fermentasmania

SIPP Grant 2023 -

Polyphenolic Fruit Waste Valorisation Study

Stage 1 –

Existing Target Fruit Ecosystem 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

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redefining the food experience

Clever intelligent fermentation

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Executive Summary

Fermentasmania, in conjunction with Fruit Growers Tasmania, received funding from the Tasmanian State Government to investigate high value uses for fruit seconds and byproducts within the existing fruit growing ecosystem in Tasmania. The focus of this report is on valorising fruit wastes that are high in polyphenols that can be used in exceptionally high value nutraceutical products and due to recent novel technical advances in extraction and preservation processes, and other uses of such fruit wastes. This is the first of six reports exploring the value-add potential of wastes and byproducts in the Tasmania fruit growing sector.

The anticipated results of the study are to clearly demonstrate that Tasmania fruit growers can secure higher incomes through increased utilisation of fruits seconds and byproducts, and consequently enhance the Tasmanian economy through increased GDP and new jobs creation.

The initial group of fruits was identified based on relative phenolic content and respective scale/ size of opportunity. The Target Fruits are Apples, Blackcurrants, Cherries, Elderberries and Grapes. Other fruits high in polyphenols that have not been included are Blackberries, Blueberries and Strawberries, largely due to strong pre-existing alternative markets and comparatively low waste volumes.

Due to generally negative perceptions associated with generic "waste" terminology, the term "**Fruit Waste**" has been defined in accordance with the Food Waste Standard to encourage more positive engagement and quality conversations with relevant Growers and Entrepreneurs about this new high value-add opportunity.

An Existing Ecosystem Map has been developed highlighting where fruit seconds are byproducts are discarded or monetised for relatively low values. The farm-forward map will facilitate further identification of amounts of Fruit Waste in relation to the Target Fruits. In addition, the types of resources available to Growers and Entrepreneurs are identified, along with supporting Infrastructure types in Tasmania. The location of Target Fruit Waste at the point of diversion is also identified.

Possible uses for wastes from the Target Fruits are identified. The highest value use of Target Fruit Waste are alcohol-related products, although that isn't always the case. Other uses identified are:

- Nutraceutical products
- Other fermented products
- Dried products
- Freeze-dried products
- Frozen uses (including supply-shifting strategies)
- Woody / Seed products
- Vinegars
- Biochemically derived products
- Food additive products

This report will be used in development of other outputs from this study.

Conclusions

There are several identified points in the existing ecosystem where fruit seconds and fruit byproducts are available for further value-add processes. This Report details compelling reasons to continue with the Project and identify the amount of Target Fruit Waste and possible viable uses within Tasmania.

Planned next steps for this Project are detailed in Appendix A.

"We are proud to be part of creating new and attractive incomes streams for Tasmanian farmers. We are equally proud to be diverting waste away from carbon emissions and into health products"

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.

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.

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.

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

Introduction

Tasmania's growing reputation as a host of fine food outcomes is due, in no small part, to the excellence of raw produce grown here. Tasmania is recognised nationally, and increasingly internationally, as a producer of high quality food & beverage products. That reputation relies heavily on Tasmania's ability to grow some of the finest raw food anywhere.



Image Source: https://www.big4.com.au/caravan-parks/tas/launceston-north-tamar-valley/launceston-holiday-park/whats-local/harvest-market

Why research Fruit?

Fruit and fruit-based products are one of Tasmania's highest value sectors. The farm gate value of fruit was over $400million in 2022[1]. Value add processes increase the value of fruit ranging from 2 times (eg. farmers' markets) to 100 times that value or more (eg. alcohol production). While international export of fruits remains small as a percentage of all of Tasmania's exports it is high value at almost $100million[2]. In any case, fruit and related products remain an important part of Tasmania's participation in the overall Australian economy, and a very important part of sales within Tasmania.

For example, the wine sector is projected to increase the value it creates in the Tasmanian economy by more than 400% from 2023 to up to $2billion in 2040[3]. That includes product sold in Tasmania and mainland Australia, as well as value created through tourism.

There are also several players in the Tasmanian fruit-growing sector who are targeting 100% utilisation of all fruit and fruit-by products grown in Tasmania. Nonetheless, there remains an under-identified amount of fruit in Tasmania that is diverted to fruit's lower-value purposes; including livestock feed, composting and landfill. Higher value options exist, notwithstanding seasonal variations in prices for Tasmanian-grown fruits.

In addition, fruits are full of several healthy ingredients that are important as part of a balanced diet. Most of us are now well aware of the value to our bodies of fruit ingredients like antioxidants, polyphenols and anthocyanins; all of which have scientifically proven health benefits.

[1] https://www.premier.tas.gov.au/site_resources_2015/additional_releases/states-fruit-produce-is-ripe-for-the-picking
[2] https://www.treasury.tas.gov.au/Documents/International-Merchandise-Exports.pdf
[3] https://winetasmania.com.au/uploads/general/Tasmanian-wine-sector-infographic-2023.pdf

Opportunities for Tasmanian Fruit Growers

Several main opportunities exist for Tasmanian fruit Growers:

1. To increase the viable price for unsold first-class fruits, fruit seconds, fruit by-products and fruits that are disposed of for very little economic benefit;

2. To explore options for sub-optimal fruits and fruit by-products that may be higher value to farmers than current uses; and

3. To participate in the growing demand for nutraceutical products (globally and in mainland Australian markets).

Tasmania's Fruit By-Products Opportunity

Tasmania has done a remarkable job of targeting the highest value markets for its fruit Growers. For example:

- Tasmania's global cherry exports are supported and rewarded by global demand for the highest quality cherries (especially in Asia); including achieving some of the highest prices for fresh cherries anywhere in the world.
- Tasmania's grapes achieve a disproportionately and exponentially high price compared to mainland Australian Growers due to the suitability for use in wine production. Demand for Tasmanian—grown grapes is high both in Tasmania and on the Australian mainland.
- Tasmania's blackcurrants and elderberries are at virtually 100% utilisation, at much higher prices than fruits grown on the Australian mainland and overseas, albeit at relatively small volumes. The success of Tasmanian-grown blackcurrants and elderberries stands in contrast to the rapid and recent decrease in production of both throughout Australia.
- Tasmanian-grown apples continue to command a premium in some markets, due in part to Tasmania's cooler conditions and lower costs of controlled climate storage. In addition, a significant proportion of Tasmania's apple crops are utilised in Tasmania for the production of higher value products such as apple juice and ciders.

While that level of excellence has been achieved and ought be celebrated (arguably more than we do), Tasmania is not always achieving maximum price for all of the Target Fruits, whether that is achieving the maximum viable price for fruit seconds or achieving the highest viable minimum price for fruit by-products and low-value disposed fruits.

Secondary markets for fruit and fruit by-products remain under-explored in Tasmania, including the following markets that are established in certain global locations:

- Fruit skins for use as fibre additives
- Ground and Powdered products
- Dried and Freeze-dried products
- Food and clothing dyes
- Flavour extracts
- Other chemical-based extracts (food and health industries)
- Fermented Products
- Secondary Ferment Products
- Distilled products
- Woody by-products
- Herbal Teas
- Pressed Oils from seeds
- Biochemical products from fruit waste

In addition, products designed for Farmers' Markets are produced in an ad hoc fashion, with very little understanding of the value possible from such markets, other than at a farm level.



Case Study: Brady's Lookout Cider

Brady's Lookout Cider is among a tranche of fruit Growers that are changing on-farm practices and targeting 'zero waste' as a business plan.

In addition to using an array of Heritage apples (some of which only they grow) to produce high-quality ciders through *méthode traditionnelle*, Brady's Lookout Cider are targeting economically viable use of by-products from the production of cider.

Their efforts to be climate friendly have included industry-leading re-use of on-farm materials to build their world-class cellar-door facility, and supporting the creation of viable biochar from apple tree cuttings and cider-pressing waste.

In addition, they use skins and pulp from cider pressings to create small scale production of Apple Flour.

"... we also want to create that curiosity about why we're caring for the environment. We hope to encourage other people so that it's not so daunting for them."

— Chris Brown, Cider Maker

The reality is that tonnes of fruit in any given Tasmanian growing season is fed to livestock, composted, and sent for bio-composting or to landfill.

Why Fruit Waste?

