fermentasmania

SIPP Grant 2023

Polyphenolic Fruit Waste Valorisation Study

Stage 6 Report

New Ecosystem Viability Report

SUPPORTED BY

Tasmanian Government

PROJECT PARTNERS

Fruit Growers Tasmania

UNIVERSITY of TASMANIA

TIA

Tasmanian Institute of Agriculture

TIA is a joint venture of the University of Tasmania and the Tasmanian Government

Startupbootcamp FoodTech

the forager food co.

redefining the food experience

Clever intelligent fermentation

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Executive Summary

The *Phase 5 Funding Report* for the Polyphenolic Fruit Waste Valorisation Project, led by FermenTasmania, explores funding and infrastructure needs to enhance economic value from Tasmania's fruit waste. This phase focuses on scaling up value-added products derived from apples, cherries, and grapes, aiming to reduce waste and generate revenue for growers and businesses.

This report synthesizes findings from the SIPP Fruit Waste Project to assess the viability of a new ecosystem for fruit waste valorisation in Tasmania. The project explored infrastructure gaps, market opportunities, and financial feasibility to determine how fruit waste could be repurposed into high-value products.

Key findings indicate that:

- Infrastructure limitations (e.g., lack of chemical testing facilities, sourcing and supply of fruit waste to producers and cherry pitting capacity) create bottlenecks.
- There is strong market potential for value-added products like functional beverages, vinegars, shelf-stable products, polyphenol-rich extracts, and dried powders.
- Estimated economic impact ranges from $1.2M–$10.2M, with a potential upside of $275M if value-adding practices are widely adopted.
- The Fermentation Hub presents an opportunity to support startup businesses, scale up innovation and overcome infrastructure challenges.
- Cooperative Research Centres (CRCs) present an opportunity for Tasmanian growers if the ecosystem includes projects and funding available.

The report concludes that a viable ecosystem is possible, but it requires investment, coordinated market development, and policy support.

"In building the Fermentation Hub, we are very proud to provide our innovative entrepreneurs with the information they will need to access funding to allow business ventures to start up and to scale, in Tasmania, and for Tasmania. In doing so, we will be adding to the Tasmanian economy and helping create jobs for Tasmanians."

Kim Seagram, fermentasmania Chair

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About fermentasmania

Fermentation is the delicious alchemy that transforms our food

- grains into bread, cabbage into kraut, milk into cheese, grapes into wine.



At fermentasmania, we believe in the power of fermentation to transform our produce, our people, and our place. By connecting industry, educators, government, and consumers, we are cultivating a community of creative food lovers & innovators.

The word fermentation comes from the Latin verb "fervere" which means to boil. We believe fermentation can turn the heat up on Tasmania, creating new jobs and new businesses on our island and helping Tasmanian food reach new markets. Through fermentation, we can craft innovative, value-added food & drinks that take a taste of Tasmania to the world.

Human history is replete with examples of resourceful use of food ‘waste’ and also of making ‘hay’ (fermented food products) while the ‘sun’ shines (before foods are spoiled). Fermented foods formed part or the core of staple diets across global cultures; from kim chi in Korea, to Sauerkraut in Germany, to food produced by indigenous Australian cultures.

Fermentation is culture and in Tasmania our culture is alive. Join us on our journey, as we put Tasmania on the map as a unique global centre for excellence in fermentation.

The Fermentas Trade Network is your one-stop-shop for our island's premium fermentation businesses. Let us put you in touch with small and large producers alike to bring a taste of Tasmania to you.

Ask us if you want to know more about the value of fermented foods.

1. Defined Terms

CRC	Cooperative Research Centre
Focus Fruits	Apples, cherries and grapes
Focus Fruit Waste	fruit and fruit by-products from Focus Fruits that remain unsold

2. Introduction

Fermentasmania and the project partners received funds from the Tasmanian State Government through the SIPP Grant to research current uses of certain fruit seconds and by-products in Tasmania, and to investigate the viability of increasing the economic value derived by growers (and others). This project follows other successful projects related to valorisation of food waste in Tasmania[1].

2.1 Project Stage

This is Stage 5 of a possible 6 stages in this Project (for more details see Appendix A).

Stage 1	Existing Ecosystem Report (complete)
Stage 2	Polyphenolic Fruit Byproduct / Waste Report (complete)
Stage 3	New Ecosystem Viability Report (complete)
Stage 4	Ecosystem Trial Report (complete)
Stage 5	Funding and Recommendations Report (complete)
Stage 6	***New Ecosystem Viability Report (this report)***

2.2 This Report

This Final Report integrates insights from previous reports and provides an assessment of ecosystem viability.

