Delivery partner resource

Horticulture Impact Assessment Program

VG17015 Impact Assessment

June 2026

Hort Innovation

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Funding statement:

Horticulture Impact Assessment Program 2024-25 – 2026-27 is funded by Hort Innovation. This multi-industry project is a strategic levy investment in the Hort Innovation Almond, Apple & Pear, Avocado, Banana, Blueberry, Cherry, Citrus, Dried Grape, Lychee, Macadamia, Mango, Melon, Mushroom, Nursery, Olive, Onion, Papaya, Passionfruit, Persimmon, Pineapple, Pistachio, Potato – Fresh, Potato – Processing, Raspberry and Blackberry, Strawberry, Summerfruit, Sweetpotato, Table Grape, Turf, and Vegetable Funds

Publishing details:

ISBN <Hort Innovation to add>

Published and distributed by: Horticulture Innovation Australia Limited
ABN 71 602100149

Level 7
141 Walker Street

North Sydney NSW 2060

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www.horticulture.com.au

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VG17015 Alternative disinfestation for market access for crops affected by tomato potato psyllid

Executive Summary

Tomato potato psyllid (TPP), Bacteria cockerelli (Sulc.) is a serious pest of solanaceous crops and some Convolvulaceae crops and is associated with extensive economic losses. Another destructive pest species that also shares some plant host species with TPP is the Mediterranea fruit fly (Medfly), Ceratitis capitata (Wiedemann). Medfly is associated with significant economic losses indirectly affecting market access of horticulture commodities. Both TPP and Medfly are currently endemic in Western Australia (WA), and TPP has been discovered in Victoria (VIC).[1]

The incursion of TPP has had serious ramifications for several horticulture industries, particularly in the restricted movement of plant material from WA. There are various recognised phytosanitary measures in place for host produce and plant products, and often, to gain market access into the eastern states or internationally, end-point treatments are required to export produce. Presently, methyl bromide (MB) fumigation is recommended in the ICA-04 to be used as an endpoint postharvest treatment option against TPP and Medfly in most produce. MB is ozone depleting and all use was prohibited in Australia from 1 January 2005 to meet phase out obligations under the Montreal Protocol. However, there is an exemption for quarantine and pre-shipment or feedstock applications.[2] MB also has food quality risks, as standard fumigation doses can damage sensitive crops.

VG17015, Alternative disinfestation for market access for crops affected by tomato potato psyllid, aimed to develop an alternative treatment against both pests to support trade from WA. It was a research investment led by the WA Department of Primary Industries and Regional Development (DPIRD). Running from 2019 to 2022, the project sought to test the efficacy and quality impacts of alternative disinfestation treatments for crops affected by TPP and Medfly.

The project focused on 3 key objectives:

— investigate alternative disinfestation treatments that reliably neutralise TPP in host crops to enable market access for produce from affected regions.

— validate treatment protocols to satisfy interstate quarantine requirements and demonstrate that fumigation and irradiation treatments can be used to disinfest both Medfly and TPP

— provide pathways to maintain or restore interstate and export supply of affected vegetable crops, thereby protecting grower livelihoods and consumer supply continuity.

VG17015 produced a range of significant outputs, including assessment of the effectiveness and quality benefits of alternative treatments to TPP and Medfly. The alternative treatments were low dose methyl bromide (LDMB), ethyl formate (EF) and phytosanitary irradiation (irradiation). The project determined that LDMB and EF satisfied quarantine standards of 99.99%, equally as efficient as the existing MB fumigation

[1] Agriculture Victoria (2026) *Tomato potato psyllid*. Accessed at https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/tomato-potato-psyllid

[2] Department of Agriculture, Fisheries and Forestry (2023). Methyl Bromide and the Montreal Protocol. Accessed at https://www.agriculture.gov.au/agriculture-land/farm-food-drought/ag-vet-chemicals/international/methyl-bromide

treatments. Fruit injury and chemical analysis tests determined that EF and irradiation did not compromise the quality of produce or its external appearance, and LDMB had fewer quality impacts than MB. These results where shared with industry through the project reference group, articles, webinars, protocols and guidelines.

While the outcomes of the project were substantial, the impact assessment was conducted qualitatively due to the lack of available data to conduct a robust quantitative assessment. This limitation predominantly stems from insufficient empirical data relating to adoption rates and cost savings of the various treatments across multiple fruit and vegetables.