Utilisation of food waste has been identified globally as an important way to reducing carbon emissions. In Australia, 40% of all food grown[4] is underutilised, most frequently ending in landfill.

While the largest share of food waste in Australia comes from consumers underutilising high quality foods[5], there is still on-farm wastage of fruits, and spoilage that means fruits cannot be sold into prime markets. The reality is that tonnes of fruit in any given Tasmanian growing season is fed to livestock, composted, sent for bio composting and also sent to landfill.

In addition, by-products from the production of high value consumer products like wine and apple juice (including grape marc and apple pomace) is largely discarded to landfill, livestock or compost in Tasmania. All of those uses may have higher-value uses if there is a supporting ecosystem. Tasmania's inability to utilise these things as a resource means it is underachieving on potential economic value, and also reducing avoidable carbon emissions. Little is known for certain about Tasmania's lost economic and environmental opportunity from fruit waste[6], and more research may identify better economic outcomes for Tasmania, including through this project.

Fruit used for on/near farm purposes (such as composting and livestock feed), are likely to miss economic and nutritional opportunities. For example, while cows seems to enjoy eating grape marc and apple skins, it is far from clear that it adds to economic outcomes for cow farmers, nor the dairy industry, and even less clear that Growers share in any value created. This report will identify possible alternatives for such practices that might be more economically valuable to Growers.

Project Stages

The current Project is attempting to identify more valuable uses of Target Fruit Waste (defined below) to the Tasmanian economy. Project Stages are identified in more detail in Appendix A of this Report and in Diagram 1, below. This Report is the output from Stage 1 of the Project.

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

[4] SOURCE
[5] SOURCE
[6] Stage 2 of this Project will seek to address that gap.

- 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:

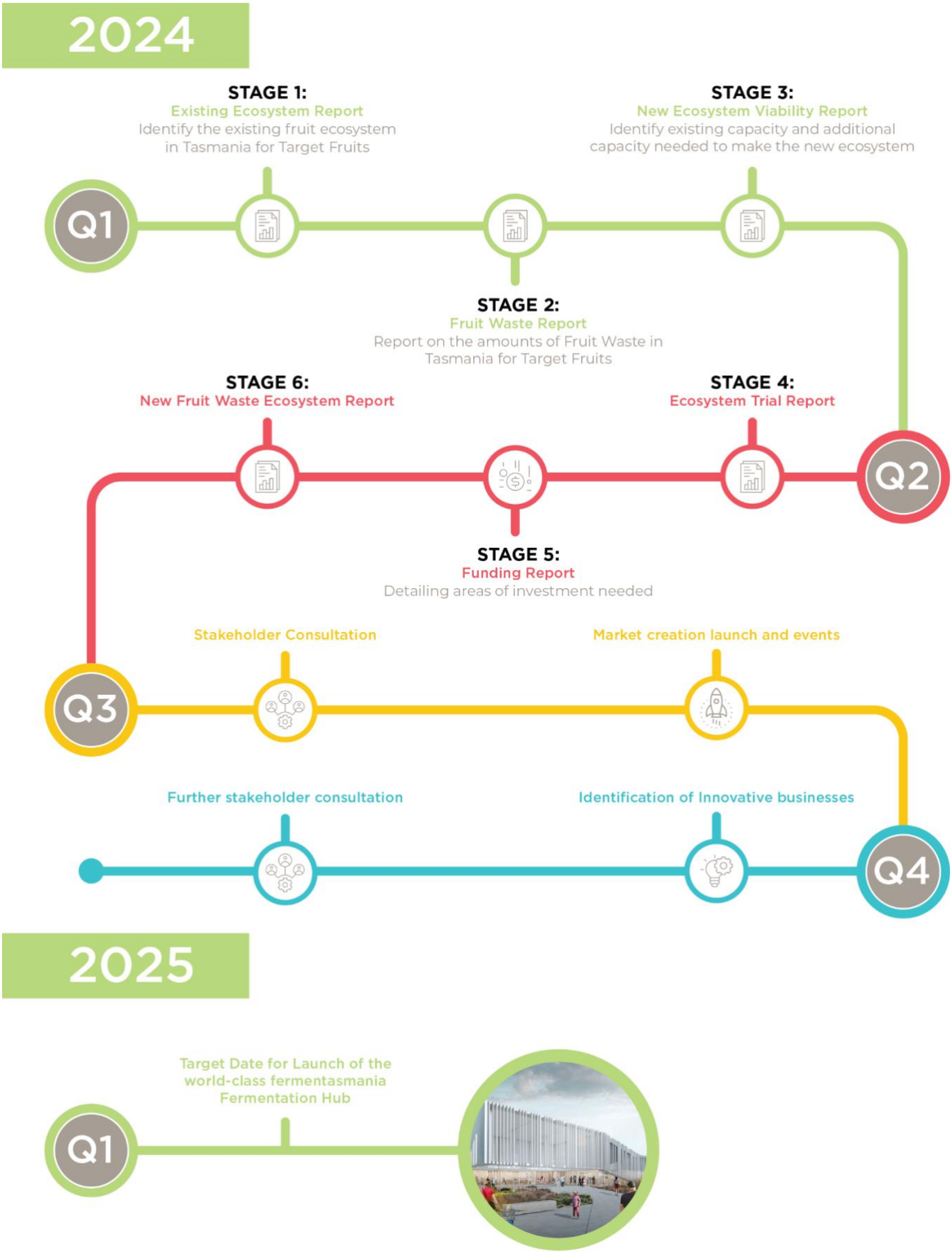
- 650 new jobs for Tasmanians
- Leveraging Launceston's status as a UNESCO Creative City of Gastronomy
- Food Tourism to Tasmania
- Agri-Tourism to Tasmania

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

Diagram 1 – Project Timeline



"Not only is the Fermentation Hub a world-class space for industry to play and innovate small scale commercial products, it will also provide spaces for cutting edge research and development, hands-on training and even agritourism and fermentation experiences for locals and visitors alike."

Kim Seagram, fermentasmania Chair

Target Fruits

High Polyphenolic Fruits

After consultation with the Government and Project Partners, fruits that are high in polyphenols were identified as of particular interest. That is because several innovative fermentation techniques have emerged recently[7] that preserve polyphenols and enable production of a powdered end-product that could be used as a nutraceutical ingredient in food and beverage products.

In addition, fruits that are high in polyphenols often are also frequently high in antioxidants and anthocyanins, which have their own definable health benefits and nutraceutical properties.

Table 1 shows the relative polyphenol content of fruits of interest.

Table 1 – High polyphenol fruits

Fruit	Polyphenol (mg/100g)	Waste Level Tasmania	Notes
Elderberry	1,349	Low	Highest of all known natural products
Blackcurrant	753	Low	Multiple boutique uses of fruit
Blueberry (Highbush)	556	Almost Nil	Mostly packed for food consumption
Cherry	272	Mid to Very High	Varies greatly by season
Blackberry	260	Low to Mid	Higher than strawberries
Strawberry	235	Low	Mostly packed for food consumption
Grape (Red)	169	Very Low	Tasmania's red grape growing is surprisingly high
Grape (Green)	89	Very High	Frequently used as fertiliser. Grape seeds contain about 60% of polyphenols
Apple	135	High	Apple skins contain most of the polyphenols

Source: https://kelseykinney.com/polyphenols-foods/ [8]

The Chosen Five (six)

The target fruits chosen ("**Target Fruits**"), were, in alphabetical order: ***Apples, Blackcurrants, Cherries, Elderberries*** and ***Grapes.***

The Partners thought it would be useful to treat grape growing as a contiguous industry, rather than dividing red and green grapes, despite the difference in polyphenol content. I addition, there are several globally-proven strategies for using grape marc, and while grape Growers use virtually all of the fruits and by-products from grape growing, Tasmania arguably currently underachieves on exploiting marc as a resource.

[7] Including a technique patented by Clever Fruits, a Partner in this Project.

[8] Although this source is an aggregation of many studies, it is useful because it directly compares all the fruits of interest. While variation has been recorded in levels of polyphenols across time and locations, the relative levels remain largely similar to those identified here.

Highbush Blueberries (the majority of blueberries grown in Tasmania) are very high in polyphenols, however almost all Tasmanian blueberry production is packed into end-use containers and sold into ready-to-eat consumer markets[9]. It was identified that there would be almost no blueberry waste left in Tasmania at the end of a blueberry season, and blueberries were therefore not included.

