



**CONSUMER
RESEARCH
REPORT —**

**The relationship
between fresh
produce packaging,
food waste and
recycling in the home**



www.freshproduce.org.au

info@freshproduce.org.au

PO Box 636, Collins Street West, Victoria 8007

Research conducted and report prepared by:

Norrelle Goldring

Commercial Strategy | Insights | Sales Leadership
Market & Channel Development | CX | Growth | Retail

Creating growth opportunities for products, places and people.

Contents

1. Background, objectives, scope	4
2. Methodology & sample	5
3. Findings	6
3.1 Usage occasions & meal types	6
3.2 Planning meals	7
3.3 Channels, purchase & transport	8
3.4 Packaged, wrapped & bagged - perceptions	10
3.5 Unpack, store & use	11
3.6 Waste, reuse & recycle	15
3.7 The effects of demographics	16
4. Discussion & key themes	17
5. Recommendations	21
5.1 Strategic recommendations	21
5.2 Recommendations for further research	21
6. Conclusion	22
7. Appendix	23
Participant ideas to reduce waste and increase recycling	23

Executive summary

The Australian Fresh Produce Alliance (AFPA) commissioned an in-home study of 38 households across different lifestages, incomes and ethnicities to understand the relationship between fresh produce packaging, food waste and recycling in the home.

This consumer-focused research follows an AFPA-funded RMIT research report, 'The role of packaging for Australian fresh produce', which identified that whilst packaging is key to reducing food waste:

- Little is known about the role that packaging plays in extending the life of food when stored by consumers at home; and
- There is a lack of consumer and industry education and understanding about the balance between packaging that reduces the environmental impacts of food waste, compared to reducing packaging's environmental impacts.

Building on these findings from RMIT, this consumer research focuses on how Australian consumers, buy, store, use and dispose of fresh produce and its packaging in their own homes.

To understand how consumers are using fresh produce and its packaging in the home, the AFPA commissioned an initial qualitative consumer study in order to provide direction on areas including:

- Overcoming storage and waste related barriers to increased fruit and vegetable consumption.
- Identification of opportunities for both packaging development and reduction.
- Packaging and storage messaging such as storage, recycling, compost.
- Broader consumer communications campaigns around fresh produce waste minimisation and optimal storage.

The 38 consumer households were located in both Sydney and Melbourne and comprised of the following lifestages:

- Young Family, most children under 12
- Older Family, most children over 10
- Single or Double Income households, no children
- Empty Nester/Adult Family

Interviews were in person, in home over the course of a month. Interviews were conducted with a focus on the fresh produce usage cycle:

Usage occasions > Meal planning > Purchase > Unpacking
Storage > Usage > Wastage.

Key Findings

From the consumer interviews, three key themes across consumers purchase, use and disposal of fresh fruit and vegetables have emerged:

- **Planning:** the relationship between spending, planned meals, and food waste.
- **Convenience:** access to fresh fruit and vegetables.
- **Storage & Use:** management of fresh fruit and vegetable quality at home.

Planning: the relationship between spending, planned meals and food waste

- The more meal planning undertaken the lower the food waste.
- At a high level, households that are more conscious of their expenditure planned all meals in advance.
- The majority of consumers interviewed as part of this research indicated a desire to reduce food waste to save, and/or not waste money.
- Consumers by their own admission are buying fresh produce regardless of whether it is packaged or not.

Convenience: access to fresh fruit and vegetables

- Despite most consumers expressing a desire to reduce packaging, packaged produce was observed in the majority of fridges.
- In every household, where fruits or vegetables had been cut or semi-prepared, the cut product was refrigerated and stored in a form of packaging for preservation – indicating a knowledge that product needs protection to extend usable life.
- Appropriate portion sizes will reduce food waste. Portion sizes vary according to household size; often smaller households are buying packaged items to avoid buying "whole" loose items e.g. lettuce.

Storage & Use: management of fresh fruit and vegetable quality at home

- Consumers **do not know** how best to store product to maintain quality.
- Storage conditions are driving produce use. Poor storage conditions are responsible for early drops in product quality and as a result product value. Consumers are value driven and therefore, as product deteriorates as does their perception of the value of the produce. This is creating a "use up" mentality.

Recommendations

This report details a number of recommendations to help manage waste throughout the fresh produce usage cycle. These recommendations are summarised across the key themes identified in the consumer interviews.

Planning: opportunities to meal plan to reduce waste

Consumers, whether they are shopping with a meal plan or not, all reported they seek meal inspiration at the point of purchase. There are opportunities for retailers to provide better meal planning tools and inspiration for consumers.

Convenience: the right size, at the right time

Further work to manage consumer expectations around packaged food and convenience should focus on better understanding portion size to ensure that consumer segments are receiving product formats that meet their needs in terms of size, level of preparation and shelf life.

Storage & Use: management of fresh fruit and vegetable quality in the home

To assist in managing food waste via better fresh produce storage at a consumer level consideration should be given to better communication on product storage, both on packaging and at shelf. This should be coupled with advice on how to store partially used products.

Relationship between packaging and food waste; financial or ethical?

This research concludes that consumers feel differently about food waste than packaging waste.

Consumers generally estimated that they only throw out 5-10% of fruit and vegetables weekly. Several consumers said 20%, and by their own admission, considered that very wasteful.

Consumers reported that they 'hate' wasting food as they feel they are throwing away money. This is in stark contrast to when consumers are asked about disposal of fresh produce packaging where they merely feel 'bad' or 'guilty' about throwing out packaging.

This contrast in consumer sentiment is attributed to the financial value consumers assign to food waste, whereas consumers do not believe they are losing anything when they dispose of packaging. Some consumers when interviewed could estimate the financial value of the food they disposed of; in contrast most consumers were unaware of the volume of packaging they disposed of in the same time period.

Conclusion

Minimising food waste is a challenge and understanding how consumers use fresh produce in the home will be core to addressing this challenge. A better understanding of fresh produce usage in the home was achieved by:

- Conducting 38 consumer interviews in households across Sydney and Melbourne.
- Observing the fridges, pantries and bins at these households to better understand storage, consumption and disposal behaviours.

This research determined that there were three key themes among the findings:

- **Planning:** the relationship between spending, planned meals, and food waste.
- **Convenience:** access to fresh fruit and vegetables.
- **Storage & Use:** management of fresh fruit and vegetable quality at home.

