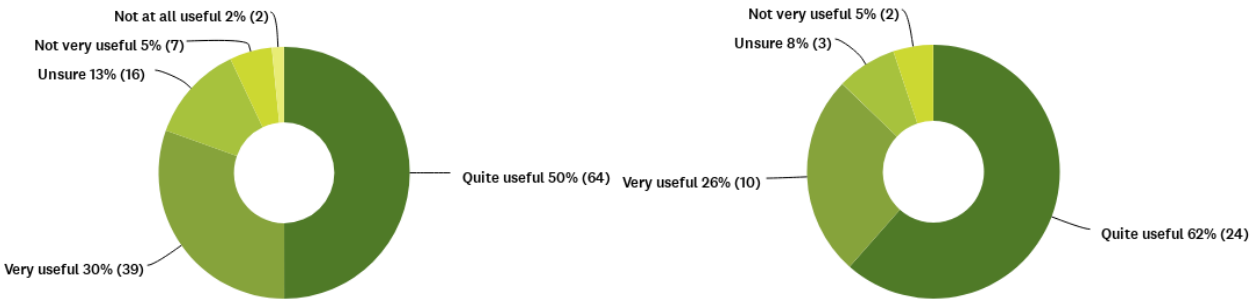


Figure 7: Usefulness of project support and information in 2017 (left, n = 128) and 2022 (right, n = 39)

Almost half (44%) of respondents felt well informed about the latest advancements in soil management and crop protection in the vegetable industry due to Soil Wealth ICP, with a further 44% feeling somewhat informed (Figure 8). This was due to the project providing multiple channels to access evidence-based information with practical, commercial examples (n = 5). A small proportion felt they had not been kept informed (8%) or were unsure (5%). The results in 2022 were similar to 2017.

> *"Soil Wealth ICP consistently provides relevant information backed up by relevant practical case studies in Australian commercial practice."* – Grower / Agribusiness service provider, Tasmania

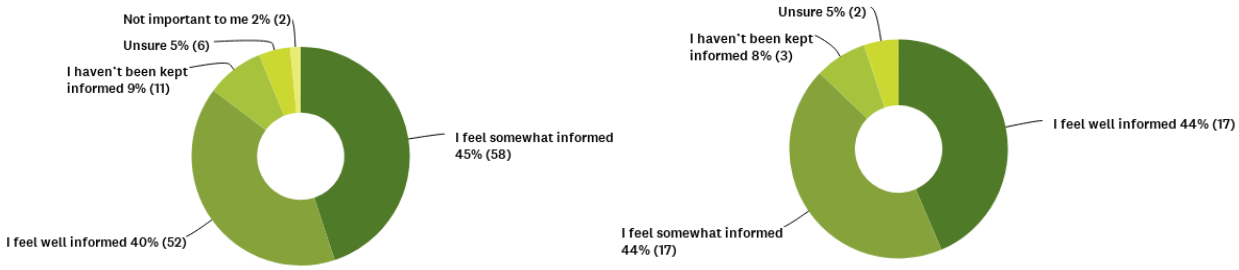


Figure 8: Extent of keeping industry informed about the latest advancements in 2017 (left, n = 129) and 2022 (right, n = 39)

Respondents identified a number of productivity, profitability or sustainability benefits from being involved in Soil Wealth ICP. This included:

- **Improved knowledge and confidence** through information provision, understanding implications for specific crop types, improving decision making and advice (n = 14)
- **Healthier soils** with improved moisture retention and plant nutrient availability (n = 7)
  "Creating healthier soils led to more resilient and healthier crops, better moisture retention, better nutrient availability and retention, less compaction, [with] reduced [machinery] horsepower requirement." – Grower, Queensland
- **Improved crop health and resilience and reduced losses** through less insect and disease pressure (n = 5)
  "Identified unsustainable practices and received support and advice regarding strategies for mitigating crop losses." – Grower / Agribusiness service provider, Tasmania
- **Reduced input use and costs**, including insecticides, fertiliser and diesel (n = 5)
  "Cover cropping has reduced reliance on fumigants and pesticides." – Industry association, Western Australia

While relatively minor compared to the benefits, the following issues or problems were identified by respondents (n = 19):

- Uncertainty and potential further support for trialing new practices or technology, for example selection of different cover crop species, calculating seed and pesticide rates, managing secondary pest and weed issues (slugs, snails)
- The need for consistent and proactive monitoring and this fitting with the whole farm operation, for example both insect monitoring for IPM and regular soil testing for nutrition management
- Investigating, quantifying and planning for different costs in changing practices or technology for different crop types and/or soils, for example direct drilling and strip tillage
- Continuing to be open to collaboration with a variety of stakeholders across the value chain, including multi-national chemical companies.

Looking to the future

Soil Wealth ICP can continually improve R&D extension services, products and communication by addressing the priority needs of growers and industry and delivering fit-for-purpose events and material.

Respondents were asked to identify their top three priority topics from the themes and topics developed at the Phase 3 co-design workshop with Hort Innovation and key industry stakeholders in August 2022. The top three priorities for future project delivery were (Figure 9):

- Soil health: Cover crops, rotations and minimum till (59%)
- Soil health: Biology and microbiome (54%)
- Crop health: Integrated pest and disease management (54%).

This was followed by composting and soil structure (soil health, 46%) and nutrient use efficiency (input use, 43%), highlighting the current challenges in the horticulture sector of increased input costs.

The bottom three ranked topics that should be lower priority for Phase 3 include:

- Soil health: Consumer education (11%)
- Input use: Fuel (11%)
- Climate and carbon: Reducing carbon emissions (mitigation, 11%).

This was followed by waste (input use, 16%) and understanding policy, markets and methods of management (climate and carbon, 19%) (Figure 9).