Overall, VG17015 has strengthened WA and VIC's market access through contributions to Interstate Certification Assurances (ICAs) for produce impacted by TPP and Medfly, and improved commercial viability of impacted produce through quality improvements and or cheaper treatment costs.

Context, objective, and details of investment

Tomato potato psyllid (TPP), Bactericera cockerelli (Sulc.) is a serious pest of solanaceous crops and some Convolvulaceae crops and is associated with extensive economic losses. TPP is a vector of a bacterial plant pathogen, Candidatus liberibacter solanacearum (CLso), which causes psyllid yellows disease in tomato, potato, capsicum, eggplant and tamarillos, and zebra chip disease in potato. It is native to western United States and Mexico and was first found in New Zealand in 2006 and on the Australian territory of Norfolk Island in 2015. The first detection of TPP on the Australian mainland occurred in Perth, WA in February 2017. To date, TPP is limited to WA and VIC[3] and zebra chip disease has not been found in Australia[4].

Another destructive pest species that also shares some plant host species with TPP is the Mediterranean fruit fly (Medfly), Ceratitis capitata (Wiedemann). Limited to WA where it is endemic, Medfly is associated with significant economic losses indirectly affecting market access of horticulture commodities. Industry stakeholders in the eastern states and territories are concerned about the impact of both pests if these were to spread to their jurisdictions. The current strategy is to confine both pests to their current distribution, prevent their spread, surveillance, and minimise their impact on domestic and international trade.

The incursion of TPP has serious ramifications for several horticulture industries, particularly in the restricted movement of plant material from WA. The pest threatens a range of vegetable crops including capsicum, chilli, eggplant, and tomato. There are various recognised phytosanitary measures in place for host produce and plant products, and often, to gain market access into the eastern states or internationally, end-point treatments are required to export produce. Presently, methyl bromide (MB) fumigation is recommended in the ICA-04 to be used as an endpoint postharvest treatment option against TPP and Medfly in most produce. MB is ozone depleting and all use was prohibited in Australia from 1 January 2005, to meet phase out obligations under the Montreal Protocol. However, there is an exemption for quarantine and pre-shipment or feedstock applications.[5] MB also has food quality risks, as standard fumigation doses can damage sensitive crops. Thus, this project aims to develop an alternative treatment against both pests to support trade from WA.

[3] Agriculture Victoria (2026) op. cit.

[4] Department of Agriculture, Fisheries and Forestry (2025) *'Candidatus Liberibacter solanacearum' complex*. Accessed at https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/plant/identify/zebra-chip

[5] Department of Agriculture, Fisheries and Forestry (2023). op. cit.

The objectives of the project were to:

- investigate alternative disinfestation treatments that reliably neutralise TPP in host crops to enable market access for produce from affected regions
- validate treatment protocols to satisfy interstate quarantine requirements and demonstrate that fumigation and irradiation treatments can be used to disinfest both Medfly and TPP
- provide pathways to maintain or restore interstate and export supply of affected vegetable crops, thereby protecting grower livelihoods and consumer supply continuity.

This project was funded by Hort Innovation, using the Hort Innovation vegetable industry research and development levy and co-investment from the Department of Primary Industries and Regional Development (DPIRD).

Alignment with Strategic Investment Plan

Project VG17015 closely aligned with, and significantly contributed towards, the Vegetable Strategic Investment Plan (SIP) 2022-2026. The project addressed biosecurity threats from TPP by developing an alternative disinfestation treatment. This protected growers' ability to maintain production and ensures the vegetable supply chain is resilient to pest outbreaks (Outcome 1). Alternative treatments allow produce from TPP-affected regions to meet interstate and export quarantine requirements, which safeguards existing market access and opens the potential for export growth (Outcome 2). This project produced protocols and guidelines for growers and exporters, which built knowledge and capability in managing pest risks (Outcome 3). Further, the project generated scientific evidence on treatment efficacy, pest mortality and produce quality outcomes, generating strong business insights (Outcome 4).

Overall, the project aligns with the outcomes of the Vegetable SIP by ensuring biosecurity, securing market access, and building industry capability. The project protects supply chains, enabling trade, and reducing risk to vegetable growers affected by TPP.