The insights gained through this research highlight that consumers when presented with the risk of food spoiling prior to usage, report feeling a financial rather than environmental/ethical penalty.

The financial implication of wasting food that is felt by consumers provides an opportunity for the fresh produce supply chain to leverage. Ultimately, the goal for the fresh produce supply chain should be to work with Australian consumers to reduce the financial and environmental burden of food waste, while increasing access to fresh fruit and vegetables.

1. Background, objectives, scope

The Australian Fresh Produce Alliance (AFPA) has a membership made up of Australia's major fresh produce growers and suppliers. AFPA members represent:

- Half the turnover of the Australian fresh produce (fruit and vegetables) industry – \$4.5 billion of the \$9.1 billion total.
- More than a third of Australian fresh produce exports – \$410 million of the \$1.2 billion total.
- More than 20,000 direct employees.
- Grower supplier network of more than 1,000 growers.

The AFPA was established by industry to “grow a healthier Australia” by improving:

- Access to fruit and vegetables for all Australians.
- The environmental sustainability of the supply chain.
- The social impact of the fresh produce sector.
- The business environment.

A key priority for the AFPA is fresh produce packaging and the relationship between packaging, food waste and Australians' ability to access fruit and vegetables.

To better understand the relationship between fresh produce packaging, food waste and Australians' ability to access fruit and vegetables, the AFPA funded a research report prepared by RMIT titled 'The role of packaging for Australian Fresh Produce'. The report found that:

- Packaging of fresh produce does help to avoid and reduce food waste, by protecting the integrity of the product in the supply chain.
- Packaging increases and extends produce shelf life from farm to plate compared to having no packaging at all.
- Packaging material and packaging formats should work synergistically to provide product protection and shelf life as it travels through the supply chain.

However, the report focussed on the supply chain from farm gate to store distribution centre and did not seek to understand what occurs with fresh produce and its packaging in the home. In fact, the RMIT research indicated that whilst packaging is key to minimising the impact of food waste:

- Little is known about the role that packaging plays in extending the life of food, when stored by consumers at home.
- There is a lack of consumer and industry education and understanding about the balance between packaging that reduces the environmental impacts of food waste, compared to reducing packaging's environmental impacts.

To better understand how consumers are using fresh produce and its packaging in the home, the AFPA commissioned an initial qualitative consumer study in order to provide direction on areas including:

- Understanding how consumers use fresh produce at home – unpacking, storage and timing of actual consumption post purchase.
- Identification of opportunities for both packaging development and reduction.
- Packaging and storage messaging such as storage, recycling, compost.
- Broader consumer communications campaigns around fresh produce waste minimisation and optimal storage.

The scope of the study included questions around:

1. How consumers use fresh produce at home – unpacking, storage, timing of actual consumption post purchase.
2. What and how much is being wasted – both food and packaging, and why, including cues to throwing something out.
3. What prevents consumers from using and buying more fruit and vegetables – what is the role of packaging, storage and at-home visibility in this? How can changes to packaging, storage and communications of this increase fresh produce consumption and purchase?
4. How behaviour looks across the cycle of: Usage occasions Meal planning > Purchase > Unpacking > Storage > Usage > Wastage. Understanding the upfront planning and purchasing elements is important in order to identify the drivers of wastage.

2. Methodology & sample

This initial piece of research is intended to uncover behaviours and attitudes that would be quantified in a subsequent research stage. Recommendations for topics to be covered in further research appear in Recommendations at the end of this report.

This piece of consumer research is qualitative in nature, albeit that the sample is quite large for qualitative depth interviews and sufficient to be directionally indicative, rather than absolute.

In total, 38 people across Sydney and Melbourne were interviewed in their homes, in order to observe their kitchens and fresh produce usage environments. The sample covered genders, lifestages, income levels, ethnicities and dwelling types, to be as representative as possible. The sample schema is below.

Interviews were conducted between 20 September and 17 October 2019. Interviews were conducted with a focus on the fresh produce usage cycle:

Usage Occasions & Meal Types > Planning > Purchase & Transport > Unpacking, Storage & Usage > Wastage, Reuse & Recycling.

To accurately record and document the consumer interviews, photos were taken of all participants' kitchens, and occasionally gardens and bins where relevant, some of which appear in this report. Participants were also voice recorded, enabling the use of deidentified participant quotes throughout this report.

Lifestage	Ethnicity, location	Melbourne	Sydney
Young Family (most children <12)	Anglo Caucasian, suburbs	3	4
	Non-Caucasian, suburbs	2	2
	Either, inner city affluent	1	1
Older Family (most children >10)	Anglo Caucasian, suburbs	4	3
	Non-Caucasian, suburbs	2	2
	Either, inner city affluent	1	1
Single/Double Income No children (SINK/DINK)	Anglo Caucasian, suburbs	1	1
	Non-Caucasian, suburbs	1	1
	Either, inner city affluent	1	1
Empty Nester/Adult family	Anglo Caucasian, suburbs	1	1
	Non-Caucasian, suburbs	1	1
	Either, inner city affluent	1	1
Subtotal:		19	19

3. Findings

The findings of the 38 in-depth consumer interviews have been presented according to the “Fresh Produce Consumption Cycle”. The Fresh Produce Consumption Cycle was initially hypothesised during the creation of the project framework, with the initial cycle being:

Usage occasions > Meal planning > Purchase > Unpacking Storage > Usage > Wastage.

This research enabled a better understanding of consumers thought process around consumption, usage and disposal of fresh produce and as a result, this cycle has been updated to better reflect consumers' behaviour:

Usage Occasions & Meal Types > Planning > Purchase & Transport > Unpacking, Storage & Usage > Wastage, Reuse & Recycling.

3.1 Usage occasions & meal types

Most Australian families are cooking the majority of the week

Most consumers are cooking dinners at home 5 to 6 nights a week and only eating out once a month and typically on a weekend, depending on income.

The exception is the Single/Double Income No Kids, who not only have more disposable income but tend to be less planned and eat out more. Young Families are the lifestage most likely to eat at home seven days a week, given tighter budgets as a result of often being a single income household, and the reported hassle of taking **young** children out.

While virtually no participants said they were ordering in, with home delivered takeaway considered to be for “**lazy people who like wasting money**”, some would order pizza in, and many would get takeaway once a week – typically a Friday night – that they would collect from the outlet.

Dinners, frequently serve as leftovers for lunch the next day or for dinner the next night. More volume is made on these occasions with easy-to-heat leftovers in mind.

