

## **Final Report**

# **Understanding Consumer Triggers & Barriers to Consumption of Australian Indigenous Vegetables & Asian Vegetables**

**Project leader:**

Dr Denise Hamblin

**Delivery partner:**

Colmar Brunton

**Project code:**

VG15071

**Project:**

Understanding Consumer Triggers & Barriers to Consumption of Australian Indigenous Vegetables & Asian Vegetables – VG15071

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Level 8  
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Telephone: (02) 8295 2300

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## Summary

The research program VG15071 - Understanding consumer triggers & barriers to consumption of Australian Indigenous vegetables & Asian vegetables was designed to identify commercially viable Australian indigenous vegetables and Asian vegetables. It was also designed to determine those vegetables that hold the greatest appeal to Australian consumers and provide recommendations to lead to the greatest likelihood of success in the market. A multifaceted approach was implemented to ensure knowledge was built upon at each stage and the research objectives were met. This approach included a knowledge audit and review, a qualitative deep-dive, a quantitative validation, sensory optimisation and an action plan for opportunities and recommendations.

The key outputs from the research program include the identification of commercially available Australian Indigenous vegetables and Asian vegetables that hold the greatest appeal to consumers, recommendations to increase purchase and consumption of these vegetables, and optimisation of breeding programs and postharvest production to ensure greatest long term market success. The outcomes of this research will inform the fresh vegetable industry on size of the opportunity for Australian Indigenous vegetables and Asian vegetables and provide strategies and create platforms that Australian growers can harness to help ensure the greatest return on investment, and ultimately, profitability.

Through this research program we were able to identify that there is a great opportunity and much potential around commercialising and expanding the distribution of both Asian and Indigenous vegetables in the Australian market. A large proportion of consumers are attracted to the idea of purchasing these unique vegetables. There were 20 vegetables evaluated in total (11 Indigenous vegetables, 9 Asian vegetables).

At an overall perspective, Colmar Brunton (CBR) has highlighted key insights and recommendations regarding both Asian and Indigenous vegetables:

- 1) **Availability:** The prevalence of these vegetables should be encouraged and facilitated in Australian Food Service and Manufacturing based on relevant consumer trends of functional health, provenance and Indigenous ingredients. This should lead to a greater consumer demand and broader availability in retail.
- 2) **Naming convention:** Trial and entry to repertoire will be aided by appealing names such as those that describe the sensory experience (Sweet Mild Radish) or clarify the origin (Australian Grown Gai Lan).
- 3) **Education & Familiarisation:** Consumers have limited knowledge when it comes to some of the vegetables. Information regarding the expected taste and texture, as well as cooking styles and recipes will be essential. Comparing the vegetable to similar tasting vegetables (i.e. Kulyu, like Sweetpotato) will lift consumer confidence around incorporating them in their cooking.
- 4) **Communicating Unique Health Benefits:** Highlighting the health and nutritional benefits of each vegetable is congruent with health trends and provides a strong reason for purchase beyond current vegetable repertoires.
- 5) **Reaching Younger Consumers:** Consumers aged 10-25 were highly engaged with these Indigenous and Asian vegetables, found them appealing and expressed the desire for them to be purchased. However, this study reveals that parents are potentially acting as gate keepers, more reluctant to purchase new vegetables for themselves and their family. Further research should be conducted into understanding this barrier to children's vegetable consumption.

Further focus and investment on the above recommendations will undoubtedly assist in the health of our vegetable industry in Australia as well as the health of everyday Australians.

## Keywords

Indigenous; Asian; fresh; vegetables; consumer; perceptions; behaviour; purchase; consumption; cooking; new product development

## Introduction

Australia's Horticulture Industry identified the need for a more in-depth understanding of consumer's needs, desires, motivations and limitations for consumers incorporating Australian Indigenous and Asian vegetables into their current repertoire. CBR was contracted by Horticulture Innovation Australia (Hort Innovation) to conduct a study investigating the appeal of a wide variety of Asian and Indigenous vegetables, and its commercial potential to the general public.

The project commenced in July 2016, and aimed to identify opportunities for the industry:

- To identify the commercial availability of Australian indigenous and Asian vegetables
- To understand how these vegetables are currently, if at all, incorporated into Australian consumer's repertoire; including optimal cooking styles, cuisines and flavour expectations
- To understand the conceptual appeal of key Asian vegetables and Australian indigenous vegetables
- To explore triggers and barriers to purchase and consume Australian indigenous and Asian vegetables
- To understand which sensory characteristics are most desirable to consumers
- To understand the difference in sensory preference between demographics (age, gender, location, cultural background)
- To inform industry of the market development required, such as consumer education, price setting, or channel availability, in order to identify short term and long term opportunities.

To meet these objectives CBR designed a multifaceted research program to collect quantitative, qualitative, sensory and secondary research information. This was used to provide the vegetable industry with:

- Current awareness, perceptions and usage of Asian and Indigenous vegetables
- The conceptual appeal of key Asian vegetables and Australian indigenous vegetables
- The sensory performance of key commodities, and provide optimisation recommendations
- Individual commodity action plans for stakeholders across all levels of the supply chain

The following vegetables were further evaluated after a shortlisting from the Stage 2 Knowledge Audit:

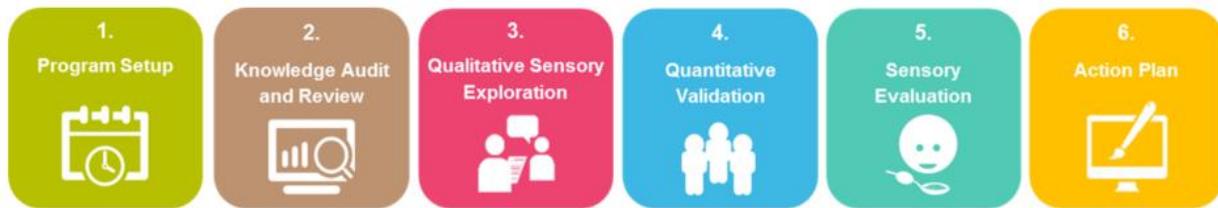
Asian Vegetables	Indigenous Vegetables
<ul style="list-style-type: none"> <li>• Amaranth (Red Spinach)</li> <li>• Bitter Melon</li> <li>• Choy Sum</li> <li>• Daikon</li> <li>• Gai Lan</li> <li>• Hairy Melon</li> <li>• Lotus Root</li> <li>• Okra</li> <li>• Wombok</li> </ul>	<ul style="list-style-type: none"> <li>• Native Thyme</li> <li>• Acacia Seeds</li> <li>• Lemon Myrtle</li> <li>• Pepperberry</li> <li>• Saltbush</li> <li>• Youlk</li> <li>• Bush Tomatoes</li> <li>• Kulyu</li> <li>• Finger Limes</li> <li>• Australian Spinach (Warrigal Greens)</li> <li>• Samphire</li> </ul>

In total, five reports were completed and reported. The outcomes of the project aim to provide the industry with actionable recommendations and insights into the potential commercialisation and distribution of both Asian and Indigenous vegetables in the Australian market.

## Methodology

To meet the objectives of the industry, the project was designed to include six stages of research; 1) Program setup, 2) Knowledge Audit and Review, 3) Qualitative Sensory Exploration, 4) Quantitative Validation, 5) Sensory Evaluation and 6) Action Plan.

**Image 1. Methodology Flow**



### **Stage 1: Program Setup**

- *To ensure alignment of program aims and objectives for all stakeholders.*

This stage solidified the goals for the project and the outcomes that were aligned and delivered to Hort Innovation’s research needs. A project logic kick off meeting with Hort Innovation’s relevant stakeholders was undertaken to ensure all parties were engaged with the proposed program. We developed program logic to clarify and communicate intended outcomes and assumptions; make causal assumptions explicit and test how they are supported by evidence; provide a framework for monitoring and evaluation; and tell an evidence-based story of how the program would work. The development of a program logic not only provided an essential focus for the program but it also enabled the research to be effectively evaluated in terms of both impact and return on investment.

### **Stage 2: Knowledge Audit and Review**

- *To categorise relevant vegetables into Asian vegetables or Australian indigenous vegetable commodity groups*
- *To identify the commercial availability of Australian indigenous and Asian vegetables*
- *To understand how these vegetables are currently incorporated into Australian consumer’s repertoire; including optimal cooking styles, cuisines and flavour expectations*

A Knowledge Audit and Review was conducted to understand and quantify the commercial availability of Asian and Australian Indigenous vegetables. This included identifying geographic prevalence, climate considerations, channel availability, variety of uses and considerations when cooking the vegetables. Secondary desk research accompanied a number of in-depth interviews with stakeholders of the supply chain (n=2), ethnographic interviews with Australian Indigenous vegetable users (n=4) and ethnographic interviews with Asian vegetable users (n=4). The in-depth and ethnographic interviews allowed us to gain a deeper insight into the current perceptions and usage of these vegetables, and assisted in scoping out the current state of the market. Our focus in this stage was to confirm what is known already with regard to Indigenous and Asian vegetables in order to build on this knowledge, rather than replicate in the proceeding research phases. At the conclusion of this stage, Project Reference Group (PRG) and stakeholders within Hort Innovation joined CBR in a teleconference to add their breadth of experience to the discussion of findings.

### **Stage 3: Qualitative Sensory Exploration**

- *To understand which sensory characteristics are most desirable to consumers*
- *To explore triggers and barriers to purchase and consume Australian indigenous and Asian vegetables*
- *To evaluate how the vegetable is incorporated into the consumer's home*

Qualitative research was undertaken to gain an in-depth understanding of consumer's needs, desires, motivations and limitations of incorporating these vegetables into their current repertoires. This included the development and testing of concepts/ideas and education platforms. Price and quality perceptions were also explored. The methodology for this stage involved two qualitative focus groups, one group per commodity group, in six different states (New South Wales, Victoria, Queensland, Western Australia, Tasmania and the Northern Territory). The two and a half hour sessions allowed for physically handling of up to 10 vegetables per focus group.