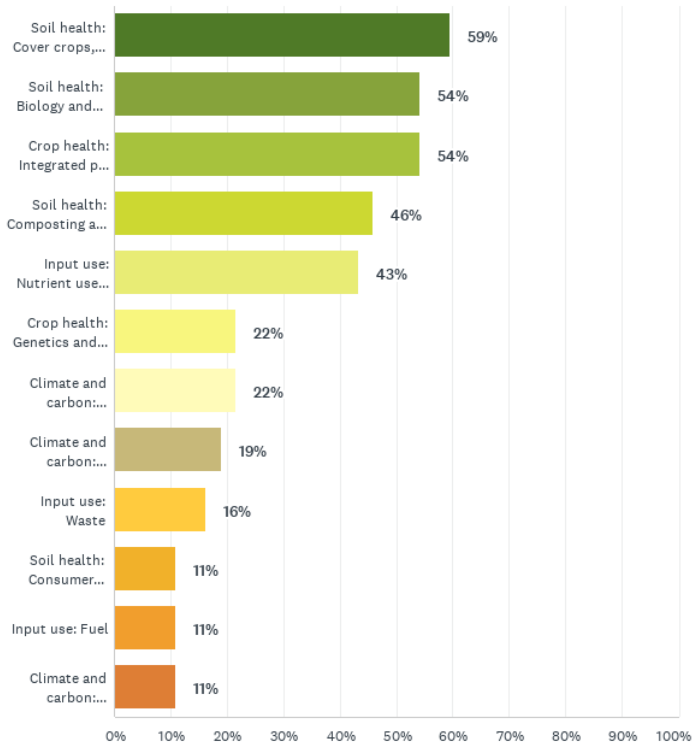


Figure 9: Priority topics that should be covered by Soil Wealth ICP in Phase 3 (2022-2027)

Respondents identified various types of events and materials that would be most useful to them and their business to guide the next phase of the project. This included:

- **Field days:** catered to growers, linked to demonstration sites, with the ability to visit different regions and learn how similar problems and opportunities have been addressed (n = 6)

"Field trips to visit different areas to see how they have dealt with similar problems." – Grower, Queensland

- Focus on farm and production system **management resources**: that are succinct, easy to access (both online and hard copy) and provide practical guidance. Respondents suggested these could cover topics such as carbon mitigation, salt management, nutrient cycling, nutrient and water use efficiency, and plant nutrition and how this relates to disease and insect pressure (n = 6)
- **Webinars:** offering both the flexibility to attend live and watch the recording (n = 5)
  "Webinars- recorded for watching at a convenient time." – Advisor, New South Wales
- **Workshops:** that provide access to new information, emerging issues and tailored to local growers and production systems (n = 3)
  "More emerging theory and data and less time spent on workshops on basic things such as water management which people already have easy access to information online and with tools." – Grower, Victoria
- **Research:** both providing access to on-farm demonstration site and applied research results, as well as ensuring material is evidenced based (n = 3).

Additional comments from respondents were largely positive and related to the current delivery of the project, expertise of the project team, or provided further guidance on specific topics for Phase 3, particularly climate change (n = 10).

"Project has been very well communicated and chosen highly relevant topics, excellent use of a levy funded project." – Industry association, Western Australia

"I think now is an opportunity for the Soil Wealth team to influence and shine the pathway ahead when explaining to farmers what climate change and a low emissions economy will mean. Regardless of how supportive farmers are about whether climate change is a concern or not. You have access to data and an ability to interoperate as well as a communication pathway which is rare and of high value." – Grower, Victoria

Conclusions and recommendations

Soil Wealth ICP has achieved the intermediate outcomes of increasing soil and plant health knowledge of vegetable growers (75% of participants) and advisors (50% of participants) to support improved farm productivity. The majority (74%) of respondent's knowledge of soil management and crop protection had increased over the past five years, either partly (60%) or mainly (14%) because of the project. This has predominantly been due to being engaged in a live webinar (48%), attended a workshop or seminar (45%), or attended a field day or farm walk (38%), or accessing a fact sheet (72%), webinar recording (60%), e-newsletter (49%), case studies (47%), and industry articles or publications (42%).

The project has made significant progress towards the end-of-project outcome to increase the rate of adoption of soil management and crop protection practices with vegetable growers and advisors (25% of participants). The majority (83%) of respondents had or were intending to change practice, with 49% partly or 2% definitely attributable to the project. The main activities included cover cropping, improved soil testing and management, compost, trials and reduced input use. Almost two thirds (62%) of respondents identified that it was very likely they would undertake these activities in the future over the next 2-3 years, with an additional 23% identifying it was quite likely.

The majority (87%) of respondents found the support and information provided through Soil Wealth ICP quite useful (62%) or very useful (26%). Almost half (44%) of respondents felt well informed about the latest advancements in soil management and crop protection in the vegetable industry due to Soil Wealth ICP, with a further 44% feeling somewhat informed.

The main productivity, profitability or sustainability benefits identified from being involved in Soil Wealth ICP included improved knowledge and confidence, healthier soils, improved crop health and resilience and reduced losses, and reduced input use and costs.

Soil Wealth ICP can continually improve R&D extension services, products and communication by addressing the priority needs of growers and industry and delivering fit-for-purpose events and material. The top three priority topics to guide Phase 3 project delivery were:

- Soil health: Cover crops, rotations and minimum till (59%)
- Soil health: Biology and microbiome (54%)
- Crop health: Integrated pest and disease management (54%).

This was followed by composting and soil structure (soil health, 46%) and nutrient use efficiency (input use, 43%), highlighting the current challenges in the horticulture sector of increased input costs.

Engagement and delivery of this information to growers and industry should focus on field days, farm and production system management resources, webinars, workshops, and providing access to on-farm demonstration site and applied research results, as well as ensuring material is evidenced based.

Appendix 4 – Soil Wealth ICP – Phase 2 Interviews; November 2022

Prepared by Kristen Stirling November 2022

Appendix 4.1 – Interview Summary

Introduction

Purpose

The purpose of this report is to provide the key findings from interviews with producers and service providers regarding the delivery year of the Soil Wealth and Integrated Crop Protection (Soil Wealth ICP) Project Phase 2. The interviews supplement a survey that was conducted across all producers and network partners that have been engaged with the program, providing further exploration of identified key themes.

The report also provides recommendations to support potential improvements in the delivery of the third phase of the Soil Wealth ICP program.

Background

The Soil Wealth ICP project provides R&D extension services, products and communication on improved soil management and plant health to the Australian vegetable industry.

Over the past 5-years AHR and RMCG have delivered the extension project on behalf of Hort Innovation. To ensure the project continues to deliver impact and value, RMCG and AHR are now consulting with a wide range of growers and industry members to assess project performance.

Approach

A total of 20 interviews were undertaken nationally. This included approximately 3 producers and 2 service providers from each state. Contact details for the interviewees were sourced from the Soil Wealth ICP database and a lead AHR/RMCG interviewer assigned to each.