What Australians cook: is fresh produce the side or the main event?

Overwhelmingly, participants reported that vegetables are used as an accompaniment or side to dinners, with a number reporting that they are also trying to have 1-2 meat free meals per week.

Popular and common dinner dishes across households include spaghetti bolognese, schnitzel, pasta, stir fries, curries, 'Mexican', pizza, 'meat & 3 veg', and sausages or BBQ chicken with vegetables or salad. Dessert was not generally observed; occasionally ice cream. Fruit serves the dessert purpose in some households.

Two factors that are influencing fruit and vegetable consumption at dinner time are ethnic background and seasonality. Unsurprisingly consumers that reported their ethnic background as Indian prepared more Indian vegetarian cuisine, other examples include consumers who identified as Eastern European preparing dishes like borscht.

The effect of seasonality was indicated by participants reporting that they make more soups and casseroles in winter while salad, though usually a dinner time side dish, is sometimes the meal itself (with protein added) during summer.

Generally, lunch is considered as a 'school lunchbox' for children but something of a forgotten or 'scratch' occasion for adults in the household. The 'scratch' occasion of lunch is also reflected in households without children.

School lunchboxes are typically sandwiches, wraps and fruit. The sandwiches and wraps may include lettuce or tomato but few other vegetables. Many parents reported their children's school requiring healthier lunchboxes with fewer pre-packaged items.

For the adults, working men are more likely to buy their lunch at work or take leftovers from the previous evening's meal. Working women often take soups or salads to work, paired with tuna or salmon.

On weekends lunch may be foregone altogether in favour of a 'cooked breakfast' or brunch.

The relationship between dinner and lunch in most households, irrespective of demographic, reflects the commonly reported idea of 'using up' fruit and vegetables. This was often reported as creating leftovers or as making dishes that would double as lunch and dinner (e.g. soup and casserole). This 'use up' mentality was also evident when consumers reported making recipes like stew and frittata that would enable the use of fresh produce that consumers considered likely to 'go off' soon.

Breakfasts during the week across all household types typically consist of cereal, toast, or muesli with fresh berries and yoghurt. Fruit is often involved in breakfast either via homemade juice or smoothies, or direct consumption.

Participants reported spending more time preparing breakfast on the weekend. As a result, breakfast on the weekend is more likely to be a cooked breakfast; either pancakes, or sausages and bacon which may incorporate tomato and occasionally mushroom or spinach.

Snacks mostly involve fruit and nuts, particularly bananas, apples, oranges and mandarins. Smoothies are also commonly reported as snacks.

Many participants with children (Young Family most children under 12, or Older Family most children over 10) reported that schools are driving fruit and vegetable consumption through 'Crunch and Sip' programs. The participants indicated they were purchasing fruit and vegetable snacks specifically for children's lunchboxes and for these 'Crunch and Sip' breaks.

Some households (Young Family most children under 12, or Older Family most children over 10) reported routines around fruit and vegetable consumption, with some parents insisting kids must have fruit with breakfast, or as a snack, or before an unhealthier snack to 'balance it out'.

What are the fruit and vegetable staples in Australian homes?

The staple fruits observed in fruit bowls and in fridges and stated by participants as being bought the most often, include bananas and strawberries (both particularly for use in smoothies), apples, mandarins, and blueberries (when in season).

Consumers report that their 'occasional' fruit purchases are kiwifruit, grapes, watermelon, rockmelon and avocados. Avocados were regarded as finicky, with a short ripeness and consumption window.

Vegetables most commonly purchased may depend on ethnicity. For consumers of Mediterranean heritage staples are tomatoes (regarded as a vegetable, not a fruit), lettuce and cucumber while Asian heritage households are more likely to list bok choy and Asian greens as staples. Regardless of ethnicity, potatoes, onions and carrots are regularly mentioned together, and were observed in the majority of households.

Other regularly purchased vegetables include mushrooms, zucchini, spinach, capsicum, and cauliflower.

Consumers reported that their 'occasional' vegetable purchases include broccolini, bok choy (particularly for stir fries), beans, eggplant, cabbage, pumpkin and celery.

Many households were also purchasing frozen fruit and vegetables; those most often observed and reported were peas, broad beans, mixed vegetables, and berries (predominantly raspberries and blueberries).

Australians know that fruit and vegetables are good for them but think fresh produce is boring

Most consumers report being aware of the need to maximise their fruit and vegetable consumption. Some are trying to move toward more plant-based diets, heightened by the media

attention given to keto, paleo and vegan diets. However, there persists a perception that "vegetables can be boring".

One of the most reported barriers to fruit and vegetable consumption is lack of meal inspiration and time. In the absence of a meal plan, consumers may default to favourite dishes, which may or may not include fruit and vegetables.

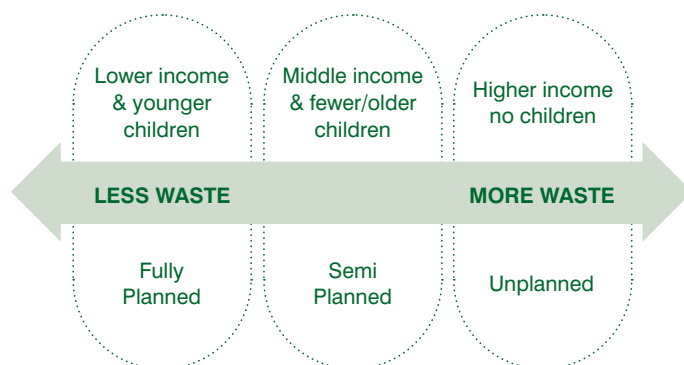
3.2 Planning meals

The degree to which meals are planned and shopped for has a direct correlation to the amount of food wasted.

Degrees of planning can be broadly categorised into:

- Fully Planned (most or all meals, up to a week in advance)
- Semi-Planned (next few days)
- Unplanned (day of, based on what's in the fridge).

Further, degree of planning reported also varies by lifestage and income. Generally, the younger and older family lifestages, and lower income households, are more planned, and the households without children (Single or Double Income, No Children or Empty Nesters) are less planned.



When comparing the level of planning to the reported level of wastage, generally: the more planned, the less wastage.

Households without children (Single or Double Income, No Children or Empty Nesters) are more likely to be unplanned and sensorially based: "What do we feel like?".