Because alternative markets for 2nd grade strawberries and blackberries have already been identified and utilised by most Strawberry Growers (gate sales, jams, farmer's markets, wines, etc...), strawberries and blackberries were also excluded.

Blackcurrants and Elderberry are useful fruits to include, not least of which because the content of Tasmanian grown Blackcurrants and Elderberries when compared to those grown elsewhere remains under-researched. It is anticipated that Tasmanian grown fruits, with near-ideal growing conditions, will contain higher than average levels of polyphenols and antioxidants when compared to fruits grown in other growing areas.

In relation to Cherries, waste amounts vary wildly from season to season (parochially 25%-65%), and it is the only fruit identified for which Growers utilise helicopters to dry the fruits, and had waste confirmed as dumped at bio-composting waste facilities in any recognisable volume in recent years. The sheer size of cherry waste in certain years seems to indicate that the economic opportunity from Cherry waste will be significantly higher than other Target Fruits. That isn't to say that the opportunity will be an easy one to achieve (whether in terms of changed Grower behaviour or capacity to utilise Target Fruit Waste), merely that it is economically large.

Apples in Tasmania produce one of the highest fruit by-product and waste streams by tonne in Tasmania and seem an excellent fit for analysis here.

Testing Tasmanian Fruits

The polyphenol content of Tasmanian-grown Target Fruits remains under-identified. While it seems likely that Tasmania's growing conditions will lead to higher average polyphenol content than certain other locations in Australia, and globally, that conclusion has not been comprehensively confirmed.

Stage 4 of this Project may further investigate polyphenol content of Tasmanian-grown Target Fruits.

[9] McTavish West report XXXXX

What is Fruit Waste?

Existing Definitions

On of the challenges to the effective completion of this Project has been, and seems likely to remain, the narratives of Growers in terms of what they identify as 'waste'. That issue was also identified in the 2020 Tasmanian Food Cluster Food Loss Report[10].

As part of this Project, we have engaged in conversation with Tasmanian fruit Growers, some of whom would declare "We don't have any fruit waste". From a certain point of view, that was invariably true, in that fruit was used as fertiliser or "fed to the cows". Those uses are entirely legitimate and useful to Growers, and it seems that the term 'waste' has something of a bad reputation among Growers and care needs to be taken to distinguish different types of outputs from the fruit growing process.

When Growers are questioned in detail about what they do with fruits grown, a more subtle and nuanced picture emerges, as will be shown in the outputs from our Fruit Waste Survey, which will identify uses of fruits, fruit by-products and fruit waste.

Stage 2 of this Project will investigate the uses of Tasmanian-grown Target Fruits and related by-products and waste.

The need for a standard approach to talking about waste seems to be useful to Tasmanian Growers. Therefore, there is a need to find a language framework that supports a different understanding of fruit, secondary fruit, fruit by-products and use / recycling of fruit seconds and by-products.

Food Waste Standard



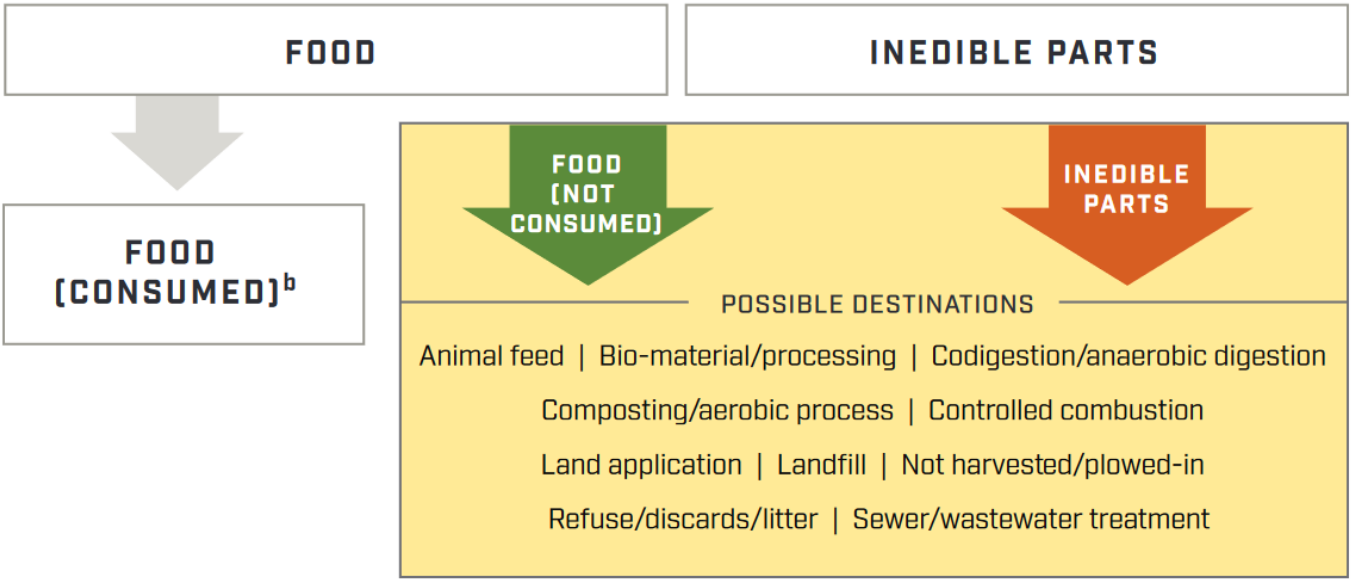
In 2019, the World Resources Institute, backed by several other organisations[11], published the "Food Loss and Waste Accounting Reporting Standard" ("**Food Waste Standard**").

That report identified several clear points in the growth and production points of food where waste is generated. It also details where and how government and industry actors can intervene to create viable income streams from fruit by-products and waste.

It also identifies the need to clarify the desired outcomes of quantifying food use, and this Report is the first of several stages in identifying the desired outcomes of maximising incomes from the Target Fruits in the Existing Ecosystem, and in potential new ecosystems.

The Food Waste Standard identifies several categories for the use of Food, as shown in Table 2.

Table 2 – Food Waste Standard – Uses of Food



[10] Prepared by McTavish West.

[11] Including The United Nations Environment P, World Business Council for Sustainable Development and WRAP. For a full list refer to About the FLW Protocol - Food Loss and Waste Protocol

Table 2 shows the distinction between consumed food and the possible destinations of food that is not consumed, and the inedible parts.

While that Table lacks easy translation to the uses of Target Fruits by Tasmanian Growers (that are sold as whole fruits and as a range of products from Target Fruits), the categories of destination of foods seems useful as a tool to identify current uses of seconds and by-products of Target Fruits. In particular, the following categories resonate with use of Target Fruits:

- Not-harvested / ploughed-in
- Animal Feed
- Bio-material / Processing
- Biochar / combustion for energy
- Composting /Aerobic processes
- Land Application
- Refuse / discards / litter
- Landfill

Working Definition of Fruit Waste

For our purposes, it seems sensible to adopt the approach of the Food Waste Standard where possible. That's because it clearly identifies various uses of grown foods, all of which are relevant to the use of Target Fruits (including fruit by-products, and relevant non-economic streams). However, there is a disconnect between the Standard and what Tasmanian Growers define as waste. The survey used in Stage 2 of this Project uses the categories identified in the Food Waste Standard to help identify where fruits and by-products from Target Fruits are in the Existing Ecosystem, and where alternative economic uses of those things will add value.

For our purposes, "Target Fruit Waste" means fruit and fruit by-products from the Target Fruits that are diverted into landfill, compost or animal feed. At each point, there is a decision to not attempt to add any further value to the Fruit Waste by-products.

"Target Fruit Waste" means fruit and fruit by-products from the Target Fruits that are diverted into landfill, compost or animal feed.