The focus groups covered:

- Current approach to purchasing vegetables
- Understanding current behaviours of dependent family members (age 10 to 18)
- Needs and desires as they apply to vegetable consumption
- Functionality needs; ease of cook, versatility, cost considerations, storage etc.
- Emotional needs; providing for a family, sense of doing good for yourself/local community/community at large
- Image needs; seen by others as trend setting, community conscious
- Level of awareness and application of Asian and Australian Indigenous vegetables
- Limitations of incorporating Asian and Australian Indigenous into broader repertoire of vegetables
- Testing of concepts of individual vegetables
- Testing of educational formats for increasing awareness of lesser known vegetables
- Physical handling of a variety of vegetables
- Probing for the expected attitudes of dependent family members (age 10 to 18)

At the conclusion of the focus groups, consumers were to take home two vegetables and conduct a home use test. They were asked to report back via an online survey on their in-home cooking experience by taking pictures of the cooking and serving of the meal, providing a short diary of their experience, giving us a depth of insight into the challenges that arose when using these vegetables in every day cooking.

### **Stage 4: Quantitative Validation**

- *To quantify key triggers and barriers to purchase and consume Australian indigenous and Asian vegetables*
- *To understand the conceptual appeal of key Asian vegetables and Australian indigenous vegetables*

In Stage 4, we ran an online survey polling Australian fresh vegetable consumers on the issues and information gathered in the prior stages of the research. At this stage the commodity groups were reduced to the 18 highest potential vegetables. The online study deep dived into each of the vegetables, provided a conceptual profile of each. The conceptual profile included images/photographs and short descriptions (i.e. what it is, nutritional benefits, taste profiles, cooking styles, recipes) of the specific vegetable to ensure consumers were aware of what vegetable was being referred to. The images selected were approved by the PRG to ensure accurate market representation.

Presenting the vegetables as concepts gave respondents all the information they needed to make an informed decision, and had the added benefit of making the vegetables comparative to product benchmarks within CBR's normative Gate3 database. This database is the amalgamation of over 5,000 of concept tests conducted over the last 25 years, across a

number of different categories. We were able to see how each vegetable ranked against one another and against thousands of other supermarket products in appeal and purchase intent. This provided a superior context to simply benchmarking the vegetables against one another, since they will not only compete against other fresh produce, but in the greater grocery arena.

We interviewed N=1,532 regular consumers of fresh vegetables in a nationally representative sample of Australians. We kept the recruitment criteria broad so that we were able to draw conclusions applicable to the Australian public at large. The larger sample of N=1,532 enabled us to cut the data into statistically robust representations of sub groups of Australians to understand the potential of the vegetables we tested in greater detail. An incomplete design was implemented whereby respondents were presented with a random selection of 4 vegetables (out of 18) from each of the commodity groups. This was to reduce respondent fatigue and ensure a robust number of evaluations per vegetable.

An important output from the online survey was the volumetric predictions analysis to evaluate the volume for first year of sales. Colmar Brunton has developed a statistical process for the estimation of the market potential of a new idea or finished product. The process involves a projection of likely trial based upon Purchase Intent, Purchase Frequency and Cannibalisation Potential. A number of calibration steps are built into the process utilising known or normalised factors for the conversion from stated to actual behaviour. A range of information gathered during the research was used to calculate the volumes that would be expected for each of the vegetables tested based on their first year in the market.

#### **Stage 5: Sensory Evaluation**

- *To determine the sensory performance of key commodities, and provide optimisation if required*
- *To understand the difference in sensory preference between demographics (age, gender, location, cultural background)*

In stage 5, the sensory evaluation and profile of the vegetables that have been identified as having a strong potential in market were included. The sensory evaluation took place at Colmar Brunton's research facility in Chadstone, Melbourne, specially built for conducting sensory testing of foods. The facility is equipped with a commercial grade kitchen which is capable of conducting evaluations with large sample sizes over a comparatively short duration.

**Image 2.** Sensory Booth and Kitchen at Chadstone Shopping Centre



Frequent fresh vegetable consumers were recruited to attend a 60 minute session where they tasted a variety of different vegetables in a controlled environment. A total of five vegetables per commodity group were evaluated in this phase (Australian Indigenous Vegetables; Australian Spinach – Warrigal Greens, Samphire, Pepperberry, Native Thyme, Lemon Myrtle, & Asian Vegetables; Gai Lan, Choy Sum, Red Spinach – Amaranth, Wombok, Daikon), and each were

served three times; once served neat (uncooked) on its own, as well as the vegetable cooked in two different recipes. This assisted in determining the sensory attributes which yielded the highest appeal and likelihood to purchase per vegetable. These key measures (appeal and purchase interest) were benchmarked against our Gate 3 normative data base for likelihood of in market success.

Our sensory evaluations utilised a combination of overall appeal, perceived intensity vs. ideal intensity to determine what sensory attributes were the most important in liking or purchase intent. By using three different representations of each vegetable, we were able to triangulate the ideal sensory characteristics each vegetable should deliver to.

#### **Stage 6: Action Plan**

- *To inform industry of the market development required, such as consumer education, price setting, or channel availability, in order to identify short term and long term opportunities.*

At the conclusion of all phases of the research, Colmar Brunton provided a comprehensive profile of each of the vegetables, and recommendations on how to approach their commercialisation. To ensure the information provided is fully utilised and actionable, we proposed a review by the PRG before dissemination to the wider industry. The aim of this final stage of research is to provide practical recommendations of how to best represent the subset vegetables that have performed the strongest through the previous stages of the study. We invite the PRG and stakeholders within Hort Innovation to participate in the workshops (in person or over the phone, location dependent) to add their breadth of experience to the conversation in order to ensure our action plan fits within the model of S.M.A.R.T goals.

## Outputs

With solid implementation of results through new industry development and communications programs and other complimentary research programs such as VG12078, the benefits of this research should be seen in increased category knowledge within the industry, increased knowledge of accessibility and range of commodities, improved ability to plan and implement findings with regard to long term breeding programs, improved promotion and communication for the allotted commodities and ultimately in the increased purchase and consumption for them.

After every stage of research, a report of the findings have been successfully completed and delivered to Hort Innovation stakeholders and the PRG. Examples of pages from the reports are included in Figures 1-6 below.

### **Outputs delivered:**

- Stage 1: Program Logic and Setup
- Stage 2: Knowledge Audit and Review
- Stage 3: Qualitative Sensory Exploration
- Stage 4: Quantitative Validation
- Stage 5: Sensory Evaluation
- Stage 6: Action Plan
- 2 x Milestone Reports

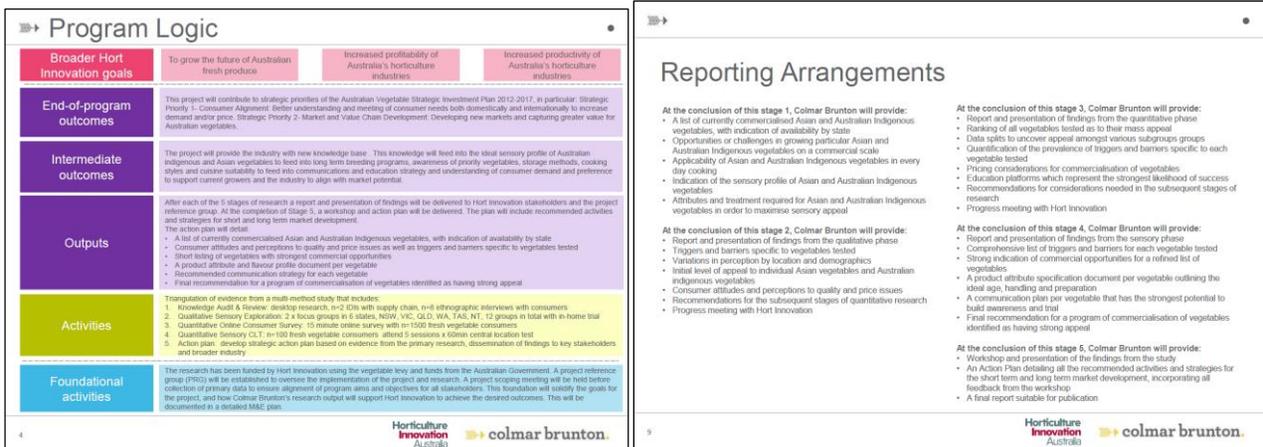
At the completion of Stage 6, an Action Plan has been delivered, with a workshop still to be conducted. The plan will include recommended activities and strategies for short and long term market development. The reports have identified a number of key findings from the research program including:

- Consumer attitudes and perceptions to quality and price issues as well as triggers and barriers specific to vegetables tested
- Short listing of vegetables with strongest commercial opportunities
- A product attribute and flavour profile per vegetable
- Recommended communication strategy for each vegetable
- Final recommendation for a program of commercialisation of vegetables identified as having strong appeal

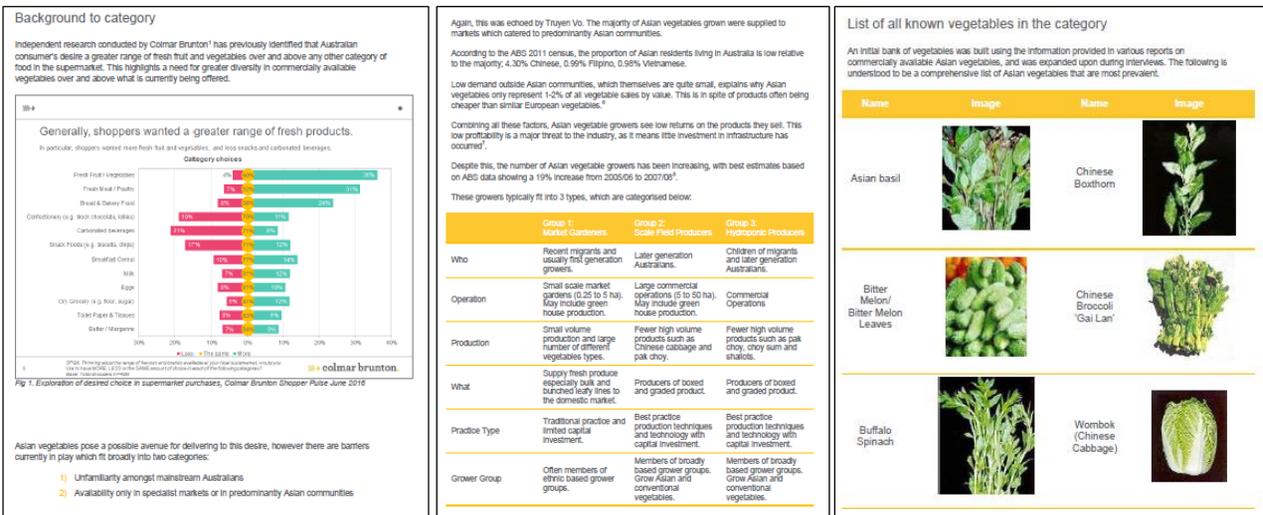
As part of the research, this uplift can be estimated by the consumer response to the online concepts in terms of the consumers' anticipated purchase behaviour. Post the current study, the effectiveness of recommended initiatives can be tested via tracking research of consumer sentiment and in the corresponding sales and volume figures available.