Table 1 Project details of VG17015

Project code	VG17015
Title	Alternative disinfestation for market access for crops affected by tomato potato psyllid
Research organisation(s)	WA Department of Primary Industries and Regional Development
Project leader	Dr. Vineeta Bilgi and Dr. Francis De Lima
Funding period	2019-2022
Objective	To develop and validate safe, effective alternative disinfestation treatments for Tomato potato psyllid to maintain interstate and export market access for affected vegetable crops.

Source: Hort Innovation

Related investments

The project was linked with 4 other investments, these are:

- MT18008 – National tomato psyllid and zebra chip surveillance: this project supported a national surveillance, identification, and reporting program for TPP and Clso across Australia. The program was designed for the early detection of and preparedness for TPP, should it cross from WA into other regions.

— VG18000 – National vegetable industry communications program: this project involved communicating the findings of levy-funded research and development and other relevant industry news, issues and data to vegetable growers and other industry stakeholders. This helped increase awareness and encourage uptake of new practices, technologies and knowledge.

— VG19015 – VegNET SA project: this project supported the continuation of extension services as part of the VegNET South Australia (SA) project. VegNET SA provided regional extension support to vegetable growers across Australia, delivering tailored assistance, information and research and development adoption support.

— MT16018 – National tomato potato psyllid (TPP) program coordinator: this project coordinated the development and implementation of a national TPP management strategy to ensure research and development, engagement and other response efforts were coordinated, prioritised and strategic.

Governance

The governance structure of VG17015 was designed to ensure strategic alignment, scientific integrity, and effective industry engagement. Hort Innovation provided oversight to ensure the project met its objectives and aligned with industry priorities. The project was funded by Hort Innovation, using the Hort Innovation vegetable industry research and development levy and co-investment from the Department of Primary Industries and Regional Development (DPIRD). The WA DPIRD was the delivery partner, with Dr. Vineeta Bilgi and Dr. Francis De Lim as the project leaders.

Additionally, the project included the establishment of a project reference group, facilitated by the project leaders. WA DPIRD sought to ensure the reference group represented growers, as well as a representative from Hort Innovation. The reference group identified issues and risks associated with the project, allowing the research team to make more informed decisions.

A Monitoring and Evaluation Plan was also established and used to assess the extent that outputs achieved their intended outcomes. Project performance was also assessed at each of the five milestones. The final report is publicly available via Hort Innovation, giving full visibility into methods, data, results and recommendations.

Impact pathway

A clear pathway from inputs to impacts can be identified. Overall, the investment produced 4 benefits for both levy payers and the broader community. Table 2 shows the logical pathway to impacts of the investment.

Table 2 Impact pathway of VG17015

Pathway	Description
Inputs and activities	**Project setup and governance** • Funded by Hort Innovation using industry levies • Project Reference Group (PRG) formed with growers and a representative from Hort Innovation. • Milestone-based reporting with continuous feedback and review. **Test fruit and insects** • Organic truss tomato and purple broad eggplant were obtained from Mitri Hydroponics and Perth Organics, WA respectively. Red cayenne chili and red capsicum were sourced from local markets. • Medfly used in the project are maintained at DPIRD's fruit fly insectary. The genetic vigour and fitness of the collection was maintained by replenishing the stock by collecting and rearing wild flies every 12 to 18 months.