Households without children (Single or Double Income, No Children) in particular overestimate what they are actually likely to use or 'get through' at home in a week due to plans changing. They subsequently feel guilty for how much they throw out.

This is in contrast to lower income households, often with children (Young Family most children under 12 or Older Family most children over 10) who more accurately estimate quantities required as often these quantities are aligned with one or more meals.

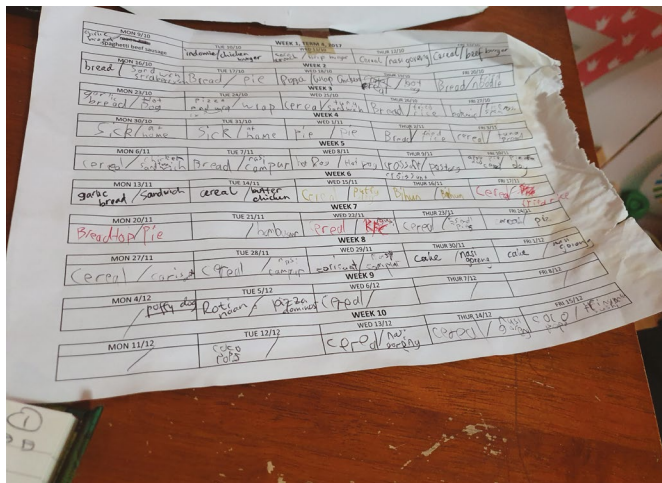
3. Findings continued

When planning what and how much fresh produce to buy, most are more likely to buy habitual staples and build meals around those, rather than plan the meals and then buy the ingredients specific to the recipes. In some instances, lower socioeconomic households and young family lifestages are planning fresh produce and meals around promotions and catalogues for budgetary reasons.

Regardless of level of meal planning, most consumers interviewed have a shopping list, whether written or in their heads. The majority say they know how much fresh produce they use based on the 'major shop' interpurchase intervals, such as weekly, and from experience, trial and error.

Quantities of fresh produce purchased therefore tend to be mostly based on "what I know we go through" and 'guesstimation'. The quantities to be purchased on a given trip are rarely indicated on the shopping list, although fruit may be planned out by the number of units based on how many days of lunches and snacks until the next shopping trip, and how many people are eating it.

What respondents have indicated is that even though some are 'Fully Planned' and know exactly what their meals will look like throughout the week, this does not necessarily translate to the purchase of exact quantities, rather a combination of ingredients that will be 'used up' prior to the next shopping trip.



A meal planning spreadsheet from a lower income, young family lifestage household.

3.3 Channels, purchase & transport

Storage space and ease of access to fruit and vegetables affect purchase frequency

Consumers reported that proximity to the supermarket directly influences the frequency of fruit and vegetable purchases – the closer the supermarket, the greater the frequency of trips.

Those living in walking distance of supermarkets shop every day or two days. For those located further from supermarkets, and for young families for whom shopping trips are a hassle, the usual frequency is a larger weekly shop on weekends punctuated by 1-2 top up trips during the week.

Households without children (Single or Double Income, No Children) are also reporting they are shopping every day or two days at the supermarket located closest to work or at the train station on the way home.

Storage space, or lack thereof, influences frequency of shopping trip to an extent. That is, the smaller the storage space, the greater the frequency of trip. This is reported by the inner-city households, which in some cases are apartments, townhouses or units that are significantly smaller in floor space than full size family homes which are often located much further from the CBD.

Smaller homes mean smaller kitchens and therefore smaller fridges, pantries, cupboards and bench space where consumers report storing fruit and vegetables. The lack of storage locations (or space within those locations i.e. small fridges) is also responsible for influencing frequency of purchase. This is particularly evident in households without children (Single or Double Income, No Children) who favour apartments over larger homes.

Channel choice: supermarkets dominate

Consumers report buying the majority of their fresh produce from major retailers. When pressed on this, consumers report they purchase fresh produce here due to convenience of location; what's closest to home, work, schools or on the way to/from any of these.

More affluent households are more likely to also shop in independent fruit and vegetable shops, which are perceived to be more expensive than supermarkets. There wasn't much stated incidence of shopping from fresh food markets, unless the markets were located reasonably close to home, such as for an Armadale resident who occasionally visits the Prahran market. Fresh food markets thus appear to be more of an occasional, rather than regular weekly, visit.

Overwhelmingly, supermarket produce is perceived to be less fresh and with shorter lifespans than that found in fruit and vegetable shops: “Stuff from fruit and vegetable shop lasts longer – into the second week”. There is a general assumption that major retailers bulk store – chilled or ambient – for long periods of time before fresh produce is placed on shelves. “You know it’s been in storage for quite a while and then when you buy it, it’s only got a few days left and some in the bag are already bad”. There is an opportunity to better communicate to consumers the supply chain steps and length, beyond simply being ‘fresh’.

The perceived extra expense of fruit and vegetable shops is considered worthwhile by consumers due to the belief that fresh produce is ‘fresher’ and better quality when sold through green grocers/speciality stores, combined with the perceptions of broader and different range to that found in supermarkets, and more ‘ecofriendly’ transport tools such as paper bags and cardboard trays and boxes. From this it can be inferred that the circular economy of crates in supermarkets is not widely understood.

Although Single or Double Income, No Children households have the income to spend at specialty fresh produce shops, such stores are perceived to close too early during the week for after-work shopping trips, so the supermarket becomes the default.

Very few consumers are shopping online for fresh produce. Consumers report this is due to the requirement for tangibility – the ability to see and feel it as a quality and/or ripeness check – which is highly important when purchasing fresh produce. Two of the 38 consumers interviewed had tried online grocery shopping, had poor experiences, and returned to physical store shopping. A further three participants who continue to shop for groceries and fruit and vegetables online are in the Young Family lifestage; and report this as a function of lack of time to get out to a physical store without hassle.

Consumers reported that the barriers and poor user experiences with online fruit and vegetable shopping include over-wrapping and over-packaging; poor or inferior quality product picked for online deliveries versus what is available in the physical store; poor choice of substitute item if the desired item isn’t available; receiving one bag of an item versus one unit, or the reverse; too hard to be home to receive delivery for those living in apartment blocks; and a fear of missing out on things that might ‘look good’ in the physical store.