# Report Outputs

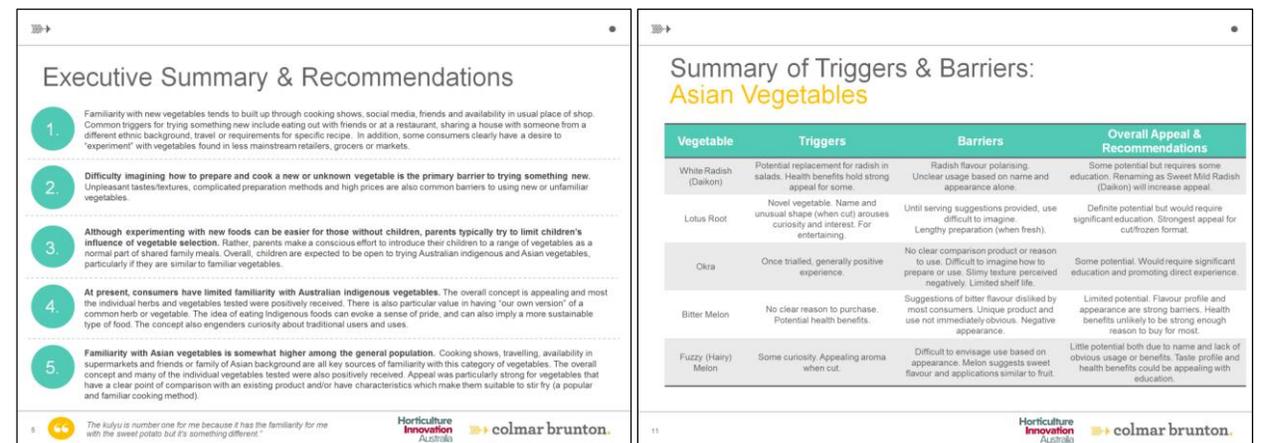
## Figure 1. Stage 1 – Program Setup



## Figure 2. Stage 2 – Knowledge Audit & Review Outputs



## Figure 3. Stage 3 –Qualitative Sensory Exploration Outputs



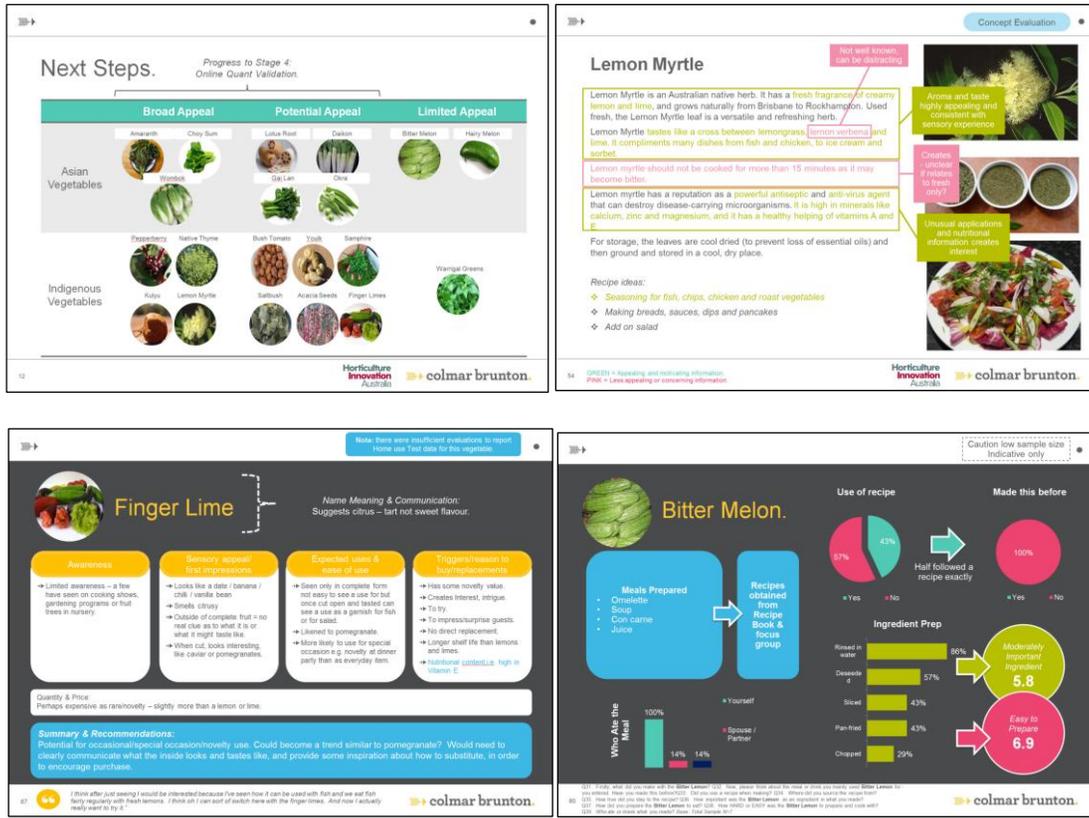
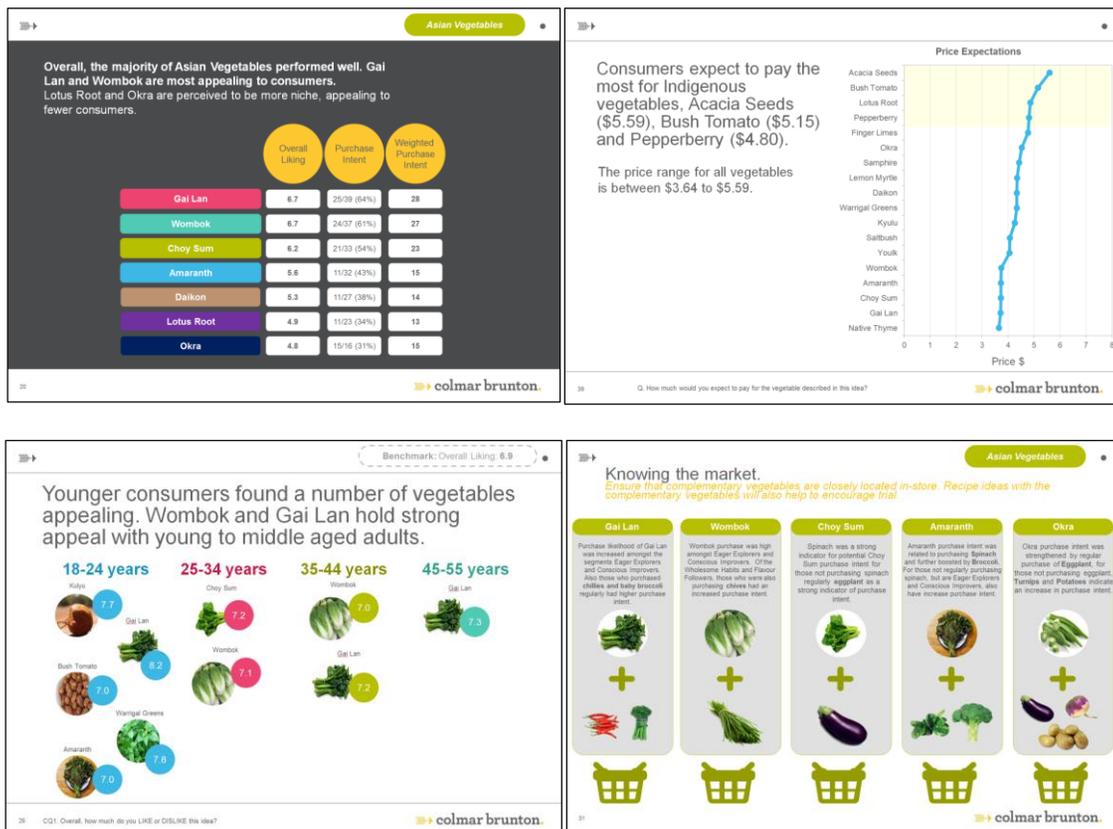