Stakeholders chosen for interviews had varying levels of engagement with the Soil Wealth ICP project, with the timing of their involvement occurring at any point during the eight years of the program. This meant it was sometimes difficult for interviewees to recall details of their involvement in the program. It was decided to seek feedback from stakeholders who had not been heavily involved in the program, as they would be able to offer different viewpoints, and also provided the opportunity to highlight which resources and activities had long lasting impact on industry and growers.

Key findings

The following insights are based on the informant interviews and are presented below in line with the main interview themes and the Program Logic developed for the Soil Wealth ICP project which identifies the following outcomes for the project:

- Intermediate outcome: 75% of vegetable growers who participated in the project have increased soil and ICP knowledge to support improved farm productivity and sustainability.

- Intermediate outcome: 50% of vegetable advisers who participated in the project, have increased soil and ICP knowledge to support improved farm productivity.
- End-of-project outcome: By 2022, 25% of vegetable levy paying business, have evaluated, considered and/or are adopting, trialling, or intending to adopt soil and ICP practices which improve farm productivity and profitability sustainably. 25% of agronomists and advisers we have engaged with during the term of the project, include a focus on soil and ICP practices which improve farm productivity and profitability sustainably in the work with their clients.

General observations

The activities and communication delivered by the project regionally were informed by the characteristics and needs of each region including the number of growers, their demographics, types of crops produced, size of farms and existing networks within that region.

Most people interviewed noted that the outstanding feature of the program was the on-the-ground support and expert advice given by the project team, which was key to the project's success. Producers with less awareness of the project still noted the general benefit of the project team for their region and industry.

Effectiveness of the project

Strengths of Soil Wealth ICP

Overwhelmingly the main strength of Soil Wealth ICP activities and communication across all regions was the opportunity to have face to face and on the ground interactions. During restrictions imposed by COVID which limited or prevented in person activities producers noted the benefit of virtual interaction and engagement. Producers appreciated the programs' ability to adapt and still provide quality resources and outreach. Other strengths included:

- Workshops and field days conducted on trial sites and farms
- Accessibility and diversity of resources available (factsheets, webinars, podcasts)
- Collaboration pursued by the program to ensure all levels of stakeholders (producers to government) were aligned and shared a mutual goal
- The breadth and practical application of material covered
- Access to industry professionals and experts.

Producers valued knowing they could 'reach out' to the project team for access to relevant R&D information when they needed it, even if they had had minimal contact with the program to date. They found using the Soil Wealth ICP website easy and accessible when looking for specific information. Interviewees also noted the value of having accessible project team members who understood local issues and were respected in the industry.

Awareness and knowledge

Interviewees were asked what extension was most valuable to them, and why. This helped inform where the project was performing well and what producers and service providers found most useful. The most common responses were:

- The farm field days and trial sites
- Fact sheets (on topics such as cover cropping)
- Online engagement through webinars, newsletter, emails
- On the ground information and support provided by project team members.

The facts and resources delivered by the project helped to inform and support decisions made by producers. They provided producers with more confidence in improving their soil health and crop protection practices, and enabled the sharing of robust, clear, and concise information between producer networks.

"I've been working on carbon and soil biology for many years – Soil Wealth ICP confirmed I was on the right track"

The field days and trial sites were the standout deliverable by the project in the eyes of producers. The opportunity to meet like-minded growers, pursue new technology and ideas, and see practical examples that they could take home was considered key to engaging producers in the program.

"Manjimup workshop / farm walk was excellent as it was hands-on, machinery to view and experts to question. Cover cropping fact sheets are great as decision-making tools"

Practice change or intent to change

Main topics

Due to the range of activities and resources delivered over the last eight years the areas of practice change were broad and often aligned with the challenges facing those specific regions. The resources used by producers to support changes in soil and plant health management were on the use of:

- Strip tillage and direct drilling
- Biofumigants
- Cover cropping
- Soil microbes
- Manure, compost, and fertiliser
- Alternative chemistry.

Producers interviewed felt particularly encouraged to change practices around soil biology and health through cover cropping, biofumigation, tillage practices, and composting approaches. This uptake was associated with the obvious improvement seen in the visual health of crops and yield. Crop resilience to major weather events was also noted as a benefit to implementing these practices.

"I've seen 5-6 growers interested in cover cropping, soil microbes and biofumigation after being introduced to them through Soil Wealth ICP"

Benefits of implementing activities

As mentioned, some producers interviewed noted the benefit they had seen after altering their management practices to focus on soil biology. Another producer noted a decreased reliance on fertiliser since incorporating compost into their system.

"It (granular compost) has improved soil structure… plants are not getting stressed. The flood should have wiped out our crops, but they bounced back. Yearly crops are getting better, the only thing that has changed is the initial input and soil preparation."

Participants in the program noted a number of positive changes they had seen in their business and organisations after being involved in Soil Wealth ICP. These included:

Less erosion
Increased soil health
Increased soil microbe activity
More durable crops
Higher and more consistent yields
More effective pest management
Increased networking and industry connections.

"I've noticed that growers are more mindful of soil now, considering the longevity of it, noticing chemicals not working so trying IPM – generally disease breaks and soil are the top benefits."

Some producers felt that they had a greater awareness of the whole farming system as a result of being involved in the program.

"I've taken more notice of paddock history, lowering the risk of problems arising and increasing my knowledge on management practices. Haven't had a major issue since, half due to biofumigants, half due to increased knowledge and risk management"

Continued support from SW/ICP

Most participants interviewed expressed the need for materials targeted towards the challenges facing their region. Some interviewees also expressed a desire for the program to deliver workshops and materials for regions that they felt had been less of a focus.

"More involvement in the west! Need content aligning with focus areas in specific districts. My three focuses in WA as the VegNET RDO are biosecurity, input use efficiency and business development so I would be happy to see more along these lines."

Interviewees shared their ideas on the types of materials they found most beneficial and proposed ways to make them more efficient in reaching and connecting with growers and others in the industry.

"Personally, I like the webinars with experts or those with experience in a subject – I learn a lot and then pass on to growers when I can. For growers, trial sites, mentoring, regular contact with experts, opportunities to discuss with other growers to see what is happening."

"It would be good to have programs where growers are more inclined to learn - more practical training. Encourage getting together with other growers to share what works and what doesn't work."