Pathway	Description
	• TPP used in the project were similarly maintained at DPIRD's insectary. **Insect development studies** • Life history studies were done to track Medfly development in infested fruit. Fruit was dissected and the numbers of eggs and larvae, live and dead, were recorded daily until pupation. • Similar studies were completed on TPP. Leaves were examined under the microscope, and the number of eggs and nymphs were recorded daily. **Fumigation trials** • Ethyl formate (EF) fumigation trials were conducted to identify the most tolerant TPP life-stage, effective EF doses, and effectiveness of those doses on Medfly. • Low dose methyl bromide (LDMB) fumigation trials were conducted to confirm the effectiveness of four doses identified to be effective on tomatoes previously. These trials were expanded to test LDMB against additional fruits including capsicum, chilli and eggplant. **Phytosanitary irradiation trials** • Phytosanitary irradiation (irradiation) was trialled on TPP eggs, nymphs and adults. This treatment was not trialled on Medfly. **Most tolerant life-stage (MTS) and confirmatory trials** • Trials on Medfly using LDMB fumigation. • Similar trials on TPP using EF and LDMB. **Large-scale trials** • Trials on Medfly using capsicum for all four doses (EF, LDMB, MB and PI) • Trials on TPP using capsicum for two new LDMB doses, as well as EF. • The trials included quality assessments (fruit injury tests and visual observations), chemical analysis (MB residue analysis and testing for the presence of bromomethane) and data analysis.
Outputs	**Project planning, governance and reporting** • PRG meetings held on 11th December 2020, 28th May 2021, 7th December 2021 and 17th July 2022 following completion of Milestones M103 through M106. • Five milestone reports were delivered. **Assessment of treatments** • M102 (31 May 2020) provided information on TPP and Medfly development in capsicum, chilli, eggplant and tomato, and comparative response of TPP against EF by testing the MTS. • M103 (30 November 2020) identified TPP eggs to be the MTS and identified a suitable dose of EF and carbon dioxide. It also reviewed doses for fruit injury on capsicum, chilli, eggplant, and tomato. • M104 (31 May 2021) was the initiation and completion of a large-scale semi-commercial EF trials on capsicum and tomato. Irradiation tests were also completed as part of this milestone. • M105 (31 November 2021) compared the response of TPP and Medfly against LDMB by testing MTS initiated at commercial fumigation service. • M106 (30 May 2022) consisted of large-scale LDMB trials for TPP and Medfly, included collection of residue data for commercial treatments and identification of effective irradiation doses against TPP. • Data packs were developed for LDMB and EF as part of these assessments. **Extension, communication, and industry engagement** • Three articles in WA Grower Magazine throughout the project. • Contribution to the Vegetable Industry Webinar Series.

Pathway	Description
Outcomes	**Alternative treatments that satisfy quarantine standards** • The alternative disinfestation treatments may be of value to growers and exporters of TPP host plants and TPP carrier plants upon certification. The project determined that LDMB and EF fumigation satisfied quarantine standards of 99.99% control, equally as efficient as the existing MB fumigation treatments. • The researchers submitted data packs for LDMB to the Subcommittee on Domestic Quarantine and Market Access (SDQMA), which has now been replaced by the Subcommittee for Market Access, Risk and Trade (SMART). They also submitted data packs for EF to the Australian Pesticides and Veterinary Medicines Authority (APVMA) and Food Standards Australia New Zealand (FSANZ). **Alternative treatments with improved quality impacts** • Fruit injury and chemical analysis tests ensured residues of the tested treatments were within the maximum residue limits for the produce. • EF and irradiation did not compromise the quality of produce or its external appearance. These treatments are not phytotoxic. Irradiation is also chemical-free. • All tested doses of LDMB only compromised fruit hardness and the visual appearance of eggplants fumigated beyond day 7. While there are some negative quality impacts from using LDMB, it has lowered fruit injury and chemical residue compared to MB. **Development of protocols and guidelines** • This project produced protocols and guidelines for growers and exporters, which built knowledge and capability in managing pest risks **Increased scientific understanding supporting future research into alternative treatment** • This project established that irradiation required further research on reciprocal crossing, ovarian dissections alongside large scale trials to satisfy quarantine standards 99.99% control.
Impacts	**More resilient market access through certification of alternative treatments** • Interstate Certification Assurances (ICAs) have been developed for treatments to disinfest fruit fly and other plant pests, including treatments that satisfy quarantine standards of 99.99% control for TPP and Medfly. • TPP is currently present in WA and VIC, and certification of alternative treatments can result in more resilient interstate trade through the greater variety in treatment options. This allows growers and exporters to satisfy more import conditions, which vary across jurisdiction. There would likely be a similar improvement in market access for international markets. • Other states and territories would benefit from the alternative treatments in similar ways should TPP be discovered in their jurisdictions. **Improved commercial viability of impacted produce** • While MB is effective at controlling pests and ensuring safety, the treatment can lead to quality issues such as skin damage or reduced shelf life. All alternative treatments have improved quality outcomes for affected produce when compared to MB. EF and irradiation did not compromise the quality of the produce or its external appearance. While LDMB led to some compromised quality in eggplants, it has comparatively fewer quality impacts compared to MB. • On top of the quality benefits, EF is a cheaper treatment than MB and would lead to commercial benefits to growers and exporters impacted by TPP. • Despite clear quality benefits of using LDMB and irradiation, both these alternative treatments are more expensive than MB. If the quality impacts for these alternative treatments outweigh the higher costs, LDMB and irradiation could also result in commercial benefits to growers and exporters impacted by TPP.