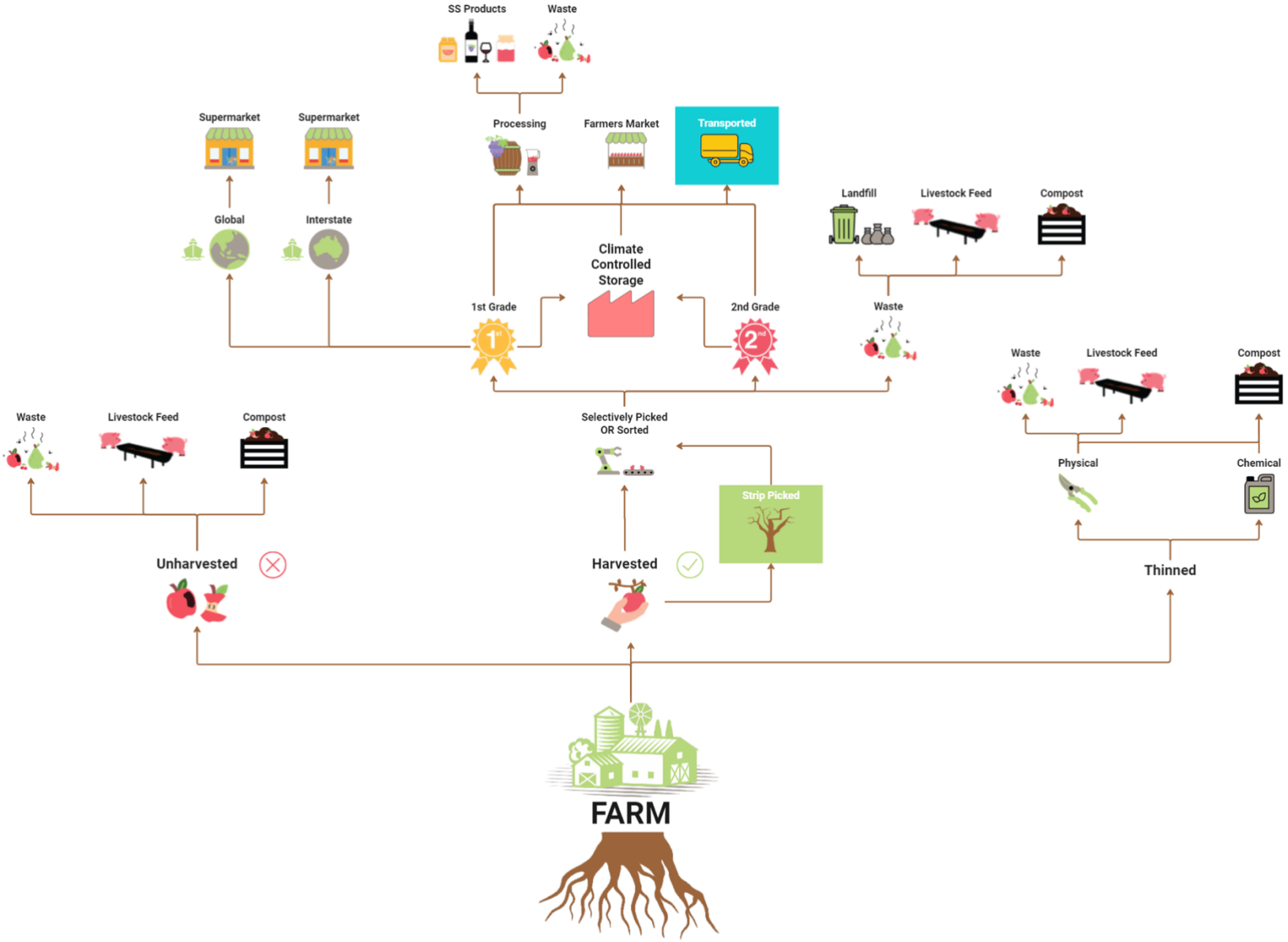
Why Food Waste Definitions matter

Defining Food Waste appropriately is important for Tasmania if it is going to identify and unlock the lost economic opportunity that by-products and waste from Target Fruits represents; enabling better decisions to be made by Growers, Industry and Regulators.

This Report stands on the shoulders of many who have addressed the issue of by-products and waste from Target Fruits in Tasmania. Below is a farm-forward identification of waste in the current Ecosystem.

Ecosystem Map

Diagram 2 – Farm-Forward Existing Ecosystem Map



In understanding the opportunities for Tasmania from the Target Fruits, it is important to understand the points in the existing ecosystem where fruit by-products and Target Fruit Waste is generated. The current ecosystem for the Target Fruits is detailed and represented in Diagram 2, 3 & 4.

Diagram 2 shows the farm-forward destinations of Target Fruits and identifies various points at which Target Fruit Waste is generated. In addition the On-Farm opportunities for strip-picked fruits and Target Fruit Waste are identified in Diagram 3, below.

Diagram 4 shows the locations of Target Fruit Waste in Off-Farm value-add processes. While those locations may be beyond the control of Growers, they may still represent lost economic opportunities.

On-farm Opportunities

On-farm Target Fruit by-products and waste is identified in at all stages of the process, including:

- thinning (chemical and physical)
- non-harvested fruits
- harvested fruits that do not meet buyer expectations (for 1st or 2nd class fruits)
- harvested fruits that do not have a timely buyer (for 2nd class fruits)
- post-production waste from shelf-stable products (eg. wines, other alcohols, jams, etc ...)
- waste fruits from all other sources

Other opportunities to monetise waste from Target Fruits are identified from strip-picked farm operations, and also from other Value-added processes.

Strip-Picked Opportunities

Diagram 3 – Strip-Picked Processes and Markets

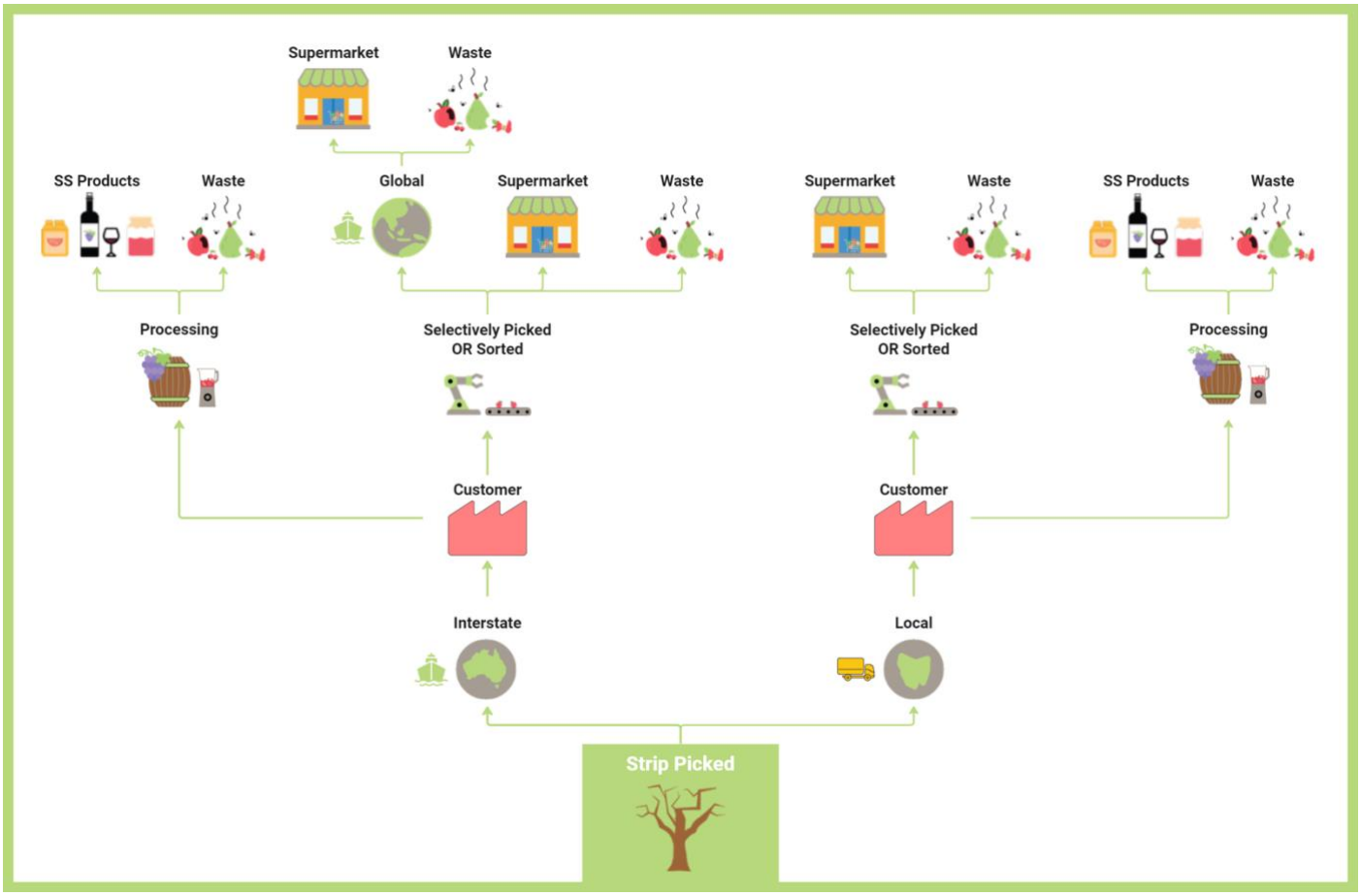


Diagram 3 shows the farm-forward processes for strip-picked Target Fruits. Strip picking involves no sorting on-farm, with all processes completed by a buyer or contractor.