Other areas for continued support highlighted by interviewees included:

Focusing on best practices and practical training

Increased input from researchers and experts
How to improve the effectiveness and efficiency of inputs
Testing and management of soil microbes
IPM of soil pathogens, nematodes and diseases
Tackling local problems.

"Continue to include workshops and projects that encourage good industry practice and provide support around practical management. Incorporate changes in conditions, soils, and other internal factors to adapt delivery of projects for different areas."

Looking to the future

Interviewees were asked how the project could be improved if it were to be continued with respondents highlighting several key areas for improvement. These included:

- Shifting the focus back to face-to-face meetings and direct grower/industry contact
- More on implementing and managing compost
- More engagement with more isolated regions such as Western Australia
- Focusing on implementation of knowledge and encouraging best practice
- Addressing issues associated with climate change and extreme weather events
- Developing more in-field resources (handbooks, identification tools).

"It needs to keep evolving - can't keep regurgitating the same information."

Several interviewees highlighted the need to pursue on the ground interactions with producers, with some feeling the success of the project is driven by the face-to-face interactions and local support provided by team members. It was also suggested that this should be used to focus on building the capacity of agronomists and advisors to increase the reach of the project.

When asked how the project could best reach producers not currently engaged, the interviewees provided a mixed response. In some areas, such as Tasmania, there seems to be a greater understanding and awareness of the project and its interactions with industry. There are other areas however that feel like more needs to be done to increase participation. The majority of the responses suggested the best way to do this was by the project team:

- Increasing their presence and activity on the ground in more remote areas
- Educating agronomists and utilising advisors to signpost producers towards the project
- Engaging with the more forward-thinking producers and utilise the networks they have within the industry
- Increasing utilisation of trial sites and field days to enable producers to meet others and see practical examples of the work done by the project.

"This is the eternal challenge for all service providers! Utilise the RDOs, IDOs and Comms teams of the various industries to get the word out. Giving contact details at the end of webinars and written resources, articles, etc, for people to be able to have more contact with experts or anyone who is prepared to share their knowledge – could make growers feel more engaged."

Conclusion and recommendations

Most interviewees confirmed the value the Soil Wealth ICP project provides both to their region and nationally. Even producers with limited contact with the program recall being left with resources they still use to his day. Face to face and on the ground engagement with producers by the project team was viewed as a key factor in the program's success by many interviewees.

"Local forums are important, but sometimes the only way sometimes is one-on-one farm visits. Depending on the region, many larger growers do not co-operate in field days/walks. You need to have good awareness of the local agronomist relationship and engage all stakeholders."

Consistent themes were raised during the interviews around ways the program can maintain or improve the delivery of resources. Based on these, the following recommendations are provided to ensure the continued relevance and effectiveness of the Soil Wealth ICP project. These include:

- Maintaining or increasing face to face interactions (such as events, workshops, producer visits)
- Ensuring information is timely, accessible, and relevant for producers
- Continuing to develop networks of professionals and experts to provide timely advice to producers
- Continuing to seek producer input on what projects, case studies, and trial sites are delivered
- Considering the role of agronomist, advisors and other services providers in supporting producer connections, particularly to larger growers.
- Promoting collaboration with other programs such as VegNet and Potatolink
- Developing new styles of resources (practical resources such as field handbooks or workplace posters).

Depending on regional priorities, the following topics could be considered for future communication and events:

- Benefits of cover cropping
- Biosecurity
- Microbial interactions
- Input cost management and efficiency
- On farm implementation of resources
- Pest and disease prediction and identification
- Managing the impacts of climate change.

The above topics are in addition to the key areas of soil health and crop health management that producers continue to value from the Soil Wealth ICP project.

The key factor to ensuring activities and information are relevant and adopted by producers, as highlighted by multiple participants, is *"on-the-ground work and direct contact with influential producers in the area".*

Appendix 4.2 Interview questions

About you

1. Contact details and role:

Name
Business
Role (grower or service provider)
Phone
Email
State
Survey completed (yes/no)
Interviewer
Date

Effectiveness of the project

2. In your view, what are the top 1-2 achievements of the Soil Wealth ICP project over the past couple of years?

Awareness and knowledge

3. What project events, material and/or communication were (or would be) most valuable to you? Why?

Practice change or intent to change

4. What have you changed or plan to change in your business because of being involved in Soil Wealth ICP?

5. What have been the top 1-2 benefits of making this change to your farm or in the advice you provide?

Prompt: explore productivity, profitability or sustainability

6. How could Soil Wealth ICP continue to support you and provide information to assist with the current change, or other changes you are thinking about?

Looking to the future

7. What are the top 1-2 improvements or changes that could be made to the project for the next phase of delivery? e.g. focus topics, types of events or materials, specific industry challenges

8. In your view, how could we reach out to growers that do not already know about Soil Wealth ICP?

Appendix 5 – Soil Wealth ICP Phase 3 Development Workshop Summary

Appendix 5.1 – Workshop Summary

Workshop 10-11th August 2022

Workshop Overview

A group of 22 vegetable industry representatives (growers, SWICP project team, Hort Innovation & others) met for an in-person co-design workshop, facilitated by Hort Innovation. The purpose of the event was to collaboratively design the next phase (2022-2027) of the levy funded Soil Wealth and Integrated Crop Protection vegetable extension project (VG16078).

The workshop used an innovative co-design process to identify what the new project should include, and a *Theory of Change* approach to help shape implementation. This approach involves first identifying the outcomes the project would aim to achieve, and then works backwards to determine what should be done to achieve those outcomes. The project design also identifies what would encourage growers to adopt new practices and potential barriers that may hinder adoption.

Four project themes were identified by vegetable industry stakeholders and the project team. These themes were discussed at the workshop and all were strongly supported. The themes are: **Soil Health, Crop Health, Input Use, Climate & Carbon.** Topics were then identified under each theme and prioritised. The top two to four ranked topics in each theme were examined further to identify sub-topics, enablers, barriers and what success would look like.

Prioritisation of themes and topics

Themes were discussed at the workshop and there was strong support for all four themes. The themes were prioritised by growers only. Each grower was asked to allocate $100 between the 4 themes according to where the emphasis should go. Results: Soil Health (35%), Crop Health (23%), Climate & Carbon (23%) Input Use (19%).