This initiative aligns with the AgriVision 2050 goals and seeks to enhance Tasmania's reputation for premium, sustainable food products.

2.3 Opportunities for Tasmanian Fruit Growers

Several main opportunities exist for Tasmanian fruit growers, as identified in previous reports of the Project, and the economic opportunity for growers from increased valorisation for Fruit Waste from Focus Fruits is in the conservative range of $1.2 million to $10.2 million. That number rises to $54 million to $275 million if growers participate in value-adding processes.

3. Current State of Fruit Waste in Tasmania

Tasmania generates large volumes of waste from apples, cherries and grapes (Fruit Waste), much of which is diverted to low-value uses (e.g., composting, animal feed). The Existing

[1] Hort Innovation, 2008, *Innovative approaches to adding value to vegetable waste – Phase 2*, https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt06053/

Ecosystem Report highlighted gaps in processing capacity, cold storage, and market linkages that prevent increased valorisation of Fruit Waste. Fruit Waste rarely leaves farms, and growers lack awareness of the full economic potential of valorisation, leading to missed revenue opportunities.

3.1 Infrastructure Gaps

Infrastructure gaps for supporting a new ecosystem were identified as follows:

- No large-scale cherry pitting infrastructure, reducing the ability to freeze and process unpicked first and second grade cherries.
- Limited chemical testing facilities, requiring interstate analysis.
- Few dedicated precision fermentation facilities, which limits the ability to experiment with novel fruit waste applications.

In addition, transport costs to interstate processors made it unviable to use Tasmanian Fruit Waste for production interstate of anything other than the highest value products.

Addressing these gaps will mean Tasmania will **create economic opportunities** in fruit waste valorisation.

4. Potential for increased valorisation

The Project identified several high-value product categories with strong market demand:

- **Functional beverages** (e.g., probiotic drinks, fermented fruit juices).
- **Shelf stable Products**
- **Vinegars and syrups** (e.g., cherry vinegar, apple-based balsamic alternatives).
- **Polyphenol-rich extracts** (nutraceutical applications).
- **Dried fruit powders and fibre additives**.

Other products with moderate or unknown market demand were also identified.

The Project identified two examples of increased valorisation that appear to be viable in Tasmania:

- **Eden Orchards** – Pasteurised cherry juice as a high-value alternative to low-margin frozen cherries.
- **Swinging Gate Winery** – Secondary ferment wines yielding **80% higher revenue** than traditional processing.

5. Ecosystem Stress-Test Findings

The Ecosystem Stress-Test aimed to identify barriers to scaling fruit waste valorisation. Key findings include:

- **Bottlenecks in Processing & Infrastructure:**
    - **Long wait times for testing** → Interstate laboratories required.

- **Challenges in pulverisation trials** → Unexpected enzyme breakdown issues with apple pomace and packing / shipping difficulties.
- **Cherry pits contamination risk** → High prussic acid content limits some processing methods.

Several insights into markets and industry were also gathered in the Ecosystem Stress-Test and the May and October 2024 Forums.

- **Market & Industry Insights:**
  - Many ecosystem participants had **never collaborated before**, revealing opportunities for **new partnerships**.
  - **Lack of market development** is a major **barrier to commercialisation** of fruit waste products.
  - **Funding and investment awareness** remains low among growers and food entrepreneurs.
  - **CRCs** remain underutilised in the Tasmanian Fruit Waste economy

These findings confirm that Tasmania is not yet ready for large-scale fruit waste valorisation, but targeted investments could change that.

6. Financial and Market Feasibility

Economic modelling suggests that valorisation could **generate between $1.2M and $10.2M** annually under current conditions. If **growers adopt value-adding practices**, the total potential could **reach $275M**.

Key financial considerations:

- **Cherry pitting investment** → Unviable for private investors due to high costs ($50K–$250K), low market demand and short window to generate revenue.
- **Fermentation infrastructure** → The **Fermentation Hub** will be able to provide a variety of trial-scale production and marketing support networks, lowering barriers to entry.
- **Government support** → Grants, green loans, and venture capital could play a role in **accelerating ecosystem development**.
- **Collectives** may be able to leverage aggregated volumes of Fruit Waste to streamline market access and market development

7. Conclusions & Viability Assessment

A **fruit waste valorisation ecosystem** in Tasmania is **viable** under **certain conditions**:

1. **Investment in key infrastructure** (e.g., cherry pitting, testing labs, fermentation facilities).
2. **Stronger industry collaboration** between growers, processors, and entrepreneurs.