Consumers searching for inspiration

Many participants, particularly those who undertake very little meal planning, look for meal inspiration in store, and simple meal ideas placed in the fruit and vegetable section and at shelf may help increase fresh produce purchase and consumption. “It would be good if there were things like ‘ideas for 5 recipes from these 3-4 ingredients’ or ‘4 things you can make from a bag of veggies’”.

Most consumers report buying only what they need until their next shop. However, they acknowledge they may come back from the store with more than they planned to buy, based on whether something is seasonal; ‘looks good’; or is on special.

Lower income households in particular report purchasing fruit and vegetables based on discounted/special pricing. Notably, most consumers perceived bulk packs as cheaper than individual or per kg priced products. These consumers often report struggling to use the entire quantity purchased, particularly when this purchase is unplanned.

Consumers report purchasing loose or non-bulk packs of fresh produce items when purchasing for items specific to a recipe, or when only shopping every 1-2 days.

Transport: the forgotten step in the cycle

Much of the focus on transport in the fresh produce supply chain is from farm gate to retail store, with little concentration on the transport of fresh produce by consumers to their home.

Consumers reported that they view transport in two stages:

1. getting the fruit and vegetables from the shelf to the checkout; and
2. from the checkout to home.

During the first stage, some consumers report placing items loose in the trolley, with the exception of ‘small things’ like beans and brussels sprouts, which need to go into some sort of bag.

However the majority reported using the ‘tear-off’ bags at the fruit and vegetable shelf, which are seen to serve the purpose of containing small, loose product on the journey from shelf to checkout; and of preventing ‘contamination’ – items rubbing against each other, either in the trolley or in the fridge crisper; and ‘keeping the vegetables fresh’ in the fridge. (There is an assumption the tear-off bags prolong vegetable life in the fridge, see Storage section).

The tear-off bags are a source of plastics angst for consumers, who wonder what the more environmentally friendly alternatives may be, and suggest a return to brown paper bags “like the fruit and veg shops have, and like we had 30 years ago”, or compostable bags, as long as this doesn’t change the weighing process or increase the cost to consumer at the checkout.

3. Findings continued

When considering the transport of fresh produce from the retail store to home, the majority of consumers are bringing their own bags from home. Similar themes around wanting to separate fresh produce to avoid contamination, either from other grocery items, or from other fresh produce items are reported in this transport stage.

3.4 Packaged, wrapped & bagged - perceptions

“Why is there so much packaging?”



Packaged produce at Coles Prahran.

Generally, consumers perceive packaging to be driven by retailers and suppliers, not from demand by customers. Consumers at all lifestages are both perplexed and irritated by the amount of packaging of fresh produce in supermarkets.

Consumers posit that packaging may possibly be required for one, some or all of the following purposes:

- Portion control
- To keep it fresh
- For shelf displays/presentation
- For hygiene and protection from insects
- For easy transportation and consumer grab & go.

The more cynical consumers wonder if it is to hit a certain price point, or “a ploy to make us pay more”, given the perception that packaged convenience or pre-prepared packaged items are more expensive than loose items. Consumers therefore understand, and in fact expect, that the packaging has to cover its own cost and that consumers are paying for the ‘convenience factor’.

There is also scepticism about what needs to be done to bagged produce, particularly salad leaves, with several speculating there must be chemicals, nitrogen or gas in the bag to ‘keep it fresh’.

Consumers are unsure why there are often packaged and unpackaged versions of the same product available. “Why are continental cucumbers wrapped and Lebanese cucumbers aren’t? It makes me angry. I’ll just buy the Lebanese ones then.”

The need to bag or package some items at all is also questioned, particularly for fruit: “Fruit has its own casing. Why do bananas need packaging or bags? They come in their own package.”

Despite the queries and the desire by most to minimise packaging, packaged produce was observed in the majority of fridges, particularly loose-leaf lettuce (baby leaves/salad mix) and herbs.

Bagged carrots and potatoes were also commonly observed in consumer kitchens, primarily because they are considered cheaper and better value than when purchased loose, or more likely to be on special. Households without children were observed to have more packaged produce than other lifestages, for both convenience and portion control reasons.



Bagged potatoes in the home of an Empty Nester.

Likewise, pre-cut vegetables such as carrots were perceived by most to be lazy, expensive and less fresh. Consumers generally assume that once something is cut it doesn't last as long, and therefore most prefer to cut produce themselves as and when they require it. The exceptions were larger, hard-to-cut items where pre-cutting enables better quality visibility, portion control, and ease of transport (less heavy), particularly watermelon, rockmelon and pumpkin.



Pre-cut pumpkin in the fridge crisper of a Young Family



Bagged carrots in the crisper of an Older Family.

A number of female participants observed their male partners to be more convenience-oriented, buying more pre-packed and pre-cut items, and 'wasting more' in general.

Consumers generally refer to all packaged produce as 'packaged for convenience', and therefore those who purchase such are considered lazy. This belief is at odds with consumers' reported understanding of packaging serving a purpose, such as keeping a product fresh or enabling transport. There is potential that consumers are aware of the negative perception around packaging and therefore underclaim their level of purchase of bagged, wrapped or cut items. This is consistent with most consumers interviewed reporting they try not to purchase packaged products, yet many packaged products were observed in participants' kitchens.

Consumer perception: bagged and pre-cut fresh produce is only for 'lazy' consumers

Salad kits, rather than just loose leaf lettuce were observed in Single/Double Income, No Children households, as "you're not buying a whole heap of stuff that will go off", but regarded by other lifestyles and less affluent households as being lazy, and expensive, and evidently not popular since "they're often reduced, when they've only got a couple of days left. There mustn't be many people buying them".

3.5 Unpack, store & use

The race to 'use things up', rather than extend life

There is a general acceptance of the status quo; that the usable lifespan of fresh produce is its life, which varies by type of product. Potatoes, onions, and carrots are perceived to last the longest, where herbs and green leaves go 'brown' the fastest and cucumbers and berries shrink or go 'soggy'. Most vegetable types are expected to last a week or less, hence the weekly shopping trip. "I don't try to make things last longer because I know I will probably go through it, and I only buy what we need for the week".

3. Findings continued

This acceptance means that the prevailing mentality becomes one of attempting to 'use up' produce via creative meals and repurposing half-used items before they 'go bad', rather than extending their life in the first instance.