The path for different fruits varies enormously in terms of eventual consumer markets. Some examples of paths for Target Fruits are:

- Grapes are sold to Tasmanian and Australian wine producers, who make wine and manage the related waste.
- Apples are sold to domestic wholesalers who store the apples in controlled environments for year-round consumption through supermarkets
- Apples are sold to juicers / cider-makers who make their products and manage the related waste.
- Cherries are sometimes clear-picked and sent to the mainland, where they are sorted and sold into domestic markets, or exported to global markers. Parochially very little waste is identified in this process.

Additional sources of waste are in the strip-picking process; however the waste is no longer in the control of Growers. Only waste that remains in Tasmania is likely to have any economic value for the Tasmanian economy, even where it is outside the control of Growers.

Off-farm Opportunities

Diagram 4 – Off-Farm Value-add Processes

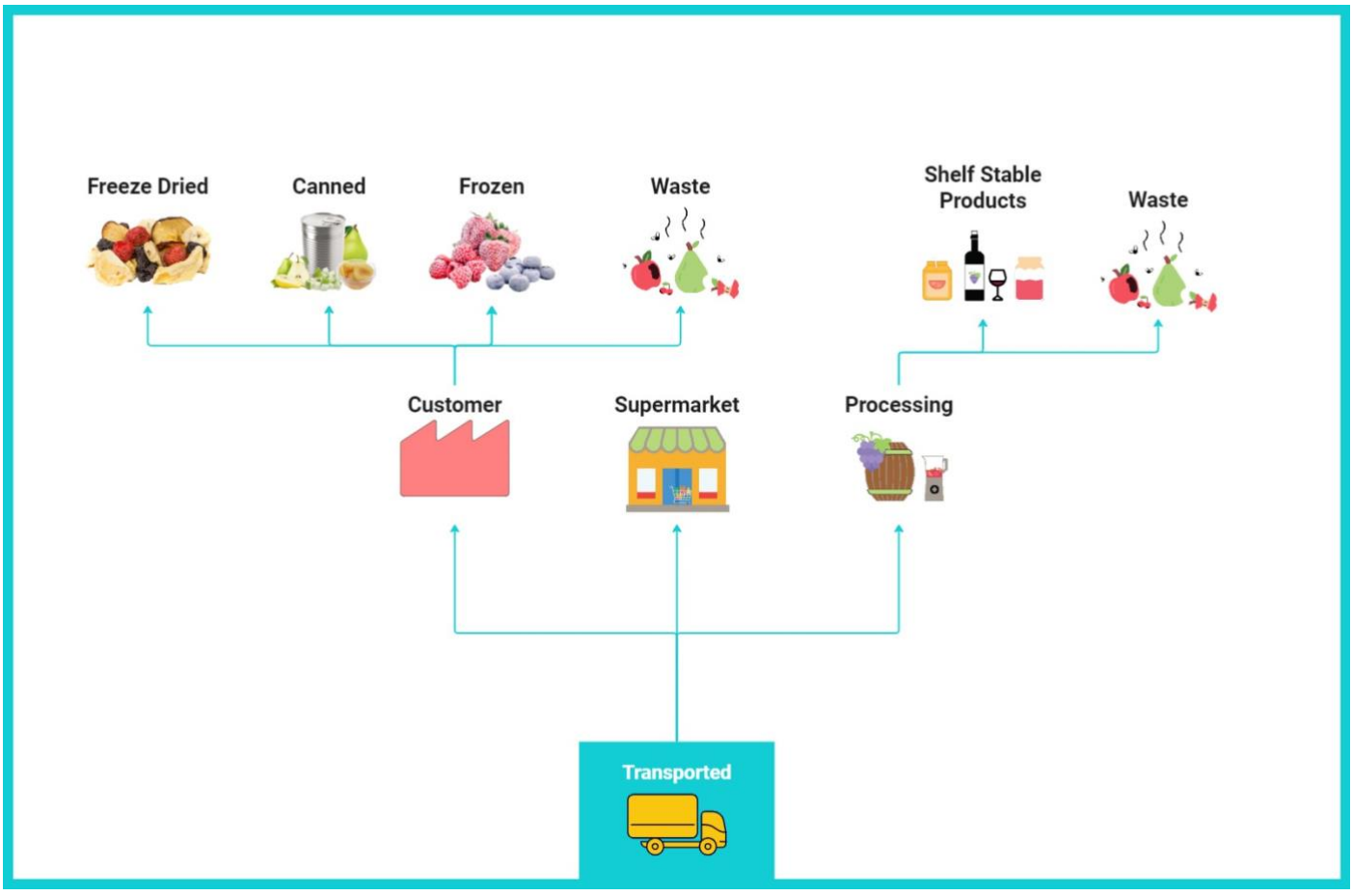


Diagram 4 shows the off-farm value-added processes in the existing ecosystem. The off-farm processes include sales to 3rd parties, and also contracted value-add services (such as jam and juicing). Examples of paths for the Target Fruits include:

- Sale to wholesalers for production of supermarket-type sales:
  - Freeze dried products
  - Tinned products
  - Whole-fruit Frozen products
- Direct sales to supermarkets, largely on the basis of farm-based packing of high-grade fruits
- Production of juices, including as inputs to alcohol products.

Farm-Forward Waste Identification

From the Ecosystem Maps, all the streams of waste are identified and summarised in Table 3. The Table identifies the most common uses of Target Fruits and is not intended to comprehensively identify all uses.

Table 3 – Target Fruit Waste locations in the current Ecosystem

Farm Activity	Type of Activity	Detail of Activity	Strategy / Conclusion	Market	Sub-Market	Sales Channel / Product						Resulting Waste Type			
						Gate Sales	Farmers' Markets	Primary Food Sellers	Shelf-Stable Products	Frozen Products	Freeze Dried products	Landfill	Compost	Livestock Feed	Unknown Waste
Thinning	Chemical	Increased Yield											✓		
	Physical	Increased Yield										✓	✓	✓	✓
Harvest	Picked	Strip Picked	Sell all	Tasmanian Markets				YES				✓	✓	✓	?
				Australian Markets				YES							x
				Global Markets				YES							x
		Selectively Picked / Sorted	1st Grade	On-Farm use		YES	YES		YES			✓	✓	✓	✓
				Tasmanian Markets				YES				✓	✓	✓	✓
				Tasmanian Processing				YES	YES	YES +	YES	✓	✓	✓	?
				Australian Markets				YES							✓
				Global Markets				YES							✓
			2nd Grade	On Farm Use		YES	YES		YES			✓	✓	✓	✓
				Tasmanian Markets				YES	YES			✓	✓	✓	✓
				Tasmanian Processing				YES	YES	YES	YES				?
				Australian Markets	'Ugly' Fruits			YES							✓
				Global Markets				YES							✓
			Waste	Unknown								✓	✓	✓	✓
	Not Picked	Left on Farm	Waste	Unknown									✓	✓	✓

Table 3 Key

✓ Waste available for use by Growers
? Waste not available to Growers; may be available to other users.
x Waste not available for use by Growers
\+ Resulting product may be available to Growers for further value-adding processes

While there are several waste streams that are realised outside Tasmania (on the Australian mainland, and in Overseas Markets), there remains many waste streams that remain in Tasmania. All those Tasmanian waste streams are potential opportunities for Growers in Tasmania (and other Tasmanian actors) to increase incomes from existing growing processes.