3. **Market-driven product development** to ensure demand for high-value products
4. **Financial incentives** to reduce investment risks for new processing methods.

Without these elements, **the ecosystem will struggle to scale effectively**.

8. Next Steps

To establish a **sustainable fruit waste valorisation ecosystem**, stakeholders should focus on:

- **Leveraging the Fermentation Hub** as a centre for R&D and trial production.
- **Developing industry collaboration and partnerships** to align supply chains.
- **Utilising funding and investment strategies**, including grants and private sector collaboration.
- **Raising awareness among growers** to encourage participation in valorisation efforts.
- **Consider establishing grower's collectives** and other mechanisms to **foster collaboration** to develop markets and provide supply stability.

Appendix A – Stages of this Project

Project Stages

Stage 1 – Existing Ecosystem Report

Identification of the existing Ecosystem in relation to Target Fruits.

Stage 2 – Polyphenolic Fruit Byproduct / Waste Report

A Report that identifies the Fruit Waste and by-products from Tasmanian Fruits.

Stage 3 – New Ecosystem Viability Report

Identification of opportunities from a new ecosystem that creates value from Fruit Waste and fruit by-products within Tasmania

Stage 4 – Ecosystem Trial Report

Trials will be conducted to test all elements of the fermentation ecosystem with a view to various scales of production.