Consumers try to eat or 'go through' produce quickly enough that it stays fresh: "Things that deteriorate the fastest we use in a week". Compounding the issue is that items bought loose don't have use-by dates, and rather rely on consumers to determine if a product has 'gone off'. This can be problematic as consumers are not necessarily aware of the correct cues to dispose of fresh produce rather than consume it. As an example, if potatoes have sprouted, it is not understood whether they are edible or need to be thrown away, or the timeframe left to eat them before they go bad.

Some consumers have therefore developed systems for managing what needs to be used first – the oldest, most perishable, or items about to 'go off' – via rotating systems, such as fridge crisper drawer to fridge shelf, or fridge to bench. These systems are designed to bring to consumers' attention the products that they need to use before they go to waste.



This Young Family put the items to be used later in the fridge ...



... and the ones that need to be used immediately or were bought last week on the bench.

Most consumers manage their storage and usage of fresh produce by recalling what was purchased in the preceding week and therefore determining what's most needing to be used this week. This is combined with what it looks like, in addition to use by dates, where they exist.

Rather than extending life, consumers use language around 'keeping fresh'. Most consumers expressed the view that there are few, if any, communications around how they could be keeping produce fresh for longer; a lack of advice on what they should be doing to store what types of produce. Storage instructions on supermarket packaged fruit and vegetables, such as on continental cucumbers, when it exists, may currently just refer to 'keep refrigerated', not whether to wrap it, put it in a container, soak it in water or any other methods.

Fruit on the bench, vegetables in the fridge, and offcuts in the fridge and freezer

When prompted, consumers indicated that their fresh produce storage decisions are based on habit, "what my mother did", and hearsay – "I heard it somewhere". This often results in improper storage methods that lead to spoilage, whether actual or perceived, and therefore waste.

An example of this consumer behaviour is that across the majority of households, the common storage method for potatoes and onions was in the bottom of a cupboard, often under the sink or in the bottom of the pantry so they were 'in the dark'.



Potatoes in the cupboard under the sink in the home of a Young Family.

Consumers reported a number of other common perceptions around storage, including:

- Apples should be kept in the fridge, not ambient on the bench with the other fruit.
- Bananas should be kept away from other things because they tend to ripen them or make them 'go off'.
- Bananas assist in ripening avocados, so they should be stored together.

Depending on what storage methods consumers have observed and learnt over time, have grown up with, read, and heard there are therefore many and varied methods as to what is stored where, and how.

The main commonality observed in consumer storage behaviour is that fruit is typically kept out in a bowl on the benchtop, as generally it is perceived that fruit doesn't need to be kept cold. Softer vegetables (tomatoes, cucumber, mushrooms) were stored in fridges as the perception is that they will last longer chilled.



Typical fruit bowl on the bench. This one in the home of a Young Family.

There were a few exceptions to this, where some participants keep everything in the fridge and nothing on the bench. This was predominantly observed in households with no children (Single or Double Income, No Children and Empty Nesters), where this behaviour is also partly a function of limited benchtop space in apartment and townhouse kitchens.

When storing packaged fresh produce in the fridge, there is a prevailing view of "what comes in wrapping, stays in wrapping", not only because it is easier but also preserves life and reduces smells. This often means items are stored in the tear-off bags they were put in at the supermarket, as well as pre-packaged items which are rarely de-bagged or unpackaged. The tear-off bags are perceived as also keeping produce fresh and extending shelf life. Berries stay in the plastic punnets they come in, usually on the fridge shelves rather than in the crisper.



'What comes in wrapping, stays in wrapping' – Older Family



'What comes in wrapping, stays in wrapping' – Young Family

There is limited understanding among consumers about what may preserve fresh produce or 'keep it fresh'. Some perceive the prevention of some items going bad is to minimise moisture, and thus keep as many items as possible in airtight containers, or if to retain moisture sometimes wrapped in damp tea towels, paper towel or newspaper. Occasionally herbs were observed in water, either in the package they came in or in a jar. Those doing these activities claim that products are 'fresh' for up to 2 weeks and are often lower income households and/or at the Young Family and Older Family lifestages.

3. Findings continued

What happens when consumers only use half?

Consumers reported that once a product has been cut, they perceive the shelf life to be lessened. During interviews, half-used items were observed wrapped in cling wrap and kept on fridge shelves or in the crisper, or sometimes the freezer. Other storage methods included use of airtight containers, zip lock bags and beeswax wraps.



Typical wrapping for half-used produce – Young Family



Produce in zip lock bags in freezer, Young Family



Airtight containers – including for compost (top left) in the fridge of a Young Family.

Consumers are not only storing cut or half used fresh produce in the fridge, several consumers are also utilising the freezer. When utilised for fresh produce, the freezer is used to preserve half-used and chopped items destined for repurposing as things stored in the freezer are expected to last a month or more. Half-used and chopped vegetables are typically used for meals they can be 'hidden' in, such as curries, casseroles, stews, stir-fries, and soups. The freezer is also the repository for strawberries and bananas for use in smoothies and banana bread.

Partially used fresh produce is often stored in cling wrap, zip lock bags or airtight containers. The downside of airtight containers is that some are opaque, and the lack of visibility means consumers may forget what is in the container and thus not use it, resulting in wastage anyway.



Airtight containers with tea towels, and plastic bags with newspaper wrapping, to retain moisture in the fridge of an Adult Family (left), & opaque Tupperware container, Young Family (right)

3.6 Waste, reuse & recycle

Prompts to reduce waste and increase recycling

Several participants mentioned their own efforts to reduce waste and increase recycling. These consumers reported that the main triggers were having grown up with composting, having children (wanting both a future for their kids and to teach good environmental practices), kids' schools doing and promoting composting; the TV program War on Waste; and local council initiatives and incentives.

Many local councils have effective communication of waste reduction and recycling programs. The more proactive councils in this space have a range of initiatives. Examples given by participants include:

- Bayside (Melbourne): provides free kitchen compost bins and compostable bags; and has downsized the red general waste bin to 80L. This has reportedly reduced residents' wastage by one third.



Kitchen compost bin and compostable bags supplied free by Bayside Council

- Blacktown (Sydney): has 'green money' points earned from the weight of recycling in their yellow bin, which residents can spend with local businesses.
- Casey (Melbourne): provides 30-40% rebates for compost bins, worm farms and bio fermenters and promotes this via its magnetised waste pickup calendar that goes on the fridge.



Casey Council compost instructions and incentives scheme detail

- Sutherland Shire (Sydney): provides 80L compost bins and worm farms free of charge, and runs free classes and workshops on composting including for those living in apartments.
- Warringah (Sydney): provides a choice of free 80L garden compost bins or worm farms and has reduced the red general waste bin size.