There are several parts of the Existing Ecosystem that are needed to successfully support diversion of Target Fruit Waste into alternative economic opportunities. They include harvesting resources, storage resources, freezing/freeze-drying resources and secondary processing opportunities. Clarification of the levels of those resources will be important for calculating the viability of a new ecosystem. Description of each of those resources follows.

Harvesting Resources

Growers have access to a range of resources at the time of harvesting. Those resources include Grower-owned transport and storage, along with 3rd party solutions. Of most relevance for increasing monetisation of Target Fruits are:

- on-site storage facilities, which are used by Growers to shift supply to match demand and maximise prices for produce; and
- 3rd party Transport solutions.

On-Site Storage Facilities

Farmers have a range of storage facilities; from short term, to climate controlled, to freezer storage.

Short Term Storage

Short term facilities are used to store product awaiting daily or other short-term collection for delivery to buyers or market partners. Virtually all of the Target Fruits have daily short-term solutions, which vary from transport-ready packing crates that are re-used (hundreds in the case of Apple Growers and only a few in the case of Grape Growers) to boxes of ready-to-display fruit containers (including clam-shells and shipping boxes as used by Cherry Growers)

Climate Controlled Storage

Climate Controlled Storage ("CCS") allows farmers to store goods until customers are ready for delivery and/or prices are more favourable for farmers.

CCS is used extensively for apples for up to 12 months, and increasingly in relation to cherries at much shorter timelines.

Freezer Storage

Freezing fruits tends to decrease viability of fruits, however for some of the Target Fruits there are product paths that are more viable through freezing than letting fruits go to waste.

A very small number of farms have their own freezer facilities, and freezer storage is heavily reliant on 3rd part providers.

Transport

Ambient Transport

Tasmanian seems to have an abundance of ambient transport resources when it comes to Target Fruits, not least because many Growers have a level of ambient transport available on-farm.

In addition, there seems to be a significant surplus of ambient transport shared across many sectors of the Tasmanian economy.

Climate Controlled Transport

Parochially, climate-controlled transport has less surplus capacity than ambient transport, however there are very few stories of lack of climate-controlled transport leading to fruits going to waste. More likely to be the cause of expired fruits are the lack of processing capacity, or lack of storage.

Nonetheless, the capacity of climate-controlled transport is an area of future investigation.

Stages 3 and 6 of this Project will investigate the capacity of Tasmania's transport infrastructure.

3rd Party Freezing / Freeze-Drying Facilities

Freezing facilities in Tasmania have tended to cater to vegetables, although frozen fruits is an increasing part of value-add for Target Fruits.

In addition, freeze-drying is also an increasing part of the Tasmanian economy, especially in relation to Target Fruits. That's in part due to the increasing market for freeze-dried fruits for use in the bush-walking economy, both in Tasmania and on mainland Australia; and due to urban consumer demand for such treats.

Stages 3 and 6 of this Project will investigate the capacity of Tasmania's freezing and freeze-drying infrastructure.

Frozen storage / Processing

Tasmania has recently become the home of Australia's largest freezing and freeze-drying facility. It seems that facility is operating at less than 100% capacity, although the optimisation of freezing and freeze-drying products (and the necessary changes to line operations) is yet to be settled.

There seems to be opportunities to secure line capacity once streams of waste from the Target Fruits are known.

Processing Facilities

Facilities to process Target Fruits at various stages needs to be taken into consideration.

Fermentation

Fermentation facilities include on-farm, wine-processing equipment, and the burgeoning fermantasmania facility.

Fermentation facilities remain under-identified in Tasmania.

Distillation

Distillation facilities are licensed by various Australian and Tasmanian Government authorities, including WorkSafe Tas, Liquor and Gaming Tasmania and the Australian Taxation Office.

None of the above-mentioned Government-agencies has a comprehensive list of the distillation capacity of Tasmania.

In any case, it seems likely that the stills in Tasmania are not at 100% capacity, and therefore there is room for more distillation of the waste from Target Fruits.

Possible Uses of Target Fruit By-Products and Waste

While this Report does not seek to be exhaustive, and subsequent Reports from this Project will add detail, there are several obvious possible paths for by-products and waste from Target Fruits that are currently used rarely or not at all. In any event, it seems true to say that the possibilities for utilising Target Fruit Waste are extensive and continue to grow with advances in food technology and sustainable practices.

Compost and Animal Feed

Using Target Fruits and related by-products and waste to regenerate soil, and as animal feed, are valuable uses. By increasing soil nutrients and adding value as high-nutrition feedstock, Growers are making viable use of their Target Fruits.

In addition, the social capital generated in various arrangements among Growers with their neighbours and communities should not be underestimated. The generation of social capital is an important part of the Tasmanian community. Nonetheless, Composting and Animal Feed are among the economically lowest-value uses of Target Fruits and their by-products and waste streams.

Compost

Using Target Fruits and by-products and waste as fertiliser or compost has certain economic benefits for the end user of such things. Early evidence indicates that some of the beneficiaries of this use are off-farm at the buyer-side or Growers' neighbours.

For certain Target Fruits, composting times can be long and careful management is needed, including composting for more than one growing season, which brings additional costs to Growers or users of such fertilisers. In addition, for various by-products of the Target Fruits, there is an appreciable risk of creating sub-optimal or even toxic soil conditions by spreading too much by-product as Fertiliser and/or Compost.

Animal Feed

Livestock gain some benefit from consumption of Target Fruits and their by-products and waste, although, as is often the case, too much of a good thing can be detrimental to livestock.

Such arrangements are beneficial at some level to Growers and Livestock owners, although it remains unclear the extent to which Growers benefit, especially if there are other economic opportunities available instead of this path.

Ground / Powdered Products

Several Target Fruits have viable paths to creation of powdered products, either from first-class fruits or from fruit by-products. Such products include:

- Flours from all the Target Fruits
- Powdered fruits for use as flavouring
- Pectin (from apples)
- Ground seeds for use in the beauty industry (grapes and cherries)

Apple flour is an example of an existing use of apple pomace, although its production is limited to only a few farmers (see above – Case Study: Brady's Lookout Cider).

Few other examples of powdered products are known within the Tasmanian economy.

Additive Products

Target Fruits can be used to add flavour and health benefits (including polyphenols, antioxidants and anthocyanins) to existing products. For example:

- Olive Oil

- Foods
- Beers
- Wines
- Ciders

Several high-profile examples of collaborations between Growers and alcohol producers highlight an existing path to market for Tasmanian Growers.

Further, food additive products are also an alternative market, such as pectin derived from fruit seconds and byproducts.

Dried, Frozen and Freeze Dried Products

Tasmania, as the recently made home of Australia's largest single freezing and freeze-drying facility[12], has opportunities to further explore the use of freezing fruits as a way to shift supply to match capacity of processing plants to produce high-value products.

Dried Products

Drying of Fruits in Tasmania isn't especially common, although some examples exist.

Freezing and Secondary Markets

While some of the Target Fruits degrade quickly through the freezing process, the constitution of some Target Fruits means that they are more easily used in secondary, post-freezing production processes. Time-shifting of production for the Target Fruits will mean that Growers may gain economic opportunity through access to secondary production processes instead of dumping Target Fruits and by-products into compost, livestock feed or landfill.

Freeze Dried Products



There are additional opportunities to produce freeze-dried products from Target Fruits that are likely to be valued by dessert-makers and brands targeting ecotourists seeking to maximise their Tasmanian wilderness experiences.

Image Source: https://foragerfoods.com.au/products/

Fermentation-Based Products

Wines

In general, it remains true that the most valuable use of any kind of Target Fruit waste (whether it be by-product, second class or waste) in purely economic terms, is either high-quality direct-to-consumer paths, or paths that result in the production of alcoholic beverages. That is in no small part due to the premium that high-quality Tasmanian produce and alcoholic beverages command in the marketplace.

Tasmania's wine sector is an important part of the Tasmanian economy. In the Australian market, consumer demand for low or no-alcohol wines is growing and likely to far outstrip any growth in the alcohol market generally.

Fruit Wines

Fruit wine of almost every variety is available at cellar doors and farmers markets across Australia, and Tasmania is no different. Nonetheless, other than grape wine, very few of the wines and liqueurs produced from Target Fruits have successfully captured the mainstream palettes of Australians' purchasing patterns at Bottle Shops.