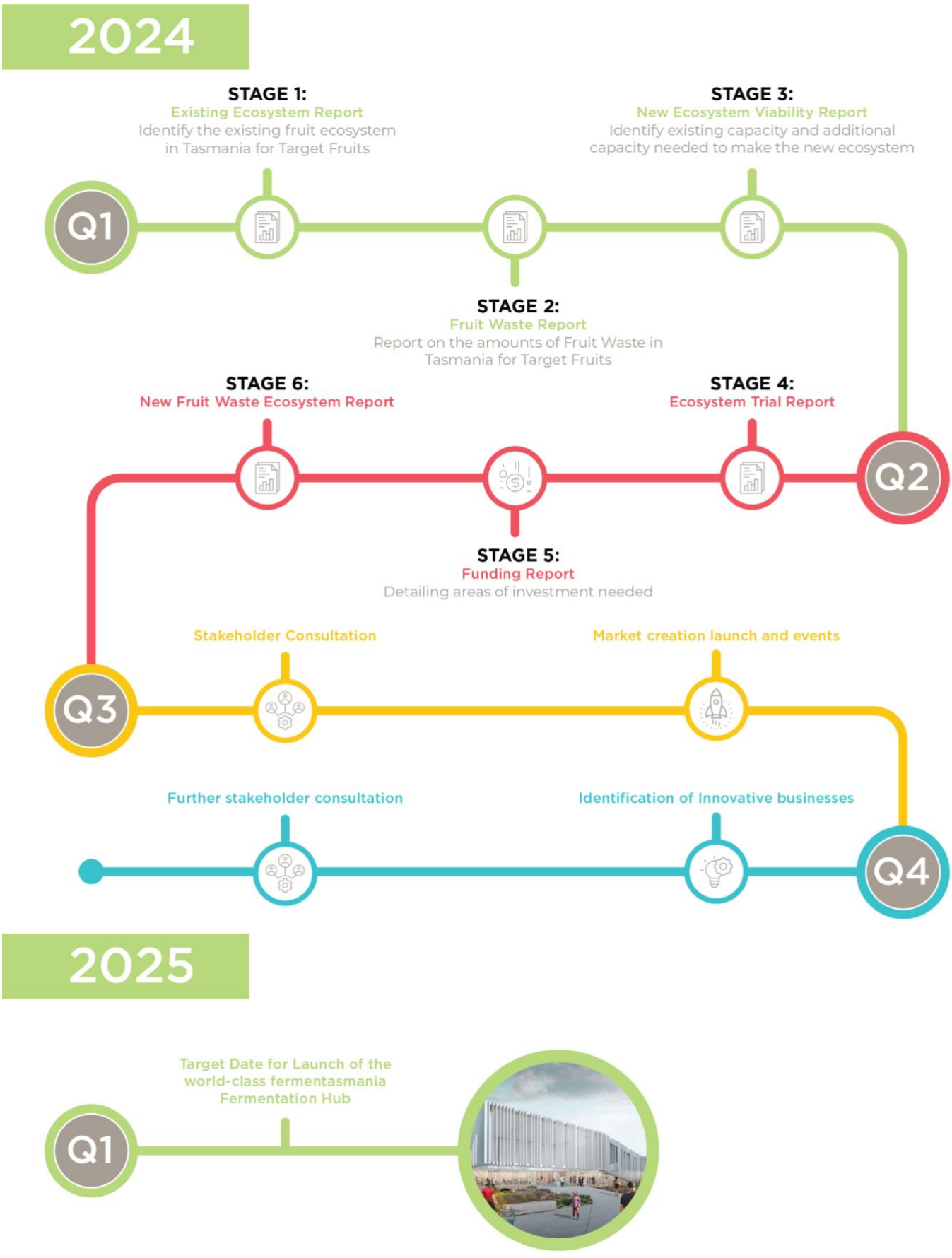
Stage 5 – Funding Report

Details of sources and needs for additional capital and infrastructure investment needed to support a new ecosystem.

Stage 6 – Fruit Waste Ecosystem Report

A report that summarises the whole Project, including the value to Tasmania of creating new ecosystems that support maximisation of Tasmania's Fruits.

Project Timeline



Anticipated Project Outcomes

The Project Partners anticipate several outcomes for the Fruit Growing sector and from the creation of new products and sectors pursuing economic opportunities highlighted in this Project.

Anticipated Project Outcomes for growers

Tasmania's growers can expect to take their share of the creation of new economic opportunities that result in:

- Higher prices for fruits and fruit by-products at certain stages of the existing Target Fruit ecosystem
- Reduced costs in relation to disposal of fruit by-products and fruit waste
- Increased value from fruit by-product streams in new market opportunities
- Reputational benefits flowing from definable and measurable reductions in carbon emissions

It is anticipated that the final outputs of this project will be the identification of:

- Clearer categorisation of Target Fruit by-products and waste streams
- Better reporting of Target Fruit by-products and waste in certain stages of growth and production
- Viable uses of existing Target Fruit by-products and waste streams in the existing and in new ecosystems.
- Highest value uses for underutilised Target Fruit by-products and waste streams.
- Market value of changing farming practice and achieving higher price points for Target Fruit by-products and waste streams
- Job creation opportunities in the Tasmanian food and beverage sector
- Pinch-points of the existing ecosystem in order to identify growth points for an additional ecosystem
- Viability of new food and beverage sub-sectors in Tasmania
- Increased utilisation of existing Tasmanian infra-structure
- Gaps in understanding of the carbon emissions of the Fruit sector in Tasmania

Further, the outcomes of this project will be a necessary input to the successful launch of the Fermentation Hub, targeting:

- 650 new jobs for Tasmanians
- Leveraging Launceston's status as a UNESCO Creative City of Gastronomy
- Food Tourism to Tasmania
- Agri-Tourism to Tasmania

Project Limitations and Exclusions

This project is limited to analysis of Target Fruits, and in addition, the following limitations are expected:

- This Project is only relevant to the 2023 growing season (although may be informed by trends in the 2024 growing season)
- In several areas there aren't complete data sets to facilitate high-quality analysis and projection, including amounts of fruit in long-term storage at farm-level. Data projections will need to be made from the available data, and it is difficult to know how accurate those projections will be

Appendix B - Reflections on this Report

fermentasmania Reflections

As identified in the McTavish West report in 2020, growers are loathe to recognise and identify fruits and fruit by-products as 'waste'. Classification of fruit by-products

Project Partners Reflections

Global / Australia Wide

Specific to Tasmania

Other

Appendix C – Project Partners Background and Interested Parties

SUPPORTED BY

Tasmanian Government

Tasmanian Government Supported

In 2021 and 2022, the Launceston region and fermentasmania had watershed years. In no particular order, all of the following happened:

- Funding for building of a Launceston-based world class food hub was secured; including fermenting, distilling and chemical innovation facilities.
- Launceston was designated a UNESCO Creative City of Gastronomy, becoming Australia's second such city.
- fermentasmania successfully applied to the Strategic Industry Partnership Program for funding to engage in this Project.

In 2023, it was announced that fermentasmania had been awarded funding for this project to investigate the viability of using fruit waste as an input into a new and high-value ecosystem.