Food waste and compost

Consumers reported that they believe in order to compost their food waste, the compost requires something to use it for, such as on the garden. Consumers report that their efforts around composting are only relatively recent (within last 12 months) and are concentrated on areas where there are larger house/land sizes and therefore more likely to have a garden sizeable enough to use compost.

Those in flats and apartments may have herb gardens in pots on the balcony, but typically are not composting as they do not see where it would be used, as well as due to space restrictions.



Garden compost bin, Young Family. This participant also had a vege garden

Consumers feel differently about food waste than packaging waste

Consumers generally estimated that they only throw out 5-10% of fruit and vegetables weekly. Several consumers said 20%, and by their own admission, considered that very wasteful.

Consumers reported that they 'hate' wasting food as they feel they are throwing away money. This is in stark contrast to when consumers are asked about disposal of fresh produce packaging where they merely feel 'bad' or 'guilty' about throwing out packaging.

This contrast in consumer sentiment is attributed to the financial value consumers assign to food waste, whereas consumers do not believe they are losing anything when they dispose of packaging. Some consumers when interviewed could estimate the financial value of the food they disposed of; in contrast most consumers were unaware of the volume of packaging they disposed of in the same time period.

3. Findings continued

When consumers are disposing of food waste, the food waste and the package it came in (tear-off bag, cling wrap or other wrap) is being disposed of directly into the kitchen bin, which is in turn disposed of via the general waste bin. The disposal of the packaging and the product simultaneously occurs either because the product has 'gone off' in the packaging, or when the product is being prepared consumers collect any food waste (peel, core, offcut) in the packaging for disposal.

Consumers reported that the cues to throw out fresh produce are primarily visual, with typical descriptors being black, marked, shrunken, limp and brown. Additionally, product feel is also a cue, if something is squishy or soggy. Smell plays less of a role.

Produce items most likely to be thrown out are salad leaves ("they go brown quickly"), lettuce, tomatoes, cucumbers, Asian greens, and strawberries. Potatoes, carrots, and onions are perceived to last longest.

Consumers also report throwing out avocados regularly because they have "tricky ripening periods". Additionally, herbs are often thrown out as they are often purchased as an ingredient for a specific recipe and are unused outside this recipe.

Changing behavioural habits takes time

Among consumers there is a high level of awareness about the need to reduce waste and to increase recycling. However, there is a level of passivity and inertia about taking active steps to do this for most consumers. Many participants report expecting business to drive it – top down, rather than grassroots upward – and are waiting to be told or prompted about how and what to recycle and compost.

Most consumers aren't actively looking beyond the recycling bin, even though they are often unaware of what happens to the contents of the recycling bins after collection. There is also a level of scepticism about recycling: "It all just goes to landfill anyway, and now that's here, since China won't take our stuff anymore".

Only four of the 38 participants interviewed were aware of RedCycle and the ability to take soft plastics back to supermarkets, indicating that there is both a further communications job to be done and a requirement for greater visibility of the bins themselves, such as placing them at front of store. When made aware of the RedCycle facility, most said they would take back packaging and hard plastics such as punnets "If it's on my way or I'll already be going there for other things. I'm not going to go out of my way." Consumers also queried whether RedCycle would accept torn and dirty plastic bags, and what RedCycle actually do with the bags once collected.

Ultimately there is a tension for consumers between the need for convenience, and the effort environmental consciousness requires in bringing bags to store, storing things differently in the fridge, composting and recycling including separating plastics. "The system is geared to convenience, so any improvements in minimising waste will be an inconvenience to the shopper."

3.7 The effects of demographics

The consumers involved in this study were separated into varying demographic groups as identified in the methodology. These included by lifestage (Young family, Older family and Households with no children), Ethnicity (Caucasian or Non Caucasian), Location (Inner or Outer Suburbs, Melbourne or Sydney), and income.

What the research highlights is that the *Fresh Produce Consumption Cycle* is generally more affected by lifestage (family size) than by other demographic factors.

This is evidenced by consumers in households without children reporting shopping more frequently and without formal meal plans because they were able to shop at their leisure or convenience.

This differs to consumers in households with children where shopping was reported as difficult and usually only occurred once per week as a result.

Further, proximity to the CBD (Inner city or Suburban) appeared to have little effect on fresh produce purchase, use and disposal. However, those who reported being within a close proximity, i.e walking distance, to a supermarket, regardless of lifestage, report occasionally topping up on fresh produce, rather than waiting for their usual shopping frequency.

Where income was observed influencing the *Fresh Produce Consumption Cycle* was in the Planning stage. It was observed that the lower the consumers income, the more meal planning they undertook. This behaviour was also repeated in families with younger or more children, regardless of income indicating the financial and time saving benefits of planned meals.

4. Discussion & key themes

From the 38 consumer interviews, three key themes across consumers purchase, use and disposal of fresh fruit and vegetables have emerged:

- **Planning:** the relationship between spending, planned meals and food waste.
- **Convenience:** access to fresh fruit and vegetables.
- **Storage & Use:** management of fresh fruit and vegetable quality at home.

4.1 Planning: the relationship between spending, planned meals and food waste

The degree to which meals are planned has a direct correlation to the amount of food wasted. Degrees of planning can be broadly categorised into:

- Fully Planned (most or all meals, up to a week in advance).
- Semi-Planned (next few days).
- Unplanned (day of, based on what's in the fridge).

What the in-depth interviews also highlighted was that degrees of planning were different across different demographics. At a high level, households more conscious of their expenditure planned all meals in advance.

Results from consumer interviews indicated that lower income households and those households with children undertake a greater level of meal planning. This is in contrast to more affluent households and often those without children who tend to shop more frequently and without usage in mind.