Topics were prioritised by growers placing blue sticky dots against the topics, with the number of dots used to rank the importance of the topics. Two to four of the highest ranked topics were chosen per theme for further analysis. Project and Hort Innovation staff also placed dots against topics, but they used different colour dots, which were not included in the prioritisation. The themes, topics, prioritisation, barriers and enablers are outlined in Tables 2 & 3 below.

What's new in SWICP phase 3?

Phase 1 and 2 of the Soil Wealth and Integrated Crop Protection project had *Soil Health* and *Integrated Crop Protection*, as the two key themes of focus. With the rising cost of inputs placing significant strain on grower margins, natural disasters impacting key vegetable growing regions, and increasing pressure to improve environmental performance, the proposed design includes two new themes: *Input Use* and *Climate & Carbon*. We think this is consistent with project evolving to address emerging issues to meet growers needs and support industry to remain proactive.

The workshop came up with some interesting topics not addressed in the previous project. These included: consumer education, crop varieties, waste management (organics & plastics), fuel, understanding government and market initiatives and policies in relation to climate change. This supports the inclusion of input use and climate and carbon as themes, and the role the project can play in translating potentially complex issues into clear information that can be used.

There was a strong message from growers to focus on the main issues, set with achievable targets, as opposed to trying to achieve too much – in other words, focus on the *low hanging fruit*.

The successful tools including demonstration sites, grower champions, clear and concise information, and targeting agronomists as well as growers will continue in the new project.

Why is carbon and climate included as a theme?

There was a discussion specifically about the inclusion of climate and carbon as a theme. A comment was made that if the project addresses the other three themes effectively, climate and carbon issues will also be addressed, so shouldn't be needed as a separate theme. The group thought this may be true for adaptation to weather events, but issues like understanding climate policy, emissions reporting methods and how to reduce emissions while maintaining productivity would benefit from having climate and carbon as a separate theme. Interestingly, the growers at the workshop thought that 23% of the project effort should be directed to this theme.

The focus of the climate and carbon theme would be information and awareness. It was recognised however, there are marketing opportunities for growers who can produce crops with low emissions. Consumers are also likely to demand low emissions produce in the future as Australia has committed to a 43% reduction in emission by 2030, and agriculture will be expected to contribute.

Outcomes

During the workshop, participants were asked to brainstorm a grower value proposition for each theme and prioritised topic. There are commonalities across themes and topics. Refer to Table 1 below for the allocation of outcomes across themes.

Table 1. Outcomes

Outcome	Soil Health	Crop Health	Input Use	Climate & Carbon
Improved yield & quality	✓	✓	✓	
Environmental benefits	✓	✓	✓	
Reduced inputs	✓	✓	✓	
Improved customer acceptance	✓	✓		
Improved grower returns	✓	✓		
Value adding			✓	
Industry reputation			✓	
Clarity on government policies				✓
Agreed emissions targets				✓
Industry-led change				✓

Table 2. Workshop Summary of Themes, Topics & Subtopics

Soil Health (35% of project focus)

Topics and sub-topics in order of priority:

1. **Cover crops, rotations, and minimum till**
   - Equipment & machinery
   - Cropping systems & management
   - Soil biology
   - Cover crop species & varieties
2. **Consumer education**
   - Sustainable production systems
   - Food safety
3. **Biology & microbiome**
   - Pre-biotic- cover crops, compost
   - Pro-biotic- inoculants
   - Post-biotic- secondary metabolites
   - Pest & disease management
   - Testing & interpretation of results
   - Impact of inputs on biology
4. **Composting & soil structure**
   - Food safety & Quality Assurance
   - Making compost- equipment, inputs, costs
   - Using compost- different types, benefits & how to measure, local availability

Input Use (19% of project focus)

Topics and sub-topics in order of priority:

1. **Nutrient use efficiency**
   - Optimal nutrition - quality and yield
   - Cash crops & cover crops- recovering nutrients, their needs & inputs
   - Soil biology- nutrient availability, N mineralisation
   - Precision agriculture & variable rate application
   - Influence of weather- wet vs dry
   - Monitoring – soil and plant
   - Nutrient synergies, trace elements
2. **Waste**
   - Recycling on-farm plastics
   - Alternatives to plastic mulch
   - Value-add organic waste
   - Retailer quality standards
3. **Fuel**
   - Reduced tillage, controlled traffic
   - Emerging technology & machinery
   - Alternative energy sources
   - Impact of government policy

Crop Health (23% of project focus)

Topics and sub-topics in order of priority:

1. **Integrated Pest & Disease Management**
   - Thresholds
   - Identification- pests, beneficials, weeds, diseases, early stages
   - Resources
2. **Genetics & new varieties**
   - Variety assessments or information
   - Varietal characteristics
   - Pest and disease resistance information sources

Climate & Carbon (23% of project focus)

Topics and sub-topics in order of priority:

1. **Understanding policy, markets & methods of measurement**
   - Getting started- language, key questions to ask, ways to reduce emissions & sequester carbon
   - Understanding complexity of policy & markets- ERF, ACCU
2. **Resilient production systems (adaptation)**
   - Forward planning and recovery – short & long-term business viability
   - Understanding risks to business
   - Demonstrated methods that work
   - Systems approach- biodiversity, genetics, soil health, microbiology, carbon sequestration
3. **Mitigation**
   - Measuring & monitoring greenhouse gas emissions, input use - change over time
   - Validated alternatives- cultivation, soil amendments, energy
   - Understanding carbon neutral farming- emissions & priorities
   - Baseline > goals > the path forward