Figure 4. Stage 4 –Quantitative Validation Outputs



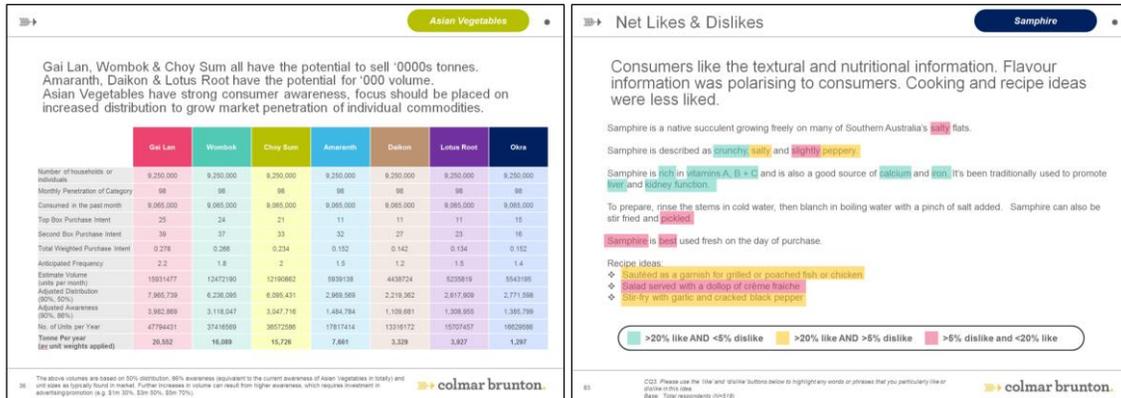
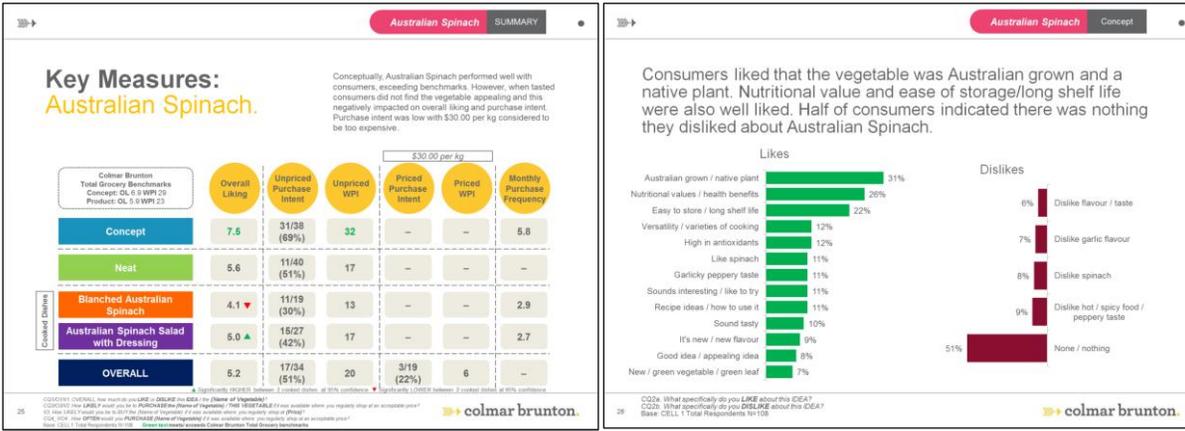
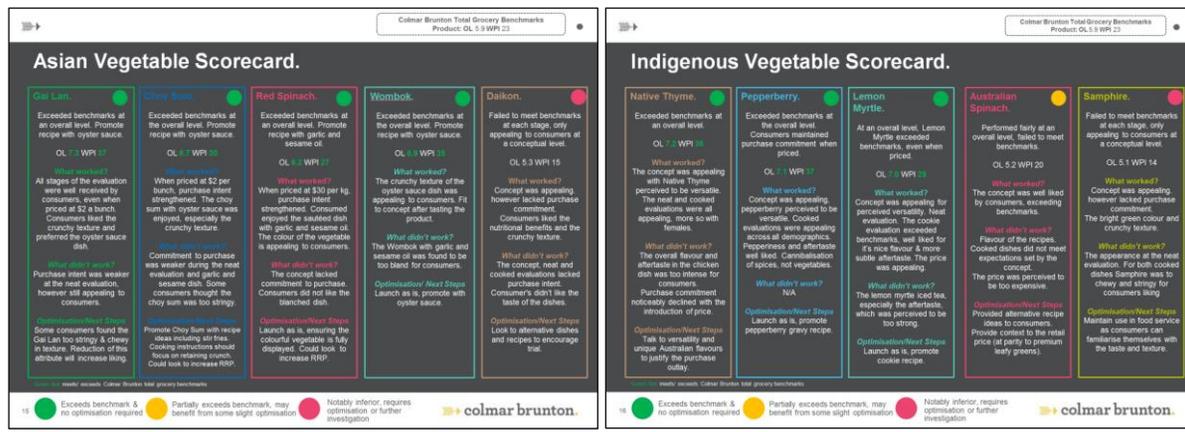


Figure 5. Stage 5 – Sensory Evaluation Outputs



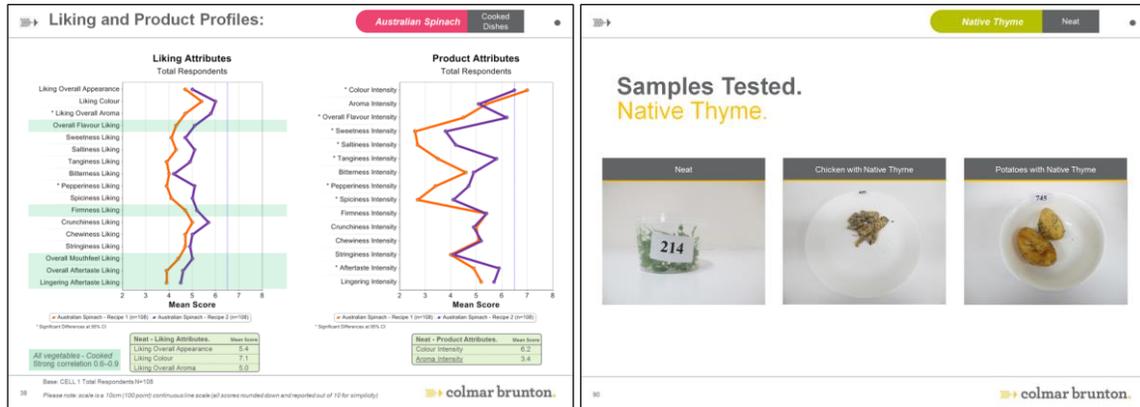
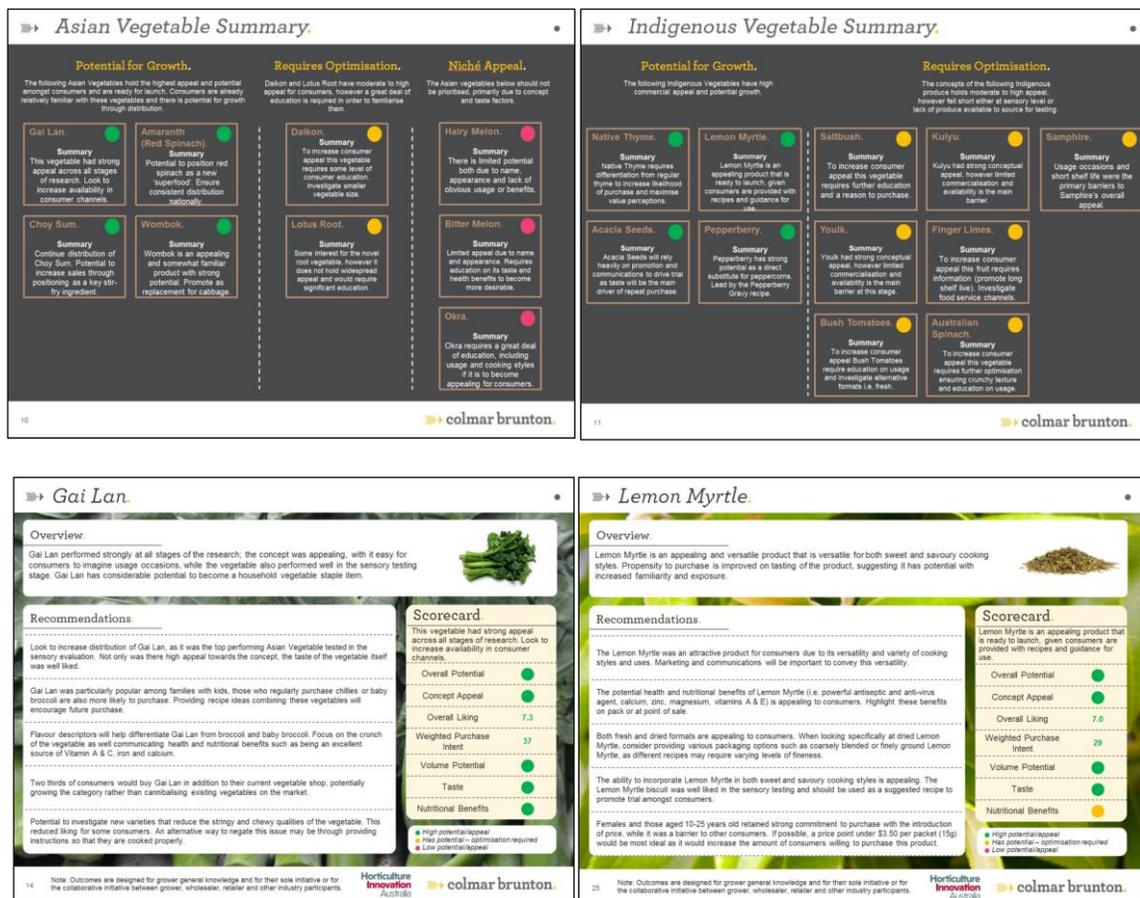


Figure 6. Stage 6 – Action Plan Outputs



## Outcomes

This project will contribute to strategic priorities of the Australian Vegetable Strategic Investment Plan 2012-2017, in particular: Strategic Priority 1 - Consumer Alignment: Better understanding and meeting of consumer needs both domestically and internationally to increase demand and/or price. Strategic Priority 2 - Market and Value Chain Development: Developing new markets and capturing greater value for Australian vegetables.