Pathway	Description
	Alternative treatments with better environmental outcomes • Adoption of the alternative treatments would lead to improved environmental outcomes. This is because MB has a very high ozone impact, LDMB minimises the impact of MB on the environment through the lower dosage, and EF and irradiation are environmentally friendly. **Knowledge sharing and collaboration with industry** • The project had active collaboration between government and industry, with the WA DPIRD as the delivery partner, project work supervised by Dr. Francis De Lima from AgHort Solutions Pty Ltd., collaboration with Tritan Fumigation for commercial trials with MB, and industry support from AusVeg and VegetablesWA. • Results, protocols and guidelines were communicated to industry (VegetablesWA, funding bodies, SDQMA, growers and exporters) during the project through articles, seminars, and project reference group meetings. This built knowledge and capability in managing TPP and resulted in increased collaboration with industry. • Further research, following on from this project, later determined that irradiation satisfies the quarantine standards for TPP.

Source: ACIL Allen

Cost and benefits

Costs

Cost of the investment

This project was funded by Hort Innovation and WA DPIRD. Hort Innovation contributed $289,007 in cash and $94,654 in overhead costs (ex GST amounts). Table 3 shows the total nominal cash contributions across the duration of the investment.

Table 3 Nominal costs of the investment by contributing partners of VG17015

Contribution	2020-21	2021-22	2022-23	2023-24	Total
Hort Innovation – Cash	$0	$0	$100,000	$189,007	$289,007
Hort Innovation - Overheads	$20,568	$17,716	$24,473	$31,898	$94,654
WA DPIRD – Cash	$118,329	$118,329	$63,342	$0	$300,000
WA DPIRD - Inkind	$83,260	$114,381	$93,205	$0	$290,846
Total	$222,157	$250,426	$281,020	$220,905	$974,507

Source: Hort Innovation

The total nominal investment of $974,507 is then adjusted for inflation to represent the real value of the investment. Adjustment for inflation is meant to present historical costs in today's dollars by making periods comparable by converting nominal values to real values by way of adjusting for changes in purchasing power due to inflation.

Costs of the investment, in nominal terms and real terms, are provided in Table 4 below.

Table 4 Real costs of the investment VG17015

Organisation	Hort Innovation	Partner organisation	Total
Nominal costs	$383,662	$590,846	**$974,508**
Real costs ($2025 financial year)	$427,162	$717,267	**$1,144,429**

Source: ACIL Allen, modelled using ABS's implicit GDP deflator

Benefits

Table 5 below summarises the potential benefits of the investment and categorises them into 3 streams: economic, environmental, and social impact. It provides a description of the benefits and how the investment could achieve them. The table also shows the assessment method that was used for each benefit.

Table 5 Summary of potential impacts of VG17015

Type of impact	Assessment	Description
Economic impacts	Unquantified	**More resilient market access through certification of alternative treatments** MB has been used as a disinfectant and continues to receive an exemption under the Montreal Protocol for use in quarantine and pre-shipment disinfestation. Without the alternative treatments, MB would continue to be used as it is certified and approved for use in preventing the spread of TPP and Medfly for interstate trade and exports. ICAs have been developed for treatments to disinfest fruit fly and other plant pests, including treatments that satisfy quarantine standards of 99.99% control for TPP and Medfly: • One ICA was developed for EF for cut flowers (WA ICA-65).[6] • Two ICAs have been developed for irradiation treatment for any fruit and vegetables that require disinfestation (QLD[7] and VIC[8] ICA-55). FSANZ advises that irradiation can be used for disinfestation of any fruit and vegetable affected by TPP if the absorbed dose is no lower than 150 Gy and no higher than 1 kGy.[9] The assessed treatment falls within this range. It is worth noting that further research was required upon completion of VG17015 to confirm the treatment satisfied quarantine standards of 99.99% control.