Table 3. Barriers and Enablers

Barriers	Enablers
Project	
Skills & knowledge ▪ Growers, agronomists, advisers, project team ▪ Ineffective communication ▪ Trained pathologists, entomologists, nematologists and IPDM specialists Resources ▪ Time ▪ Cost ▪ People ▪ Weather ▪ Equipment Information ▪ R&D on some aspects ▪ Readiness of technology ▪ Technical resources ▪ Data availability ▪ Considering the complex system ▪ Research not validated General ▪ Sales agronomists ▪ The value of 'carbon projects' ▪ Federal government policy & regulation ▪ Challenges greater than horticulture	People ▪ Whole industry support - growers, retailers, suppliers, research, government, across agriculture ▪ Grower support and champions – demonstrating success ▪ Supporting young growers ▪ Involving and upskilling agronomists, advisers ▪ Industry collaboration ▪ Skilled co-operators Activities ▪ Targeted focus/ clear objectives ▪ Collaboration with related projects ▪ Face-to-face extension activities ▪ Demonstration sites ▪ Training – short courses, on-line self-learning resources, masterclasses ▪ Partnerships - other programs & initiatives, BOM, government, policy, seed companies ▪ Cross regional & cross industry learning Information ▪ New R&D ▪ Tools, models, materials, methodologies ▪ Reliable information General ▪ Crises ▪ Adoptability & ease of use ▪ Access to policy makers ▪ Ability to influence ▪ Linkages to on farm practice
Growers	
Business ▪ Cost versus benefit ▪ Lack of (instant) financial benefits ▪ Risk & fear of change/failure ▪ Fit with production system ▪ Complexity - multiple systems, conflicting information ▪ Current issues take priority – not immediate issue ▪ Customer specifications ▪ Rejections by retailers Resources ▪ Lack of growers' time ▪ Lack of support from an agronomists ▪ Staff issues ▪ Land availability Knowledge ▪ Agronomist skills ▪ Commercial interest sales agronomists provide minimal support ▪ Reasons why a different approach may work ▪ Lack of options available ▪ Understanding of how to measure, compost ▪ Access to technology	Business ▪ Reduced cost or improved yield or quality ▪ Improved sales and price, access to markets ▪ Affordable and easy alternatives ▪ Reduced risk and improved system resilience ▪ Pre-requisite to access business finance ▪ Clear business benefit - demonstrated profitability ▪ Confidence that it works, easy to implement, saves time ▪ Retailer/market demand ▪ Imminent crisis ▪ Clear, achievable next steps ▪ Reliability Activities ▪ Clear, credible information ▪ Proof of concept on farm (demos) ▪ Training - understand risks, clear next steps ▪ Positive case studies General ▪ Crises ▪ Whole industry support- agronomists, consumers, retailers, government, researchers ▪ Positioning/ expectations of industry, government (regulations or policies), customers ▪ Legislation & market requirements

Information Sources

Who

- Growers, grower champions
- Advisors
- Researchers
- Industry extension groups
- Input suppliers
- Retailers
- Community innovation groups
- Farmer advocacy groups e.g. Farmers for Climate Action
- Federal, state, local government
- International groups
- Industry associations (AORA, WMRR)
- Other agricultural sectors, other industries

How

- Online - social media, email, newsletter, website, google
- Podcasts, videos, webinars, masterclasses, short courses
- Demonstrations & farm visits
- Industry events
- Study tours
- Apps and guides for pest ID
- Tools – e.g. Cool Farm Tool, CSIRO FarmPrint, emissions calculation tool, other ag industry tools
- Databases, BoM, climate data
- Relevant R&D outputs