At the completion of the six stages of the research project, we have been able to provide insights and recommendations as to which of the Asian and Indigenous vegetables have the greatest potential for commercialisation. The project will provide the industry with new knowledge base and a wealth of information around the triggers and barriers to purchase - which can be leveraged to convert consumer trial. This knowledge will feed into the refinement of long term breeding programs through greater understanding of consumer's ideal sensory profile of Australian Indigenous and Asian vegetables. Other outcomes of the projects are awareness of vegetables which to prioritise in terms of commercialisation and distribution. Understanding of appropriate storage methods, cooking styles and cuisine suitability to feed into consumer focussed communication and education strategy. This information will support current growers (including those in indigenous communities) the opportunity of aligning with market potential.

### Vegetable Profiles

The following table outlines the findings from the research project in terms of a vegetable's sensory profile, cooking styles that consumers would use the vegetables in and appeal of shelf life & storage methods.

**\*\* Sensory Profile and Cooking Styles only included for vegetables that proceeded to Stage 5 of the research project**

Vegetable	Sensory Profile	Cooking Styles	Shelf Life/Storage Methods
<b>Gai Lan</b>	Liked the colour, taste, flavour, texture and crunchiness of Gai Lan. Dislike the chewy/stringy element of the vegetable.	Added into stir fries with oyster sauce, or added with sesame oil and garlic.	Short shelf life of up to 3 days does not appeal to consumers.
<b>Choy Sum</b>	Liked the crunchiness, taste, flavour, texture and of Choy Sum. Dislike the chewiness/stringy element as well as strong/lingering aftertaste of the vegetable.	Added into stir fries with oyster sauce, or added with sesame oil and garlic. Expect to use in a similar way to other leafy vegetables (e.g. spinach, silverbeet, bok choy).	Short shelf life of up to 3 days does not appeal to consumers.
<b>Amaranth (Red Spinach)</b>	Consumers liked the nice taste, flavour, colour and the look/appearance of Red Spinach. Some consumers however did not like the taste.	Sautéed with Garlic and Sesame Oil, can also be blanched on its own.	Consumers liked the similarities in storage methods and shelf life to spinach.
<b>Wombok</b>	Liked the taste, flavour, crunchiness, texture, and mouthfeel. Disliked the pale colour of the vegetable.	Stir Fried Wombok with Oyster Sauce or Sautéed Wombok with Garlic and Sesame Oil.	Consumers liked the longer shelf life of 5 to 7 days in the refrigerator.

<b>Daikon</b>	Liked the crunchiness, health benefits, and fresh/refreshing flavour. The taste was polarising.	Either poached or eaten raw in a salad	Consumers liked the long shelf life of several weeks.
<b>Lotus Root</b>	Lotus Root did not proceed to Stage 5 – Sensory Exploration in the research project.	Lotus Root did not proceed to Stage 5 – Sensory Exploration in the research project.	Consumers like that whole Lotus Root can stay fresh for up to 2 weeks inside the refrigerator.
<b>Hairy Melon</b>	Hairy Melon did not proceed to Stage 5 – Sensory Exploration in the research project.	Hairy Melon did not proceed to Stage 5 – Sensory Exploration in the research project.	Hairy Melon did not proceed to Stage 4 – Quantitative Validation in the research project.
<b>Bitter Melon</b>	Bitter Melon did not proceed to Stage 5 – Sensory Exploration in the research project.	Bitter Melon did not proceed to Stage 5 – Sensory Exploration in the research project.	Bitter Melon did not proceed to Stage 4 – Quantitative Validation in the research project.
<b>Okra</b>	Okra did not proceed to Stage 5 – Sensory Exploration in the research project.	Okra did not proceed to Stage 5 – Sensory Exploration in the research project.	Short shelf life of one or two days does not appeal to consumers.
<b>Native Thyme</b>	Liked the colour/overall appearance, taste, flavour, aroma and mild/subtle flavour. Some consumers disliked the strong/lingering flavours.	Used as a direct replacement for thyme (on chicken, potatoes etc.)	Fresh or dried formats highly appealing for consumers.
<b>Acacia Seeds</b>	Acacia Seeds did not proceed to Stage 5 – Sensory Exploration.	Acacia Seeds did not proceed to Stage 5 – Sensory Exploration.	Consumers find the long shelf life of Acacia Seeds appealing.
<b>Lemon Myrtle</b>	Consumers liked the aroma, taste, flavour, lemon flavour, sweetness and mild/subtle flavour.	Baked in cookies/desserts, used in drinks (i.e. tea).	Consumers find the long shelf life of Lemon Myrtle appealing.
<b>Pepperberry</b>	Consumers liked taste, flavour, aroma and peppery flavour. However, some consumers considered it to be “too peppery”.	Direct replacement for pepper. Used in gravies, on potatoes, curries etc.	Consumers find the long shelf life of Pepperberry appealing.
<b>Saltbush</b>	Saltbush did not proceed to Stage 5 – Sensory Exploration.	Saltbush did not proceed to Stage 5 – Sensory Exploration.	Consumers find the long shelf life of Saltbush appealing.
<b>Youlk</b>	Youlk did not proceed to Stage 5 – Sensory Exploration.	Youlk did not proceed to Stage 5 – Sensory Exploration.	N/A
<b>Bush Tomatoes</b>	Bush Tomatoes did not proceed to Stage 5 – Sensory Exploration.	Bush Tomatoes did not proceed to Stage 5 – Sensory Exploration.	Consumers find the long shelf life of dried bush tomatoes appealing.

<b>Kulyu</b>	Kulyu did not proceed to Stage 5 – Sensory Exploration.	Kulyu did not proceed to Stage 5 – Sensory Exploration.	Consumers liked the similarities in storage methods and shelf life to sweetpotatoes.
<b>Finger Limes</b>	Finger Limes did not proceed to Stage 5 – Sensory Exploration.	Finger Limes did not proceed to Stage 5 – Sensory Exploration.	Consumers like that the fresh fruit have a shelf life of 4–5 weeks
<b>Australian Spinach</b>	Consumers liked the colour and crunchiness. Texture and taste was polarising, whilst aftertaste was generally not appealing.	Australian Spinach used in salads.	Consumers find the long shelf life (up to two weeks) highly appealing.
<b>Samphire</b>	Consumers liked the crunchiness, colour and appearance of Samphire. Chewiness, stringiness, taste and bitterness were the least appealing aspects.	Samphire added into fresh salads or sautéed with butter.	The short shelf life (“best used fresh on the day of purchase”) of Samphire was unappealing.

The continuing outcome of this project is that the Australian fresh vegetable industry has access to information on consumer perceptions and attitudes; with insights and recommendations. The long-term potential outcomes of this project are dependent on industry and individual fresh vegetable businesses taking actions based on the insights and recommendations.

## Evaluation and discussion

The research program VG15071 - Understanding consumer triggers & barriers to consumption of Australian indigenous vegetables & Asian vegetables was effective in the timely delivery of project outputs, with reports delivered to schedule. The project was effective in identifying key consumer perceptions and attitudes which are relevant to the future commercialisation of Asian and Australian Indigenous vegetables, including current awareness levels, triggers and barriers to purchase, provenance issues, functional health and nutritional benefits, education, and potentially renaming the vegetables. Over the course of the research stages, the industry was provided with in depth information on each of the shortlisted vegetables and recommendations on how best to progress these vegetables into greater distribution channels.

Asian vegetables have healthy levels of awareness and recall, whereas consumers have limited familiarity with Australian Indigenous vegetables (only one in three consumers were aware of Indigenous Vegetables). Cooking shows, travelling, availability in supermarkets and friends or family of Asian background are all key sources of familiarity with this category of vegetables. The overall concept and many of the individual vegetables tested were also positively received. Appeal was particularly strong for vegetables that have a clear point of comparison with an existing product and/or have characteristics which make them suitable to stir fry (a popular and familiar cooking method). There is also particular value in having “our own version” of a common herb or vegetable. The idea of eating Indigenous foods can evoke a sense of pride, and can also imply a more sustainable type of food. The concept engenders curiosity about traditional users and uses. Furthermore, if “Asian” is included in name, it will also be important to clarify that the vegetable is grown in Australia, not imported.

It is critical to understand what is driving both the triggers of and barriers to Asian and Indigenous vegetable consumption so as to further grow the industry. Familiarity with new vegetables tends to build up through cooking shows, social media, friends and availability where one typically shops. Common triggers for trying something new include eating out with friends or at a restaurant, sharing a house with someone from a different ethnic background, travel or requirements for specific recipe.

Specific nutritional information was found to be crucial in garnering appeal for Asian and Indigenous vegetables. Findings from Project Harvest (VG12078), found that from 2015 to 2016, specific health and nutritional benefits have increased as a trigger to purchase from 15% to 26%. An emphasis on the specific health benefits of consuming Asian and Indigenous vegetables should be promoted on packaging and in-store. Appealing to health-conscious consumers is key; this will in turn increase the average serves of vegetables per day over time, a critical opportunity for the industry as well as for governments in terms of remedying Australians’ insufficient vegetable consumption. While consumers believe they eat enough vegetables overall, Project Harvest (VG12078) has also found that the average consumed serves of vegetables per day is 2.7 – below the recommended five serves per day, with young females (18-34) most notably below this level. However, it was found in this study that younger consumers (18-24 years old), are more open and willing to try new Asian and Indigenous vegetables. Highlighting the specific health and nutritional benefits of each vegetable is congruent with health trends and provides a strong reason for purchase beyond current vegetable repertoires.

In Stage 5 – Sensory Evaluation of the research, all vegetables tested held high conceptual appeal, meeting Colmar Brunton Grocery Concept Benchmarks (6.9/10). The vegetables that performed strongest in the sensory stage of research were due to taste meeting its conceptual expectations. Gai Lan, Choy Sum, Red Spinach and Wombok all exceeded benchmarks for sensory testing, with Daikon the only Asian vegetable which fell slightly below the sensory benchmarks. The Indigenous vegetables with highest Overall Liking included Pepperberry, Native Thyme and Lemon Myrtle. Warrigal Greens (Australian Spinach) and Samphire did not perform as well in terms of sensory profile, but still holds potential in terms of commercialisation. Sensorially, the strongest drivers of overall liking were the overall mouthfeel, flavour, aftertaste, lingering aftertaste and the liking of firmness.