[6] WA Department of Primary Industries and Regional Development (2021) *Fumigation of Cut Flowers with Ethyl Formate for Tomato-Potato Psyllid.* Accessed at https://interstatequarantine.org.au/wp-content/uploads/2021/06/WA-ICA-65.pdf

[7] Biosecurity Queensland, Department of Agriculture and Fisheries (2022). *Irradiation Treatment.* Accessed at https://interstatequarantine.org.au/wp-content/uploads/2023/01/ICA-55-Irradiation-Treatment-23-12-22.pdf

[8] Victorian Government Department of Energy, Environment and Climate Action (2023). *ICA-55: Irradiation Treatment.* Accessed at https://interstatequarantine.org.au/wp-content/uploads/2023/07/ICA-55_1.3-Irradiation-120523.pdf

[9] Australian Government (2024). *Australia New Zealand Food Standards Code – Standard 1.5.3 – Irradiation of food.* Accessed at https://www.legislation.gov.au/F2015L00406/latest/text

Type of impact	Assessment	Description
		• ICA-04 existed prior to the project and approved MB for disinfestation in NSW, QLD, SA, VIC and WA, but these have not been updated to include LDMB.[10] These ICAs facilitate more resilient interstate trade of fruit and vegetables impacted by TPP and Medfly, resulting from the greater variety in disinfestation options which allow growers and exporters to satisfy more import conditions that vary across jurisdictions. There are similar improvements to resilience of market access for international markets. TPP is currently present in WA and VIC, meaning impacted growers and exporters in WA can use EF because of WA ICA-65, and those in VIC can use irradiation because of VIC ICA-55. This is on top of the pre-existing ICA-04, which allows disinfestation via MB. Other states and territories that do not have TPP will also benefit from the alternative treatments in similar ways should TPP and Medfly be discovered in their jurisdictions. The research contributed to the development of the ICAs with data packages that were submitted to the SDQMA (now called SMART) for LDMB and APVMA/FSANZ for EF. While there is a clear contribution, this impact cannot be quantified. It would require speculative assumptions regarding grower and exporter adoption of alternative treatments in multiple fruit and vegetables. This information is not tracked, making it impossible to determine what proportion of interstate trade and exports have used the alternative treatments tested through this project.
	Unquantified	**Improved commercial viability of impacted produce** While MB is effective at controlling pests and ensuring safety, the treatment can lead to quality issues such as skin damage or reduced shelf life. All alternative treatments have improved quality outcomes for affected produce when compared to MB, resulting in improved commercial viability of fruit and vegetables impacted by TPP and Medfly. On top of the quality benefits, EF is a cheaper treatment than MB, leading to additional commercial benefits to growers and exporters impacted by TPP. EF minimises handling costs and time as it is efficacious at low fumigation temperatures (unlike MB). It also offers time and labour savings as it can be used in-transit shipping containers. EF also has less onerous requirements for PPE.[11] This implies EF could improve the commercial viability of impacted produce.

[10] Australian Interstate Quarantine (n.d.). *ICA results*. Accessed at https://interstatequarantine.org.au/ica-results/?ica_number=4

[11] Ryan, R., Dominiak, B.C. (2021). *Ethyl formate: review of rapid-acting fumigant.* Proceedings of the 11th International Conference on Controlled Atmosphere and Fumigation in Stored Products (CAF2020). p271-273. Accessed at https://caf.phtcenter.com/wp-content/uploads/2022/07/CAF2020-P8768.pdf

Type of impact	Assessment	Description
		Irradiation is more expensive than MB, and for it to be a commercially viable treatment, other benefits must outweigh the cost. Factors that impact this include high capital costs, poor consumer acceptance increasing barriers to using the treatment, labelling requirements that increase operational costs, and costs of operational development and change.[12] While irradiation is more expensive than MB, FSANZ determined in 2014 that it has clear direct and indirect benefits that outweigh the costs to community, Government or industry.[13] This implies irradiation could improve the commercial viability of impacted produce. While LDMB has a clear savings in gas costs of up to 10% due to the lower dosage, this savings is outweighed by the significant commercial costs of extended use of fumigation chambers. LDMB will only be more commercially viable than MB if the quality benefits outweigh the greater expense. It is unclear if this is the case as it would require a robust quantitative comparison of quality benefits against a specified cost increase, which is unknown. Quantifying the overall improvements in commercial viability due to alternative treatments requires more detailed cost information that is not available at time of assessment. Additionally, quantification also requires speculative assumptions regarding grower and exporter adoption of alternative treatments in multiple fruit and vegetables. This information is not tracked, making it impossible to determine what proportion of interstate trade and exports have used the alternative treatments tested through this project.
Environmental impact	Unquantified	**Alternative treatments with better environmental outcomes** Adoption of the alternative treatments would lead to improved environmental outcomes. This is because MB has a very high ozone impact, LDMB minimises the impact of MB on the environment through the lower dosage, and EF and irradiation are environmentally friendly. On top of the environmental benefits gained from reduced CO_2-eq, there are potential social benefits such as improved public health and safer working environments. Quantification of this benefit requires speculative assumptions regarding grower and exporter adoption of alternative treatments in multiple fruit and vegetables. This information is not tracked, making it impossible to determine what proportion of interstate trade and exports have used the alternative treatments tested through this project.