[12] Forager Foods owns this honour.

There may be opportunities for Tasmania to capture new markets.

Fermented and Functional Drinks

The success of Kombucha in Australia indicates a trend away from fizzy drinks toward more healthy options. There may also be high value markets for powdered fruit-based supplements using fermentation to provide manufacturers with cost-effective natural and health ingredients.

Fruit byproducts from the Target Fruits, due to their high polyphenol / antioxidant content, may also be attractive to the broader Functional Drink market as a way to make health claims provide falvour profiles can be tailored to the changing consumer palatte.

Vinegars

While Vinegars are not alcohol products, they rely heavily on the same processes. There are several examples of vinegars made from Tasmanian Target Fruits:

- Apple Cider Vinegar
- Cherry vinegar
- Red Wine vinegar
- White Wine vinegar

Nutraceutical Products

The size of the global market for food and beverage products that have scientifically proven and specific health benefits, the '***nutraceutical***' sector, is set to explode. From an established market size of $US 307 Billion in 2021, estimates for adjusted growth range from $US 463 Billion by 2027[13] to as much as $US 651 Billion by 2030[14].

In Australia, the opportunity is projected to be similar. From a base in 2022 of $10 Billion, estimates for adjusted growth range from $13 Billion by 2028[15] to $16 Billion by 2031[16].



Image Source: https://www.dnaindia.com/lifestyle/report-what-is-nutraceuticals-7-benefits-should-know-nutrient-pharmaceutical-vitamins-minerals-fibre-health-benefits-2945475

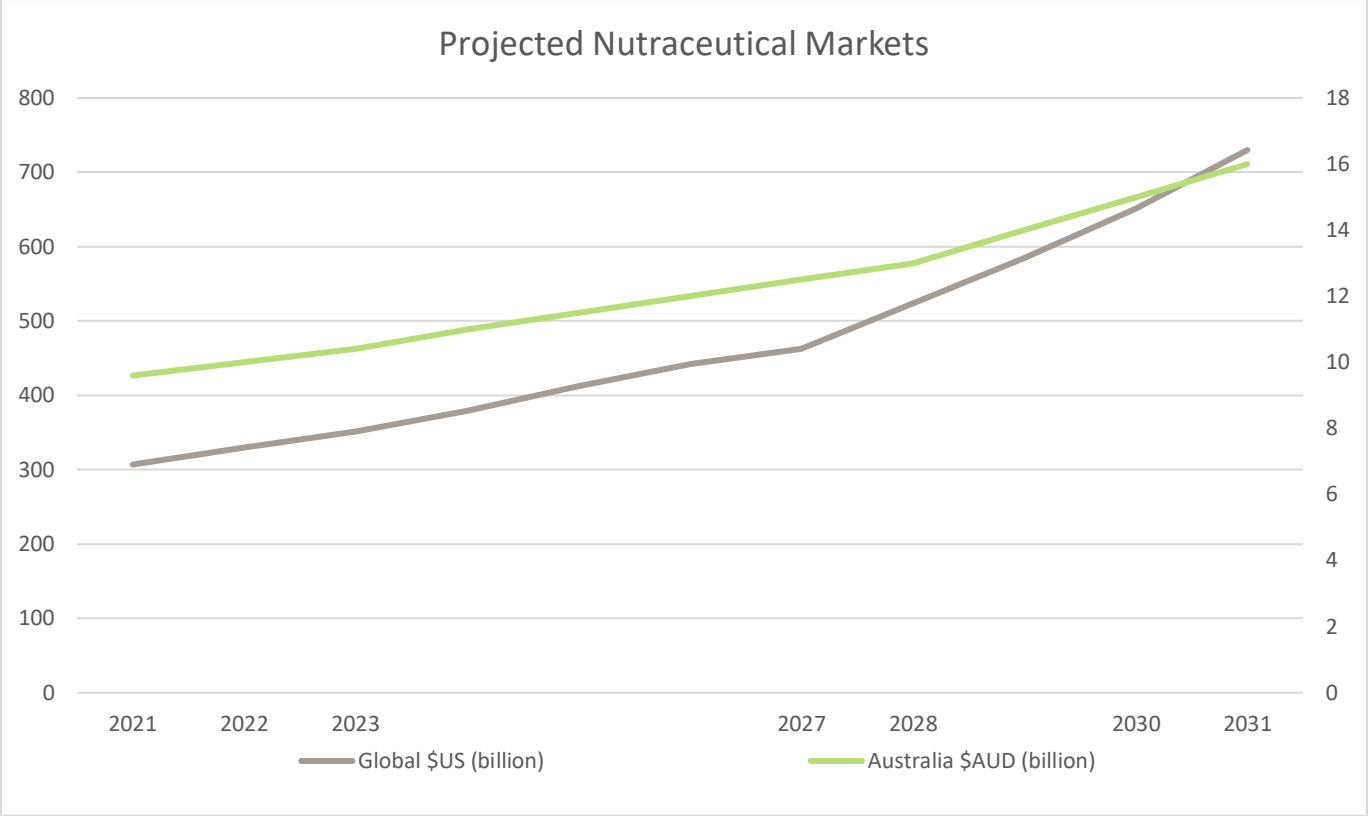
Table 4 – Projected Demand for Nutraceutical products in Australia and Globally

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Australia $AUD (billion)	9.6	**10**	10.4	11	11.5	12	12.5	**13**	14	15	**16**
Global $US (billion)	**307**	330	351	379	412	442	**463**	524	585	**651**	730

Numbers in the above table are compiled industry estimates and projections and adjusted for inflation projections.

[13] https://www.expertmarketresearch.com/reports/nutraceutical-products-market
[14] https://www.prnewswire.com/news-releases/global-nutraceuticals-market-report-2023-sector-to-reach-650-5-billion-by-2030-at-a-3-49-cagr-301839801.html
[15] https://www.mordorintelligence.com/industry-reports/australia-nutraceutical-market/market-size
[16] https://growthmarketreports.com/report/nutraceuticals-market-australia-industry-analysis

Chart 1 – Demand for Nutraceutical products in Australia and Globally



The key players in the food and beverage sectors are almost entirely the key players in the nutraceutical sector, with the addition of the main players in the dietary supplement sector. The dietary supplement sector is broadly projected to grow by as much as the nutraceutical sector or more, with similar needs for powdered nutraceutical ingredients as inputs to production. As Chart 1 shows, the opportunity is greater in the global market, than in Australian markets.

Growth in Asian markets is also projected to be exponentially greater than both global and Australian markets, although the reports investigating Asian markets have much higher volatility in their predictions, perhaps indicating a greater degree of uncertainty in those markets.

One of the identified barriers to achieving such growth is the sourcing and supply of concentrated liquids and powders that contain the highest quality nutraceutical ingredients. Putting it plainly, Tasmania can only expect to participate in the global (and mainland Australia) nutraceutical market growth if it can take existing produce and turn it into a product that can viably be exported at a competitive rate. The only currently identified viable path is to take tonnes of fruits (including fruit by-products and waste), extract the best nutraceutical ingredients by various methods of concentration (including fermentation), and export kilograms of concentrated product. By producing a super-concentrated ingredient, Tasmanian can then access global nutraceutical markets.

Thanks to ongoing research into fermentation and its ability to take large amounts of fruit by-products and waste and turn it into very concentrated nutraceutical ingredient, including removing any undesirable flavour compounds and profiles, now is a very good time for Tasmania to investigate its part in the global nutraceutical industry.

Recent development of fermentation techniques (including those that will be showcased at the new fermentasmania hub), will mean that there may be opportunities for Tasmania to export its lowest-value fruit by-products of the Target Fruits as a high-value nutraceutical ingredient.

Any of the waste from Target Fruits, including apple pomace from cider and juice production seem likely to also be excellent sources of inputs for production of a powdered or freeze-dried nutraceutical product.

‘Piquette’ Wines

A second use of grape skins in making wines would require a great deal of winemaking skill and expertise, but it is a possible economic opportunity for Tasmania given the volume of grape marc that is otherwise diverted for lower-value uses. Piquette wines (wines made from a secondary ferment of grape skins) can result in balanced still wines, and can also be made in the *‘pét nat’*[17] style, which involves leaving some of the grape skins and sediment in the bottle to add further sparkle, flavour and character to the wine. It is the predecessor of the *méthode traditionelle*[18], which is used in varieties of wine including champagne.