There was a moderate to high correlation demonstrated amongst these attributes. Recipes and flavour expectations will help to overcome this major barrier to trial. From our findings, younger consumers 18-24 years old are more open to trying Australian Indigenous and Asian vegetables, particularly if they are similar to familiar vegetables. Although experimenting with new foods can be easier for those without children, parents typically try to limit children's influence of vegetable selection. This study reveals that parents are potentially acting as gate keepers, more reluctant to purchase new vegetables for themselves and their family. Further research should be conducted into understanding this barrier to children's vegetable consumption. Rather, parents make a conscious effort to introduce their children to a range of vegetables as a normal part of shared family meals.

In-store communications providing recipe ideas, nutritional information/health benefits, possible substitutions, taste comparisons and storage requirements are seen as the most effective ways to encourage purchase. Printed communications in store should be sufficiently detailed to allow consumers to understand the offer, but simple enough for them to digest in a short amount of time. Although the use of humour is appealing, in this context, communications should focus on educating consumers. Discounted prices or introductory offers would also reduce barriers to trying something new. Some consumers clearly have a desire to "experiment" with vegetables found in less mainstream retailers, grocers or markets. Contrastingly, some consumers had difficulty in imagining how to prepare and cook a new or unknown vegetable was the primary barrier to trying something new. Unpleasant tastes/textures, complicated preparation methods, high prices and a short shelf life are also common barriers to using new or unfamiliar vegetables.

Consistent across all stages, naming was perceived to be an important factor in encouraging adoption of unfamiliar vegetables, particularly for consumers who first encounter the product in store with only physical appearance and name to base their impressions on. The name needs to provide sufficient information to allow consumers to imagine how it might taste and be used, or provide a clear point of comparison (i.e. Sweet Mild Radish, or clarify the origin – Australian Grown Gai Lan). Where possible, align name with similar products (e.g. if appearance and taste like spinach, aligning name to similar vegetables could broaden appeal), or provide a clear point of difference to prompt trial and substitution. Flowering broccoli (Choy Sum) and native sweet potato (Youlk) are good examples, both being similar to more mainstream products but also having a differentiating "hook".

In terms of pricing, there is a higher commitment to purchase Asian vegetables than Australian Indigenous vegetables when consumers are shown the price of the commodities. Consumers expect to pay more for Indigenous vegetables, primarily due to perceptions of these commodities being rare, special and exotic. It is recommended that with the introduction of new varieties, lower price points are adopted to encourage trial.

The results from the research program proved to be very positive for both Asian and Australian Indigenous vegetables, with widespread appeal for both. On a whole, the vegetables had the potential to grow the category, rather than to cannibalise.

## Recommendations

Insights and recommendations were based around the key findings for the vegetables over the course of the research stages. The outcome of this project is that the Australian fresh vegetable industry now has access to important information on consumer perceptions and attitudes towards Asian and Australian Indigenous vegetables, with insights and recommendations. The long-term potential outcomes of this project are dependent on industry and individual fresh vegetable businesses implementing action plans based on these insights and recommendations.

At an overall perspective, Colmar Brunton has highlighted key insights and recommendations regarding both Asian and Indigenous vegetables:

- 1) **Availability:** The prevalence of these vegetables should be encouraged and facilitated in Australian Food Service and Manufacturing based on relevant consumer trends of functional health, provenance and Indigenous ingredients. This should lead to a greater consumer demand and broader availability in retail.
- 2) **Naming convention:** Trial and entry to repertoire will be aided by appealing names such as those that describe the sensory experience (Sweet Mild Radish) or clarify the origin (Australian Grown Gai Lan).
- 3) **Education & Familiarisation:** Consumers have limited knowledge when it comes to some of the vegetables. Information regarding the expected taste and texture, as well as cooking styles and recipes will be essential. Comparing the vegetable to similar tasting vegetables (i.e. Kulyu, like Sweetpotato) will lift consumer confidence around incorporating them in their cooking.
- 4) **Communicating Unique Health Benefits:** Highlighting the health and nutritional benefits of each vegetable is congruent with health trends and provides a strong reason for purchase beyond current vegetable repertoires.
- 5) **Reaching Younger Consumers:** Consumers aged 10-25 were highly engaged with these Indigenous and Asian vegetables, found them appealing and expressed the desire for them to be purchased. However, this study reveals that parents are potentially acting as gate keepers, more reluctant to purchase new vegetables for themselves and their family. Further research should be conducted into understanding this barrier to children's vegetable consumption.

At an individual commodity level, the following insights and recommendations have been made:

**Table 1. Action Plan Recommendations for Asian and Indigenous Vegetables**

Commodity		Recommendations
Gai Lan	High potential/ appeal	<ul style="list-style-type: none"> <li>Look to increase distribution of Gai Lan, as it was the top performing Asian Vegetable tested in the sensory evaluation. Not only was there high appeal towards the concept, the taste of the vegetable itself was well liked.</li> <li>Gai Lan was particularly popular among families with kids, those who regularly purchase chillies or baby broccoli are also more likely to purchase. Providing recipe ideas combining these vegetables will encourage future purchase.</li> <li>Flavour descriptors will help differentiate Gai Lan from broccoli and baby broccoli. Focus on the crunch of the vegetable as well communicating health and nutritional benefits such as being an excellent source of Vitamin A &amp; C, iron and calcium.</li> <li>Two thirds of consumers would buy Gai Lan in addition to their current vegetable shop, potentially growing the category rather than cannibalising existing vegetables on the market.</li> <li>Potential to investigate new varieties that reduce the stringy and chewy qualities of the vegetable. This reduced liking for some consumers. An alternative way to negate this issue may be through providing instructions so that they are cooked properly.</li> </ul>
This vegetable had strong appeal across all stages of research. Look to increase availability in consumer channels.		

<p><b>Choy Sum</b></p>	<p><i>High potential/appeal</i></p>	<ul style="list-style-type: none"> <li>• Conceptually, Choy Sum was most appealing to younger consumers. The high nutritional value was well liked by consumers including potassium, folic acid and vitamin K.</li> <li>• Differentiating Choy Sum from other leafy greens is the key challenge. Consumers loved the taste of the product, so providing flavour descriptors will encourage trial.</li> <li>• The majority of consumers indicate they would purchase Choy Sum in addition to their current vegetable purchases, representing strong potential for category growth.</li> <li>• Purchase intent increased with the introduction of price, suggesting this is an attractive part of the offer, with the potential for the Recommended Retail Price (RRP) to be increased above \$2 per bunch.</li> <li>• Appeal was strongest when evaluated stir fried with oyster sauce - promotion should focus on recipe ideas such as stir fries, with an emphasis on retaining the crunch in cooking instructions.</li> <li>• As crunch was a key sensory driver of liking, ensure that supply chain and transport is optimal for retaining textural crunch and vegetable is not going limp whilst in-store.</li> <li>• New product development could focus on offering pre-chopped formats with stir-fry sauce, appealing to convenience driven consumers.</li> </ul>
<p><b>Amaranth (Red Spinach)</b></p>	<p><i>High potential/appeal</i></p>	<ul style="list-style-type: none"> <li>• The colour of the vegetable is appealing to consumers, this should be promoted to increase appeal and give consumers a reason to choose it over existing vegetables such as baby spinach.</li> <li>• Encourage purchase through Red Spinach’s health &amp; nutritional information by labelling it as a ‘superfood’. Ensure clear communication that Red Spinach has a high concentration of iron, copper, carbohydrates, calcium, folate, vitamin A, B6 &amp; C, and is a source of protein and amino acids.</li> <li>• As the vegetable wilts quickly with a short shelf life, there is potential to value add with a pre-packed format, likely to encourage purchase. Ensure the packaging is transparent, so consumers can see the colour of the plant and assess freshness.</li> <li>• Provide recipe ideas on pack that include sautéed with garlic and sesame oil to ensure an enjoyable sensory experience. Consumers should also be already able to envisage using this vegetable in similar ways to spinach as well as usual/known meals.</li> <li>• Red Spinach commands a higher price per kilo (\$30) than regular spinach, however purchase intent remains strong. There may be potential to increase the RRP above the \$30 per kilo price point.</li> </ul>
<p><b>Wombok</b></p>	<p><i>High potential/appeal</i></p>	<ul style="list-style-type: none"> <li>• Continue the current distribution of Wombok into various purchase channels. There are clear expectations around taste and use, with little further information required to encourage trial.</li> <li>• The challenge now exists in increasing the frequency of Wombok currently being purchased.</li> <li>• Similarity to known vegetables gives strong potential, however consumers require a clear reason to choose Wombok over their regular cabbage. This can be done through communication of superior shelf life, value, taste or texture.</li> <li>• Consumers find the crunchy texture highly appealing. Communicate to consumers that Wombok can maintain a crunchy texture even after cooked.</li> <li>• The oyster sauce dish was well liked and should lead promotions. Providing recipe cards to compliment Wombok would help provide further inspiration.</li> <li>• Almost three quarters of consumers indicated they would purchase Wombok in addition to their existing vegetables, potentially expanding the market.</li> </ul>