[12] Steritech (2023). *AM19002 Building capacity in irradiation.* Accessed at https://www.hin.com.au/__data/assets/pdf_file/0010/185149/AM19002-Review-Commercial-Barriers.pdf

[13] Food Standards Australia New Zealand (2014). *Call for submissions- Application A1092: Irradiation of Specific Fruits & Vegetables.* p12. Accessed at https://www.foodstandards.gov.au/sites/default/files/food-standards-code/applications/Documents/A1092 Irradiation-CFS.pdf

Type of impact	Assessment	Description
Social impact	Unquantified	**Knowledge sharing and collaboration with industry** Active collaboration between government and industry occurred throughout the project, with the WA DPIRD as the delivery partner, project work supervised by Dr. Francis De Lima from AgHort Solutions Pty Ltd., collaboration with Tritan Fumigation for commercial trials with MB, and industry support from AusVeg and Vegetables Australia. Results, protocols and guidelines were communicated to industry (VegetablesWA, funding bodies, SDQMA and growers) during the project through articles, seminars, and project reference group meetings. Additionally, further research following on from this project determined that irradiation satisfies the quarantine standards for TPP. While there are clear knowledge sharing benefits resulting from this research, it is inherently difficult to measure given the variability and indirect nature of these effects. Therefore, it is not appropriate to quantify this benefit.

Source: ACIL Allen

Key findings

While the project delivered important outputs and long-term strategic benefits, its impact assessment has been conducted qualitatively due to a lack of benchmark data. While treatments and management strategies have been developed, data around adoptions rates and cost savings have not been tracked, making it impossible to determine what proportion of interstate trade and exports have used the alternative treatments tested through this project. There is insufficient empirical evidence to support a robust quantitative assessment of the economic and environmental impacts of the alternative treatments.

The following key findings have been identified for this assessment:

- **More resilient market access through certification:** Interstate Certification Assurances (ICAs) have been developed for treatments to disinfest fruit fly and other plant pests, including treatments that satisfy quarantine standards of 99.99% control for TPP and Medfly. TPP is currently present in WA and VIC, and certification of alternative treatments has resulted in more resilient interstate trade through greater variety in approved treatments.
- **Improved commercial viability of impacted produce:** All alternative treatments lead to improved quality outcomes for disinfested produce when compared to MB, improving the commercial viability of fruit and vegetables impacted by TPP and Medfly. On top of these quality benefits, EF is also a cheaper treatment, and the direct and indirect benefits of irradiation outweigh the costs to community, Government or industry. It is unclear whether LDMB leads to improved commercial viability in impacted produce as it is unknown whether the quality benefits outweigh the greater expense of the treatment.
- **Alternative treatments with better environmental outcomes:** MB treatments have a very high ozone impact and there has been international pressure to address this issue. The research identified alternative treatment of LDMB that minimises the impacts on the environment through the lower dosage. Furthermore, the research also identified EF and irradiation are environmentally friendly. There are also potential social benefits, such as improved public health and safer working conditions, associated with this environmental benefit.
- **Knowledge sharing and collaboration with industry:** Active collaboration between government and industry was evident, particularly through collaboration with Tritan Fumigation for commercial trails with MB, and industry support form AusVeg and VegetablesWA. Results were communicated to industry during

the project through articles, seminars, and project reference group meetings. Given the variability and indirect nature of these effects, it is not appropriate to quantify this benefit.

Consultations

The following stakeholders were consulted on this assessment:

— Rohan Prince, Director of Horticulture, WA DPIRD

— Dr Vineeta Bilgi, Technical Area Manager, Plant Pest & Disease Control Programs, WA DPIRD

— Andrea Magiafoglou, Research and Development Manager, Hort Innovation

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