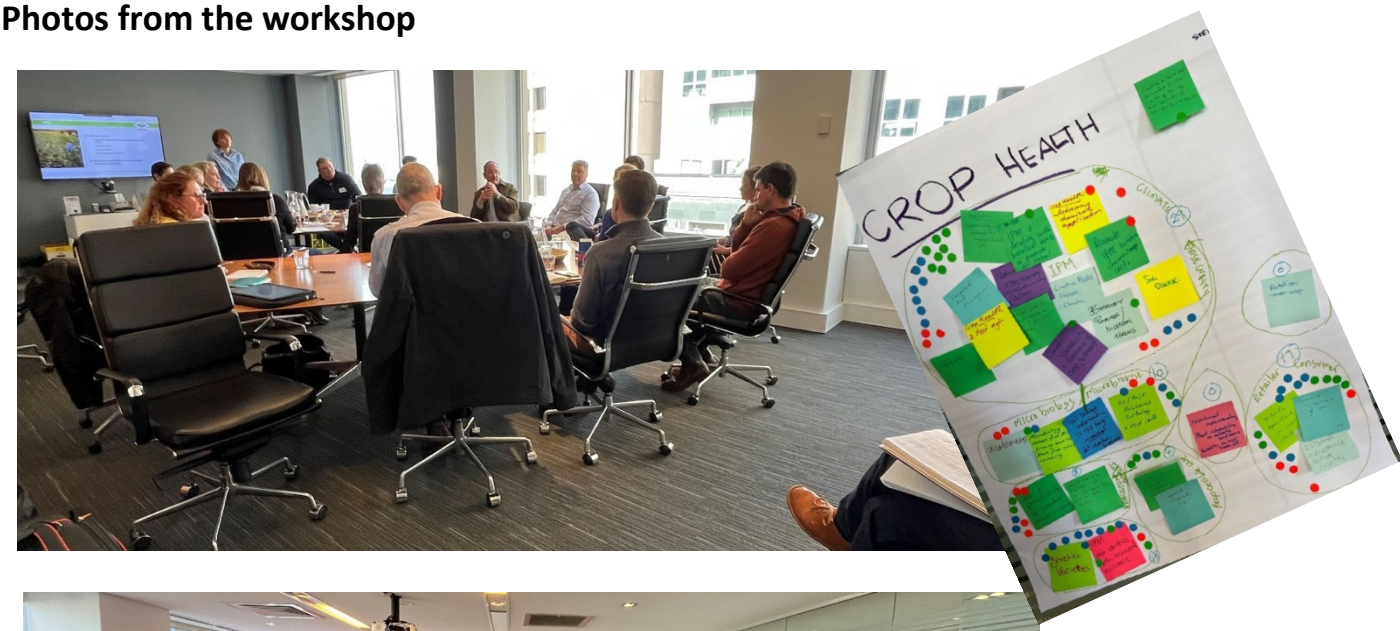
Ongoing Support

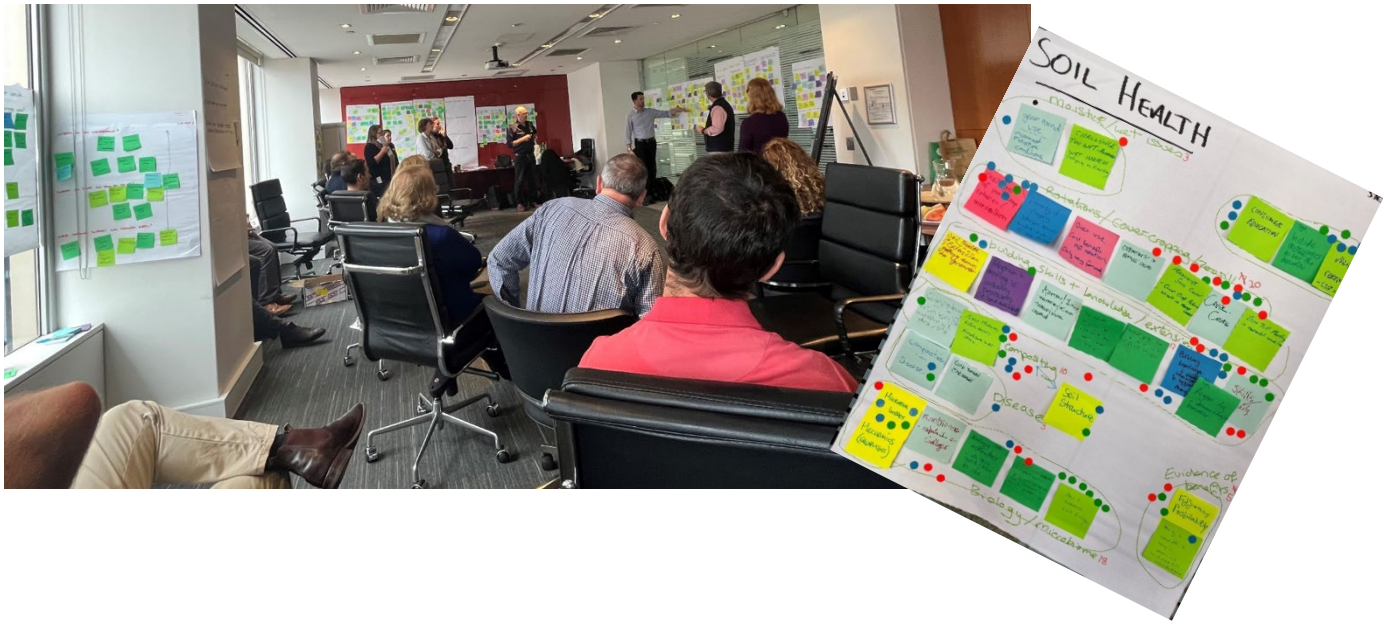
- Face to face
- Community
- Partnership networks
- Technical support - feedback, regular check-ins
- Up to date resources
- Access to current policy, legislation, standards, technology
- Incentive schemes
- Regular updates- policy

Appendices

Appendix 5.2 - SWICP Workshop Notes summary

Photos from the workshop





Appendix 5.2 - SWICP Workshop Notes summary

Soil Health (35%)

Targets/Outcomes

- Less inputs- time, fuel
- Improved yield & quality

] Increased grower margin

- Environmental benefits
- Relaxed produce specifications
- Improved grower return & market access for sustainable production

Rank (grower votes)	Topics	Sub-Topics	Project Barriers	Project Enablers	Grower Barriers	Grower Enablers	Information Sources & Ongoing Support
1 (7)	**Cover crops, rotations and minimum till**	• Equipment & machinery • Cropping systems & management • Soil biology • Cover crop species & varieties	• Skills & knowledge • Resources: time, cost, people • Lack of R&D • Weather • Equipment	• Grower support and champions • Industry collaboration • Targeted focus • Face-to-face extension activities • Demonstration sites	• Cost • Risk & fear of change/failure • Lack of growers' time • Staff issues • Lack of financial benefits • Land availability • Lack of fit with production system • Current issues take priority • Unintended other impacts	• Reduced cost or improved yield or quality • Clear business benefit • Confidence that it works • Retailer/market demand • Support • Proof of concept on farm (demos) • Easy to implement • Saves time	**<u>Information Sources</u>** • Online- social media, email, newsletter, website • Growers • Advisers • Industry extension groups • Demonstrations • Study tours **<u>Ongoing Support</u>** • Face to face • Technical support - feedback, regular check-ins • Community
2 (6)	**Consumer education**	• Sustainable production systems • Food safety					
3 (5)	**Biology & microbiome**	• Pre-biotic- cover crops, compost • Pro-biotic- inoculants • Post-biotic- secondary metabolites • Pest & disease management • Testing & interpretation of results • Impact of inputs on biology					
4 (4)	**Composting & soil structure**	• Food safety & Quality Assurance • Making compost- equipment, inputs, costs • Using compost- different types, benefits & how to measure, local availability					

Crop Health (23%)

Targets/Outcomes

- Less inputs- time, fuel
- Improved yield & quality
- Environmental benefits
- Customer acceptance

Increased grower margin

Rank (grower votes)	Topics	Sub-Topics	Project Barriers	Project Enablers	Grower Barriers	Grower Enablers	Information Sources & Ongoing Support
1 (10)	**Integrated Pest & Disease Management**	• Thresholds • Identification- pests, beneficials, weeds, diseases, early stages • Resources	• Skills & knowledge • Resources: time, cost, people, • Technical resources	• Grower support and champions • Whole industry support & partnerships including seed companies • New R&D • Targeted focus	• Cost • Risk & fear of change/failure • Lack of growers' time • Complexity • Customer specifications • Rejections by retailers	• Whole industry support- agronomists, consumers • Training- understand risks, clear next steps • More sales & improved price • Imminent crisis • Reliability • Positive case studies • Regulation & policy	**<u>Information Sources</u>** • Apps and guides for pest ID • Database • Growers • Advisers • Demonstrations & farm visits • Online- social media, email, newsletter, website, google • Podcasts, videos, webinars, masterclasses • Local industry extension groups • Study tours **<u>Ongoing Support</u>** • Up to date resources • Technical support - feedback, regular check-ins • Community
2 (9)	**Genetics & new varieties**	• Variety assessments or information • Varietal characteristics • Pest and disease resistance information sources					

Note: precision ag moved to Input Use
Note: retail and consumer considered under Soil Health

Input Use (19%)