Fruit growers Tasmania Supported

Fruit growers Tasmania, as the second peak-industry body involved in guiding the Project, represents apple, pear, cherry, berry and stone fruit growers in Tasmania. It represents the interests of Tasmanian fruit growers and is by Tasmania's fruit growers, for Tasmania's fruit growers.

Fruit Growers Tasmania

Fruit growers Tasmania key focus areas are to support growers with matters of pest and disease management, strengthening of national and international trade and to support industry development. Fruit growers Tasmania:

- offers information and support services to make life easier for members as well as other Tasmanian fruit growers.
- organises industry information sharing activities, including orchard walks, field days, and the annual conference.
- ensures representatives and other industry leaders serve on industry Strategic Industry Advisory Panels, representing the State and their colleagues on the boards of national industry peak bodies.

- assists growers with navigating government export registrations and audit processes. Members can use our website to keep up to date with industry and government export information including audit scopes, work-plans, and other relevant information.
- assists growers meet the growing national and international food safety quality assurance certification auditing requirements by coordinating microbiological and residue testing services.

Partner Supported

In addition to Government support, and the peak industry bodies, fermentasmania and Fruit growers Tasmania, several other partners were strategically invited to join this Project. That's because we wanted this project to test the limits of the proposed ecosystem so that any interventions and supports to create new income streams can target the parts of the ecosystem that lack capacity.

Those partners are:

- **University of Tasmania** through **Tasmanian Institute of Agriculture**
  The Tasmanian Institute of Agriculture (TIA) has a mandate to deliver research, industry development and education for the agri-food industry of Tasmania.

  Our vision is to enable Tasmanian food producers and processors to accelerate primary sector productivity while maintaining and improving Tasmania's land and water quality for future generations.

  Close relationships across the agriculture and food value chain at a local, national and international level ensure we are connected with stakeholders and that our research and education priorities support industry needs and aspirations.

  Website: https://www.utas.edu.au/tia

- **Startupbootcamp**
  A global family of industry-focused programs that support early to growth stage food, aqua and agritech founders to rapidly scale their companies. We provide direct access to an international network of the most relevant mentors, corporate partners, and investors.

  We are working with startups with innovative technology, products, services or disruptive business models that solve problems or have solutions for the FoodTech, and Blue/AgriTech sectors.

All our programs align to the UN Sustainable Development Goals, continuing our focus on the Circular Economy, adding value to Australia's animal and horticultural produce as functional foods or ingredients, and finding innovative technologies to help our global food and beverage sector become more efficient and sustainable.

Website:

https://www.startupbootcamp.com.au/programs/foodtech-tasmania

- Clever Fermentation
  Clever develops fermented superfruit health ingredients for nutraceutical, supplemental and functional food brands.

  Website: https://cleverfermentation.com/

- **Forager Foods**
  Forager Food Co. is at the forefront of the Australian freeze-drying industry, offering a range of premium freeze-dried products, all expertly crafted using the finest ingredients and the latest in manufacturing facilities and technology. Commencing operations in 2009 we have quickly grown to be the largest and most advanced manufacturer of freeze-dried products in Australia.

  Forager Food Co. processes, dries, and package a diverse range of foods providing extended shelf life whilst protecting the most valuable and delicate ingredients, including vitamins, minerals, antioxidants, colours, and flavours.

  Our production facilities feature state-of-the-art freeze-drying capability and are supported by full-service manufacturing facilities, including ambient, chilled, and frozen storage, food processing, packing, despatch, and logistics services.

  Website: https://foragerfoods.com.au/about/

Interested Parties

In addition to the formal Project Partners, other parties we have identified with significant interest in the outcomes of this project, and the success of the fermentasmania hub, include:

- City of Gastronomy
- City of Launceston
- Enterprize
- Hort Innovation
- Northern Tasmania Development Corporation
- McTavish West
- Tasmanian Farmers and Graziers Association
- Tasmanian Food Cluster
- Tasmanian Fruit & Vegetable Export Facilitation Group
- Van Diemen Project
- West Tamar Council

Throughout the remainder of this project, we will add to the above list. If you would like to be kept informed of the progress of the project, please contact Dwayne Baraka by email, or on 0481 88 00 46.

Interested sub-sectors

In investigating this report, the following sub-industries were identified:

- Grappa production
- Piquette production
- Polyphenol Concentrate production
- Haskap berry growers

Future parts of the study will try to identify interested parties from within those sub-sectors.