Image Source: https://www.foodandwine.com/wine/what-exactly-is-a-pet-nat

At least one Tasmanian producer specialises in the pét nat technique and regularly sells all that it can produce, reflecting the global shift towards wines produced from that method.

In addition, and although rarely attempted by most producers, the possibility of a second ferment of apple pomace after cider production is also a potential product for future exploration.

‘Waste’ Alcohol

At least two producers in Tasmania are expressly targeting using Target Fruits by-products and waste as inputs to production for ciders (including with non-apple fruits), spirits and fruit-flavoured beers. While it is too early to declare success on those ventures, early indications are that consumer demand for such products (with an identifiable carbon and waste reduction effect) is strong.

Distillation-Based Products

Waste from Target Fruits can also be used in distillation techniques. In Tasmania, there are significant opportunities to use waste to distil further products.

Gin, Whiskey and Others

Gin and Whisky/Whiskey remain outstanding success stories in the Tasmanian beverage sector. While those things are not derived from the Target Fruits, there seems to be an abundance of stills in Tasmania that are not currently fully utilised. This presents certain opportunities to create niche liqueurs from Tasmanian produce. Alternative uses of Target Fruits by-products may create alternative, high value, alcohol markets.

As an example, apple-based liqueurs are the latest attempt whose success can only be determined over time.



Image Source: http://www.stillsmiths.com.au/images/portfolio/Copper-Still-8.jpg
Courtesy Stillsmiths Tasmania

Grappa-inspired liqueur

The history and origins of Grappa are hotly contested, but the consensus that does exist show it is produced from the waste from pressing grapes for wine, known as grape ***marc***; skins, seeds stems and

[17] from the French, ‘pétillant naturel’, meaning ‘naturally sparkling’
[18] https://en.wikipedia.org/wiki/Sparkling_wine_production

all. Even among award-winning Australian producers of a marc-based spirit, there is more fable than pure history in their recounting of the story of Grappa[19].

In any event, since 1951, Grappa has been part of Italy's formal designation and protected under EU law since 1989; with similar protection to that offered to Champagne. Nonetheless Portugal, France, Spain and Germany also have a storied history of using grape marc to make a spirit, albeit with a different name.



Grape marc-based spirits even have specialised tulip-shaped glasses that connoisseurs use to analyse the nose, colour and viscosity of the spirit. Grappa sales in Europe have been bolstered in recent years by sales to younger demographics, cementing growth in the global Grappa industry.

There is opportunity for Tasmania to use the tonnes of grape marc as an input into high-quality grappa-like spirit to compliment the growing range of specialist liquors and liqueurs.

Image Source: https://www.tastingtable.com/1392623/grappa-misunderstood-italian-brandy-explained/

Other Fruit Liqueurs

While fruit liqueur sales have previously stagnated in Australian bottle-shops (with some exceptions), there is evidence and projections that there is increasing demand for drinks made from 'exotic' flavours, and with provable claims about organic inputs. In addition, cellar door sales of specialty liqueurs remains strong. As Tasmanian's tourist industry continues to expand, there seems likely to be increasing markets for cellar door sales of liqueurs from all of the Target Fruits.

There may also be opportunities to use Tasmanian fruits to create other liqueurs that might match global and emerging tastes, including from Blackcurrants, Cherries and Elderberries.

Woody / Seed By-Products

Some examples were found among Growers who utilised woody by-products (such as pips, seeds, clusters and stems) to create products, including:

- Grape seed oil
- Sour Cherry pip oil

Research indicates that woody by-products are also viable and highly valued for use as Biochar-based fertilisers and water purification applications.

Bio Processing and SynBio

Bioactive compounds exist in all of the Target Fruits, and biochemical extraction of various compounds from the by-products of Target Fruits should be monitored for ongoing developments in this new area of fruit valorisation.

Bio-Chemical Opportunities

In recent years, food technologists have identified viable economic paths for fruit by-products and fruit waste using chemical and bio-active processes, including:

- Extraction of phenols from fruit seeds including from grapes, apples and cherries;
- Biofuel production;
- Electricity production using anaerobic digestion;
- Pyrolytic combustion to produce biochar (with benefits specific to the inputs to burning, such as water filtering applications);
- Fermentation to create faux leather; and

[19] https://www.pietrogallusestate.com.au/event/the-history-of-grappa/

- Controlled recombination with other waste streams to produce maximised biogas and energy from burning waste.

Ongoing research into microbiome modulation (a field in which Australia already has a reputation as a world leader) is investigating uses of fruit waste in products that promote healthier microbiomes and gut health in humans. Any demand for fruit wastes will lead to increased valorisation and use in high value non-medical products.

SynBio, which includes the use of synthetic microbes and artificial intelligence within bioprocessing-fermentation designed for specific health outcomes, is a related field currently attracting moderate investment from the Pharmaceutical Sector. and fruit wastes may also be useful in SynBio products. Some experts suggest that SynBio will come to rival the Pharmaceutical Sector over time.

New Ecosystem Demands

It is anticipated that prior to creation of any new Ecosystem, which will rely and build upon the existing Ecosystem, some thought and planning will need to be given to the current bottlenecks and stress points of the existing system.

Those things will be addressed in subsequent stages of this Project, including Stages 3 and 6.

Data Availability

There are several pillars needed to successfully support conclusions in this Project. While that is more important to other Stages of this Project, it is useful to identify the levels of data availability in the Existing Ecosystem.

Fruit Resources

Fruit Growers Tasmania issues an annual survey to its members. That survey is increasingly focussing on waste, and increased quality of identification of waste streams will lead to higher quality outcomes in this project.

Some Government data is also available on the production and waste generated from Target Fruits, although the transparency and voracity of that data is limited.

On-Site Storage Facilities

Very little data exists in relation to the availability and utilisation of on-farm storage facilities. That is important in terms of understating how much capacity Growers have to shift supply into more viable pockets of demand, such that they could maximise revenue opportunities behind the farm gate.

Transport

There seems to be a glut of transport capacity in Tasmania, although any data that would tend to support or detract from that conclusion remains difficult to find. Such data also lacks distinction between ambient and climate-controlled transport.

In addition, much of the transport of Target Fruits relies on the farm-forward assets of Growers. Farm-forward transport assets remain almost entirely unidentified.

Processing Facilities

The capacity of processing facilities to accept waste from the Target Fruits remains under-identified in Tasmania.

Freezing / Freeze-Drying Facilities

Even while Tasmania has the largest capacity in its history for processing foods using freezer and freeze-dried technology, there is very little data available to make conclusions on the viability of alternative ecosystems.

Fermenters

Test and commercial-level fermentation facilities have, until recently, been very limited in Tasmania. Even while fermentation capacity is expanding, there is very little data about Tasmania's fermentation capacity.

Distillers

The explosion of distillation of facilities in Tasmania is echoed in the number of high-quality gins, whiskies and other beverages available in Australia.

That said, there is very little reliable data about Tasmania's utilisation of its stills.

Conclusions

This Report details compelling reasons to continue with the Project and to identify the amount of Target Fruit Waste and possible viable uses within Tasmania.

For further information about remaining stages, see Appendix A.

Appendix A – Stages of this Project

Stage 1 – Existing Ecosystem Report

THIS REPORT

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.

Appendix B - Reflections on this Report

Fermentasmania will maintain a ‘live’ version of this document that will include reflections on this report and certain feedback from partners and Growers.

fermentasmania Reflections

Project Partners Reflections

Global / Australia Wide

Specific to Tasmania

Other

Appendix C – Project Partners Background and Interested Parties

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.

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
- Haskap berry Growers

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

Appendix D – Related Reports and Studies

Identified Publications

There have been several publications relevant to this project, including studies of fruit waste in Tasmania:

Year	Publisher	Title
2023	Fruit Growers Tasmania	Tasmanian Seasonal Produce Guide – 2022/23
2023	Fruit Growers Tasmania	Tasmanian Grown Fruits website
2022	Fruit Growers Tasmania	Tasmanian Seasonal Produce Guide – 2021/22
2020	Tasmanian Food Cluster	Tasmanian Food Cluster Survey – Food Loss