Targets/Outcomes

- Less inputs- time, fuel
- Improved yield & quality

] Increased grower margin

- Environmental benefits
- Value-adding
- Improved social licence and reputation

Rank (grower votes)	Topics	Sub-Topics	Project Barriers	Project Enablers	Grower Barriers	Grower Enablers	Information Sources & Ongoing Support
1 (8)	**Nutrient use efficiency**	• Optimal nutrition – quality, yield • Cash crops & cover crops- recovering nutrients, their needs & inputs • Soil biology- nutrient availability, N mineralisation • Precision agriculture & variable rate application • Influence of weather- wet vs dry • Monitoring – soil and plant • Nutrient synergies, trace elements	• Skills & knowledge- ineffective communication • Sales agronomists • Readiness of technology • Data availability	• Whole industry support & partnerships- Cross regional & cross industry learning • Crises • Grower support and champions • Adoptability & ease of use • Proactive • Clear objectives	• Cost • Risk & fear of change/failure • Lack of growers' time • Lack of options for recycling • Knowledge of - how to measure, compost, technologies available • Commercial interest sales agronomists & lack of support	• Recognition • Positioning/ expectations of industry, government (regulations or policies), customers • Clear, achievable next steps • Affordable and easy alternatives- cost vs benefit	**<u>Information Sources</u>** • Industry events & farm visits • Industry extension groups • Growers • Study tours • Online- social media, email, newsletter, website, google • Federal, state, local government • Alternative energy community innovation groups • International- Canada (waste), NZ (WUE), Europe • AORA, WMRR (Australian, Organics Recycling Association, Waste Management and Resource Recovery Assn of Australia) • Other agricultural sectors • Other industries **<u>Ongoing Support</u>** • Access to current policy, legislation, standards, technology • Incentive schemes • Local government- waste
2(6 combined)	**Waste**	• Recycling on-farm plastics • Alternatives to plastic mulch • Value-add organic waste • Retailer quality standards					
3 (6 combined)	**Fuel**	• Improved on farm practice- reduced tillage, controlled traffic • Emerging technology & machinery • Alternative energy sources • Impact of government policy					

Climate & Carbon (23%)

Targets/Outcomes

- Understanding of 'whats in it for me?'- policies & markets, translating policy to bottom line, efficiency gains = profitable business, saving costs
- Clear agreed emissions targets – growers, retailers
- Proactive industry-led change – emissions reduction, environmental and economic sustainability, waste reduction

Rank (grower votes)	Topics	Sub-Topics	Project Barriers	Project Enablers	Grower Barriers	Grower Enablers	Information Sources & Ongoing Support
1 (17)	**Understanding policy, markets & methods of measurement**	• Getting started- language, key questions to ask, ways to reduce emissions & sequester carbon • Understanding complexity of policy & markets- ERF, ACCU	• Changes in federal government policy & regulation • Lack of validated research • Beyond scope of project • Challenges greater than horticulture	• Whole industry support- growers, retailers, suppliers, research, government, across agriculture • Other programs & initiatives- retailer, supplier, Net Zero Emissions in Agriculture CRC • Access to tools, models, materials, methodologies • Crises • Grower support and champions- demonstrating success • Access to policy makers & ability to influence • Linkages BoM, government, policy, bottom line, on farm practice	• Complexity- multiple systems, conflicting information • Cost • Timescale- not immediate issue • Access to technology	• Support & unified message- retailers, BoM government, researchers • Legislation & market requirements • Incentive- price, access to market • Clear business benefit- demonstrated profitability • Crises • Pre-requisites to access business finance e.g. emissions reduction plan • Clear information	**<u>Information Sources</u>** • Grower champions • Demonstrations • Tools- Cool Farm Tool, CSIRO FarmPrint, emissions calculation tool, climate analogue, other ag industry tools • BoM, climate data • IPCC- Intergovernmental Panel on Climate Change • Retailers e.g. WW Emissions Disclosure project • Farmer advocacy group- Farmers for Climate Action • Vegetableclimate.com • Climate accountants **<u>Ongoing Support</u>** • Regular updates- policy • Technical advice- emissions reduction
2 (10)	**Resilient production systems (Adaptation)**	• Forward planning and recovery- short & long term business viability • Understanding risks to business • Demonstrated methods that work- shift in practice • Systems approach- biodiversity, genetics, soil health, microbiology, carbon sequestration					
3 (6)	**Mitigation**	• Measuring & monitoring greenhouse gas emissions, input use - change over time • Validated alternatives- cultivation, soil amendments, energy • Understanding carbon neutral farming- emissions produced & sequestered, priorities • Baseline > goals > the path forward					

What to Measure to quantify success

- Wider adoption of improved practice, new grower champions
- Profitable, sustainable production systems
- Grower engagement
- Cross & in-industry collaboration, partnerships, consolidation in targets
- SWICP talked about
- Financial incentives exist
- Measurable change- Hort Sustainability Framework
- Australian vegetable industry considered leaders by other countries
- People want to be involved in the vegetable industry- careers, seen as innovative, where people want to work
- Clarity of resources for growers
- Growers & vegetable industry involved and accepting of emissions policies
- Increase in growers & agronomists trained in IPM & soil health

Who could be involved

- Agricultural suppliers & resellers- technology, biologicals, crop protection, seed
- Private agronomists & advisers
- Universities & tafe- alternate disciplines, graduate programs
- Students
- Research corporations- Soil CRC, GRDC
- Landcare
- National Farmers Federation
- Philanthropists
- Greening Australia
- Natural Resource Management- soil facilitators
- National drought initiative
- Drought resilience hubs
- National soils advocate
- Soil Science Australia
- Reef catchment
- Catchment management authorities
- Supermarket retailers
- Consumers
- Hort Innovation
- Other Hort Innovation R&D delivery partners
- Carbon- policy & tool developers- e.g. CSIRO, BoM, government policy makers
- Australian government e.g. DAFF
- All levels of Australian government informing policy and reg
- Accreditation scheme providers
- Training providers e.g. Dr Paul Horne
- Composters
- VegNet- Lockyer Valley Grower Group, Bowen Gumlu Grower Association etc
- International
- International Farming Systems Association
- Partnering With Innovation
- Product developers
- Australian Organics Recycling Association

Parking/Potential R&D Topics

- Biological product QA framework
- Regenerative ag – does the industry embrace this term for social licence
- How to manage ½ grown cover crop
- R&D support
- How can growers have input into setting targets re: carbon + climate
- Cover crops to control priority soil borne diseases
- Pyrolysis
- Plant environment disease interaction – practical use
- Nitrogen availability – mineralisation / monetisation during crop growth
- Published results for different pest thresholds – associated with weather info etc.