<p><b>Daikon</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• The name ‘Daikon’ current limits potential. Renaming to Sweet Mild Radish (Daikon) will increase appeal and help cue usage. Currently there are no comparison fruits or vegetables to help consumers imagine how it would be prepared, used and what it would be paired with. Renaming to Sweet Mild Radish, may help to switching with red radishes.</li> <li>• The health benefits were well liked by some consumers. Ensure information is clearly communicated to consumers (high in Vitamin C and potassium).</li> <li>• As the crunchy texture was well liked by consumers, providing recipe ideas to use in a Greek salad or crunchy Asian style slaw will assist in increasing consumer appeal. Placement near the salad vegetables and radishes in retail channels may also encourage trial.</li> <li>• Investigate breeding of smaller formats. The majority of Daikon that was purchased throughout the project was large in size, a quantity to be used across multiple dishes. Smaller or pre-prepared formats would encourage purchase and reduce wastage. These pre-prepared formats may consist of pre-cut cubes or small batons.</li> <li>• Ensure consumers are informed that Daikon is grown in Australia. With provenance a relatively important factor for consumers when purchasing vegetables, the Japanese translation of the name may cause confusion as to where it is grown.</li> </ul>
<p>To increase consumer appeal this vegetable requires some level of consumer education. Investigate smaller vegetable size.</p>		
<p><b>Lotus Root</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• Lotus Root arouses curiosity due to its name and unusual shape but conceptually does not have widespread appeal. It is difficult for consumers to imagine uses for the vegetable, this can be overcome by providing relevant information about taste and uses.</li> <li>• The multi-step preparation requirements are a deterrent for consumers, with appeal likely to be strongest with a pre-prepared &amp; easy to use packaging format. Pre-prepared formats also help to add value to the product.</li> <li>• Consumers expect a whole Lotus Root to cost approximately \$5.00 and has relatively moderate estimated volume sold. In context to the other Asian vegetables, consumers are willing to pay slightly more for this due to its novelty value.</li> <li>• Health information was liked by consumers, ensure this is clearly communicated at point of sale, including high fibre, magnesium and iron.</li> <li>• Those who had tried Lotus Root liked the vegetable. Trial at point of sale as well as further information on cooking styles &amp; recipes is recommended as consumers are then able to envisage utilising this in their repertoire i.e. chips, salads and stir fries.</li> <li>• In order to increase appeal of the vegetable, provenance of the vegetable should be emphasised through labelling as ‘Australian Grown Lotus Root’ at on pack and at point of sale.</li> </ul>
<p>Some interest for the novel root vegetable, however it does not hold widespread appeal and would require significant education.</p>		
<p><b>Hairy Melon</b></p>	<p><i>Low potential/ appeal</i></p>	<ul style="list-style-type: none"> <li>• Naming is important as consumers are unlikely to purchase based on name and look alone. The current names that include ‘Hairy’ or ‘Fuzzy’ are not considered to be appealing when in relation to food. Consider renaming to Winter Melon. However, this may limit the use to winter months only.</li> <li>• Taste profile and health benefits can be appealing, along with potential versatility (use cooked and raw) and long shelf life. Highlight health benefits, including Vitamins B1, B3 and C to help prevent migraines, eye health, digestive health etc.</li> <li>• Consumers have no clear reason to buy. Sensory qualities suggest cucumber substitute but no evident benefit over and above “normal” cucumber. Consumers will need a strong value proposition in order to prompt trial and future purchase.</li> <li>• Provide further information to consumers in regards to taste and health &amp; nutritional benefits on pack and instore. In addition, provide ideas for use for consumption occasions such as a snack / for kids lunchboxes to add variety.</li> </ul>
<p>There is limited potential both due to name, appearance and lack of obvious usage or benefits.</p>		

<b>Bitter Melon</b>	<i>Low potential/appeal</i>	<ul style="list-style-type: none"> <li>• Consider remaining the vegetable. Whilst ‘Bitter Melon’ provides an indication of the flavour and sets sensory expectations, it is off-putting. Other names that could be used are African Cucumber, Karavella or Balsam-pear.</li> <li>• Whilst the texture is acceptable, the taste is unappealing and disliked. Investigate breeding programs that reduce the amount of momordicin, with the aim to lessen the strength of bitterness. This is the primary barrier to consumption at this stage.</li> <li>• Providing consumers with recipe ideas that provide a balance of flavour is critical. Focus on balancing the flavour of Bitter Melon with salt or sweet flavours, this will provide balance and a more palatable dish. When served in Indian curries it is accompanied with yoghurt to offset the bitterness.</li> <li>• Bitter Melon is a unique vegetable that lacks clear comparison to other foods. This makes it difficult for consumers to imagine how and when it would be used without substantial additional information.</li> <li>• The health information was of interest to some consumers. Providing this at point of sale may encourage trial. Highlight the functional benefits of Bitter Melon i.e. the fruit and seeds is used to make medicine, used for stomach and intestinal issue etc.</li> <li>• The preparation required is a further barrier, offering pre-prepared options is a way to increase value and encourage trial. Consider pre-cut Bitter Melon that is ready to eat/cook, with accompanying recipe instructions on pack to provide inspiration.</li> </ul>
<b>Okra</b>	<i>Low potential/appeal</i>	<ul style="list-style-type: none"> <li>• Okra’s name and appearance both failed to provide any clues as to possible taste or usage, which is an inhibiting barrier at point of purchase. Extensive education and information would need to be provided to encourage use.</li> <li>• Conceptually, the vegetable was unappealing. The description of the inside ‘sap’ was off-putting to consumers, as was the short shelf life (2-3 days).</li> <li>• To mitigate the short shelf life perceptions, ensure that the vegetable is available in loose formats. This will allow consumers to purchase what they need and use on the day of purchase, further strengthening freshness perceptions.</li> <li>• However, the few consumers who did try Okra find the experience overall positive. To overcome hesitation at the retailer, provide free taste samples and significant promotion. This may include pairing Okra with complementary vegetables in dishes.</li> <li>• Okra was found to be appealing for children, relative to the other vegetables tested. Providing family friendly recipes (easy preparation, mild flavours) may also be an avenue to increase trial with families.</li> </ul>
<b>Native Thyme</b>	<i>High potential/appeal</i>	<ul style="list-style-type: none"> <li>• Due to its similarity to the commonly known Thyme, it is easy for consumers to imagine multiple uses for the herb, however it also means some form of added benefit (e.g. Increased strength, complexity) must be communicated to prompt purchase.</li> <li>• Being native to Australia carries inherent value, ensure this is clearly communicated to consumers.</li> <li>• The fresh and dried formats are appealing, with the product performing strongly in sensory testing, especially among females.</li> <li>• Price had a noticeable negative impact on commitment to purchase, the versatility and unique Australian flavours should be highlighted to help communicate the value. Further, complexity and potency of flavour means that only a small amount is required. Size of formats should take this into consideration.</li> <li>• Consumers who purchase parsley are more willing to purchase Native Thyme. Ensure both herbs are located closely together to provide ease of shopping. Native Thyme will primarily be purchased in addition to their current shop, therefore more likely to grow the vegetable category.</li> </ul>

<p><b>Lemon Myrtle</b></p>	<p><i>High potential/appeal</i></p>	<ul style="list-style-type: none"> <li>• The Lemon Myrtle was an attractive product for consumers due to its versatility and variety of cooking styles and uses. Marketing and communications will be important to convey this versatility.</li> <li>• The potential health and nutritional benefits of Lemon Myrtle (i.e. powerful antiseptic and anti-virus agent, calcium, zinc, magnesium, vitamins A &amp; E) is appealing to consumers. Highlight these benefits on pack or at point of sale.</li> <li>• Both fresh and dried formats are appealing to consumers. When looking specifically at dried Lemon Myrtle, consider providing various packaging options such as coarsely blended or finely ground Lemon Myrtle, as different recipes may require varying levels of fineness.</li> <li>• The ability to incorporate Lemon Myrtle in both sweet and savoury cooking styles is appealing. The Lemon Myrtle biscuit was well liked in the sensory testing and should be used as a suggested recipe to promote trial amongst consumers.</li> <li>• Females and those aged 10-25 years old retained strong commitment to purchase with the introduction of price, while it was a barrier to other consumers. If possible, a price point under \$3.50 per packet (15g) would be most ideal as it would increase the amount of consumers willing to purchase this product.</li> </ul>
<p><b>Acacia Seeds</b></p>	<p><i>High potential/appeal</i></p>	<ul style="list-style-type: none"> <li>• It is a unique product that lacks clear comparison making it difficult for consumers to imagine how and when it would be used without substantial additional information.</li> <li>• Consumers are unlikely to purchase based on name and appearance alone, marketing will be very important, with the nutritional content a potential way-in to hook consumers in the absence of taste and aroma. Plant-based proteins are on the rise, so calling out the ‘up to 20% protein content’ will appeal to consumers and increase likelihood of trial.</li> <li>• When consumers have the opportunity to smell and taste the seeds it is appealing and also provides clear clues for usage, suggesting Acacia Seeds have potential, but likely as an occasional purchase.</li> <li>• Providing ground formats will reduced consumer preparation required, and appeal to time conscious cooks.</li> <li>• As well as nutritional content, call out flavour descriptors ‘roasted nuts &amp; chocolate’ on pack. Recipe ideas such as shortbread, protein slice and granola will also be appealing to consumers.</li> <li>• Interest was strong amongst bakers - to help shopability in store look at stocking in the baking aisle with the nuts, seeds and spices. There is also potential to investigate new product development for cake and cooking mixes/packets.</li> </ul>
<p><b>Pepperberry</b></p>	<p><i>High potential/appeal</i></p>	<ul style="list-style-type: none"> <li>• Pepperberry has clear application for consumers in everyday cooking. Primarily as a replacement for pepper – however, its added sensory delivery needs to be communicated to encourage switching from regular pepper.</li> <li>• The Pepperberry was sensorially appealing across recipes with the pepperiness and aftertaste well liked – more specific recipe ideas such as Pepperberry Gravy may increase appeal.</li> <li>• Price is not a major barrier to purchase, commitment remained strong at \$30 per kilo. Consumers expect to pay a similar amount for Pepperberry as they would for pepper. Communicate the unique flavour and native qualities of the product to communicate value and differentiate from regular peppercorns.</li> <li>• Whilst small 25 gram packets were seen as an appropriate size for Pepperberries, there is an opportunity to value-add through a number of packaging and format options. This includes pre-ground Pepperberry, dried whole Pepperberry as well as fresh Pepperberries. Provide serving suggestions on pack to allow consumers to tailor the strength of pepper flavour to meet their needs.</li> <li>• There needs to be a clear reason as to why consumers should use Pepperberry instead of normal pepper. Highlight on pack that Pepperberry has high antioxidants as well as adding a rich plum colour to sauces. Provenance information and association with being grown in native Australia is also appealing to consumers.</li> </ul>

<p><b>Saltbush</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• There needs to be a clear reason for consumers to replace salt with Saltbush. Calling out specific health and nutritional benefits such as high in protein, vitamins, and minerals will emphasise the healthier alternative when adding extra flavour to dishes.</li> <li>• Marketing and promotions must communicate the value of choosing the Indigenous option, in order to prompt consumers to sample the product. Provenance and having a healthy, native and natural substitute for salt is potentially an appealing factor that would help to drive purchase.</li> <li>• Saltbush should be accompanied with suggested recipes to promote trial among consumers. This will help improve the current lack of knowledge around this plant. The idea of wrapping larger Saltbush leaves around meat and fish was intriguing to some consumers.</li> <li>• The long shelf life of dried Saltbush (up to 2 years) and the need for only a small portion required for cooking is appealing to consumers. This means that it can be used over time and left in the pantry for use when required.</li> <li>• Small 25g packets are seen as most appropriate for saltbush. Consumers expect to pay a similar price to more unusual types of rock salt (i.e. pink Himalayan rock salt).</li> </ul>
<p>To increase consumer appeal this vegetable requires further education and a reason to purchase.</p>		
<p><b>Youlk</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• The Youlk has potential in the Australian market. Investment should focus on the commercialisation of the vegetable to ensure distribution into consumer channels. Currently the vegetable has limited availability in food service.</li> <li>• Consumers were willing to pay around \$4 per kilo for the Youlk, relative to premium potato varieties. Costs benefit analysis should be conducted to understand whether commercialisation will be profitable based on consumers price expectations.</li> <li>• The Youlk was particularly appealing among those in South Australian and even more so among families with adult children.</li> <li>• Use of the word ‘radish’ in the name is polarising and suggests a hot flavour – if possible this should be avoided. Consumer education of the Indigenous name, Youlk is recommended.</li> <li>• The versatility of the vegetable as an inclusion in sweet or savoury dishes is the key appeal and should be emphasised in communications.</li> <li>• The suggested cooking styles and recipes (roasting, in a salad raw) are a way to communicate versatility when moving forward.</li> <li>•</li> </ul>
<p>Youlk had strong conceptual appeal, however limited commercialisation and availability is the main barrier at this stage.</p>		
<p><b>Bush Tomatoes</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• The fruity flavour description of the Bush Tomatoes is appealing, however mention of an ‘earthy’ flavour should be minimised as it reduces appeal.</li> <li>• There is some interest in its use as a thickening agent substitute for flour, and to enhance tomato flavour, however due to consumers’ unfamiliarity with the fruit extensive education would be required to encourage purchase. May be a good alternative for gluten avoiders.</li> <li>• The extended shelf life is an attractive feature, with perceived ease of use in a dry/powdered form adding to appeal. Pack should be easy to store and airtight to increase longevity.</li> <li>• Consumers liked the versatility of the product - promoting both sweet and savoury dishes will be important to communicate this attribute.</li> <li>• Investigate potential to harvest and deliver fresh bush tomato varieties to consumers - these are more appealing than dried or powdered. Snap frozen or freeze dried may retain better flavour and nutrition, relative to current formats. Whilst these methods may be more expensive to deliver to retail, consumers are willing to spend over \$5 per shop.</li> <li>• Nutritional information was appealing to consumers, include Recommended Daily Intake (RDI) figures regarding potassium and Vitamin C.</li> </ul>
<p>To increase consumer appeal Bush Tomatoes require education on usage and investigate alternative formats i.e. fresh.</p>		

<p><b>Kulyu</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• Kulyu has potential in the Australian market. Investment should focus on the commercialisation of the vegetable to ensure distribution into consumer channels. Currently the vegetable has limited availability in food service.</li> <li>• Including ‘native sweetpotato’ in the name could help overcome barriers and cue usage as it provides a clearer point of comparison. Provenance and having Australia’s own version of a sweetpotato was also an appealing factor that would help to drive purchase.</li> <li>• Consumers envisage paying the same amount, if not more for Kulyu as they would for sweetpotatoes (above \$4.00 per kilogram). Highlighting provenance factors and versatility may further increase the value proposition to potentially hold a higher price point than sweetpotatoes.</li> <li>• Information on selection, preparation, cooking and usage is needed to encourage purchase. The comparison to sweetpotatoes assists in understanding how to incorporate Kulyu into various styles of cooking. Yet, it is still vital to provide recipes at point of sale to help consumers familiarise with Kulyu – with baking and roasting holding the widest appeal.</li> <li>• Future opportunity will be to target younger consumers, 18-24 years of age, who found the vegetable highlight appealing. These consumers are less confident in the kitchen, so recipes should focus on easy and quick meals. The industry could investigate pre-prepared options, such as mash or roast Kulyu that would offer an easy trial dish to consumer as they gather the knowledge and skills to cook their own dishes.</li> </ul>
<p>Kulyu had strong conceptual appeal, however limited commercialisation and availability is the main barrier.</p>		
<p><b>Finger Limes</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• The health and nutritional benefits of Finger Limes were appealing, as was the ‘zesty citrus’ description. Promote the high levels of folate, potassium and vitamin E.</li> <li>• References to seafood, caviar and seafood recipes are unappealing to many consumers – more ideas and inspiration about how to use and substitute for other ingredients is required to encourage purchase. In-store the fruit should be situated near the citrus and pomegranates for easier substitution.</li> <li>• External appearance does not give indication of its taste or use – the inside appearance must be clearly communicated to convey its potential use and provide intrigue/novelty value. Providing samples at point of sale will allow consumers to see the inside of the fruit as well as taste the product.</li> <li>• Whilst there is some appeal for Finger Limes to be included in cooking repertoire, it is unlikely to become an everyday item. Finger Limes do however create intrigue and interest, with potential for occasional/special occasion/novelty use. Positioning the fruit as a premium product (packaging, price point \$4+) will align with the special occasion usage. Providing recipe ideas on pack for dinner parties will also cue usage occasions for consumers.</li> <li>• With limited volume through the supermarkets, investigate distribution through food service. More recently the fruit has been increasingly incorporated into fine dining menus as well as cocktails. Hotel chains, restaurants and bars are all worthy channels to expand distribution.</li> <li>• As this may be used as an occasional product, highlight the long shelf life at point of sale, 4-5 weeks. This will help assure consumers at trial that they there will be limited wastage and an opportunity to use the Finger Limes across a number of dishes in the 4-5 week period.</li> </ul>
<p>To increase consumer appeal this fruit requires information (promote long shelf live). Investigate food service channels.</p>		

<p><b>Australian Spinach</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• The name Warrigal Greens was considered to be unappealing. It is suggested that the vegetable should be renamed to ‘Australian Spinach’. Marketing and promotions must communicate the value of choosing the native Indigenous option, in order to prompt consumers to trial the product.</li> <li>• Conceptually the vegetable was appealing, especially to males. Consumers liked the long shelf life- communicate correct storage instructions to ensure consumer satisfaction.</li> <li>• Sensorially, the crunchy texture of the vegetable was liked by consumers. However, some found the leaves to be stringy and chewy. The furry nature of the leaves was off-putting to some consumers. Examine new varieties that retain the crunch, but are overall less stringy and furry.</li> <li>• Providing alternative recipes and ideas is necessary for the vegetable to deliver on its conceptual appeal. Highlight Warrigal Green’s ability to easily substitute for a wide range of green vegetables such as spinach and silverbeet. Look to food service for cuisines and cooking styles that will work best for this vegetable.</li> <li>• The price point of \$30.00 per kilogram was perceived to be too expensive for Warrigal Greens. Context to the retail price should be provided (at parity to premium leafy greens). Furthermore, greater emphasis the health and nutritional benefits of the vegetable may help to justify the cost for purchase.</li> <li>• Sourcing Warrigal Greens for consumer testing proved to be a major difficulty. Investment should focus on the commercialisation of the vegetable to ensure distribution into consumer channels. Currently the vegetable has limited availability in food service.</li> </ul>
<p><b>Samphire</b></p>	<p><i>Has potential – optimisation required</i></p>	<ul style="list-style-type: none"> <li>• The easy preparation and potential use as a garnish, stir-fry or salad is appealing and cued by appearance, however the name (Samphire or Sea Asparagus) does not suggest usage or taste, with marketing and promotions required to communicate this.</li> <li>• The nutritional information was relatively appealing to consumers. Ensure health benefits are communicated at point of sale- including vitamins A, B and C, as well as promoting healthy liver and kidney function.</li> <li>• Sensorially, Samphire performed poorly, commonly found to be too chewy/string and with low commitment to purchase. Consumers are looking for a crunchy product. Investigate alternative varieties that are less stringy (similar to the success of stringless celery). Providing pre-prepared formats that only include the tender tips will also reduce the perception of chewiness and will add value to the industry.</li> <li>• Mention of its limited shelf life is a barrier to purchase, with clearer information required to clarify longevity. Examine supply chain efficiencies to ensure the products arrives in-store at optimal freshness. Investigate packaging that can retain freshness and extend shelf life. Best before dates and storage instructions on pack will help manage consumer expectations.</li> <li>• Purchase of Samphire is likely to be occasional rather than as a regular vegetable purchase. Loose formats situated near the herb section may encourage use as a garnish.</li> </ul>

## Scientific refereed publications

None to report.

## Intellectual property/commercialisation

No commercial IP generated.

## References

VG12078 & VG14060: Project Harvest. (2013-2017). *Colmar Brunton Pty Ltd.*