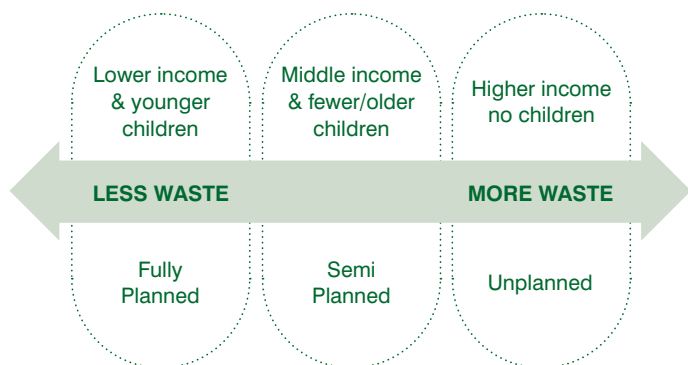
There are several tools available both domestically in Australia and examples overseas of tools designed to help consumers better plan meals to manage food waste. An example of this is the *Love Food, Hate Waste* tool available online. This tool has since been adapted by both NSW and Victorian state governments to assist consumers better plan their meals to reduce waste.

Given the behaviour observed in these consumer interviews, and the relationship between meal planning and income, it can be assumed that planning meals is driven more from financial and time management necessity rather than consciousness around food waste reduction. In turn, this means that although tools such as those provided via *Love Food, Hate Waste* are useful in providing advice to forward leaning, socially conscious consumers, a more commercial approach may be required for the majority of consumers.

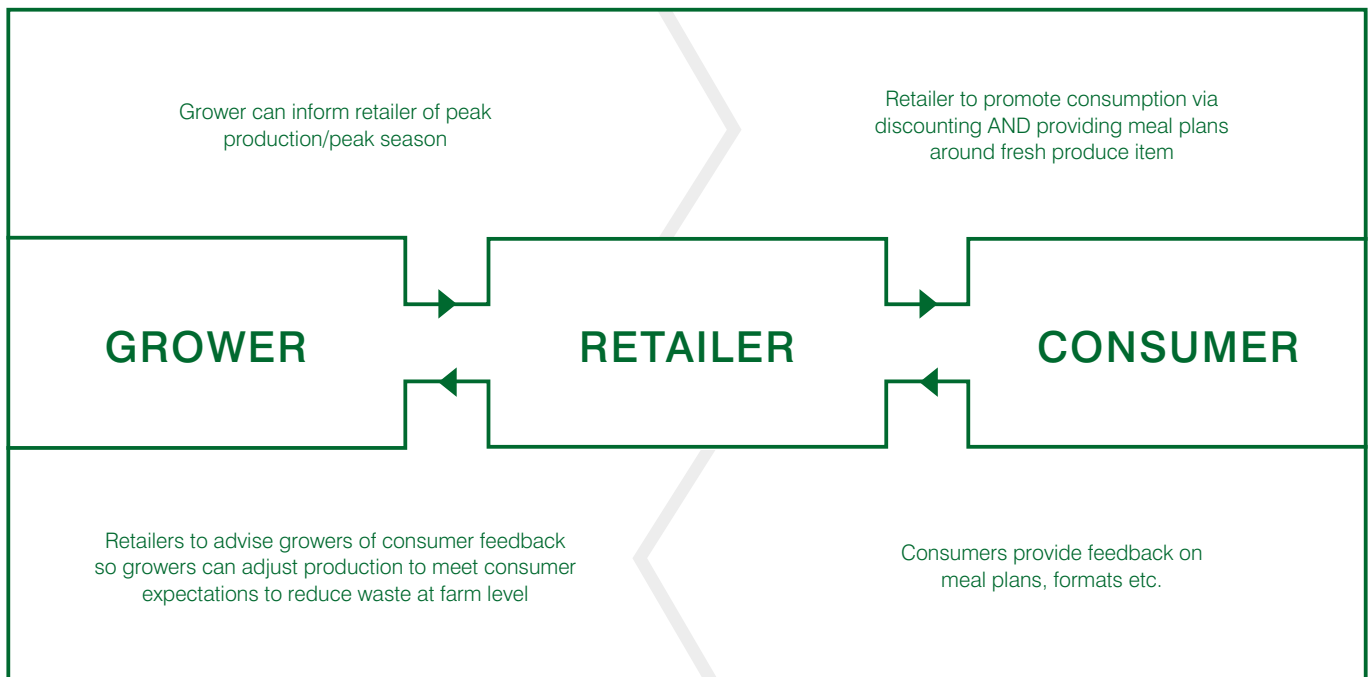
This insight presents an interesting opportunity for the fresh produce industry to work hand in hand with retailers to provide better opportunities for consumers to plan their meals while providing both financial and social benefit.

One such opportunity that has been identified by consumers is the potential for retailers to provide in store messaging around complete meal options and merchandise these options together. This enables unplanned shoppers to make better purchase selections that will ensure usage and therefore minimise waste.

There is also potential to leverage the relationship between retailers and fresh produce suppliers to better optimise the promotional cycle that matches product seasonality/peak production with meal plans and suggested meals. The below figure outlines this feedback loop at a high level.



4. Discussion & key themes continues



The 38 in-depth consumer interviews indicated that consumers are well aware of the price per kilo of the produce they buy.

When it comes to making a purchase, either planned or unplanned, the decision to buy loose or packaged/bagged product comes down to cost, as well as the number of units required – regardless of income or household composition.

What has been observed in this research is a correlation between bulk buys, impulse buys, items on special, and level of wastage. Consumers indicated that whilst they are tempted to buy in bulk because it is cheaper than buying by the individual unit, that they often wind up throwing out some of what is in the bag, thus negating the value of the original deal.

This calls into question the role of average weight of purchase (AWOP) based promotional mechanics such as upweighting, upsizing (bulk packs) and multibuy in fresh produce, where non-expandable consumption is evident; even if consumers buy more they don't necessarily use more. In dry goods categories with non-expandable consumption, such as hair colour, multibuy, discounts and AWOP based promotions serve to 'pull the sale forward'. That is, the consumer stockpiles and uses the 'additional' product on the next planned usage occasion (in the case of hair colour, four to six weeks), without needing to buy another one. This is not the case in fresh produce, where if a bulk pack or multiple items are purchased in a bundle buy, they are still perceived to need to be used up in a week before they go bad. A review of promotional mechanics with respect to fresh produce may be required.

If bulk packs and multibuy type mechanics, including some forms of discounting, are to be used then a means of providing ways to use the 'extra' product needs to be provided to consumers. For example, if potatoes are on special or in a bulk pack, meal ideas and recipes for use of larger amounts of potatoes could be provided at shelf and at display.

Consumer price awareness, combined with non-expandable consumption where stockpiling leads to waste, also poses a question around the cost of packaged items versus unpackaged items. Where packaged items are more cost effective, the research indicates consumers will purchase them, over unpackaged content and regardless of planning. This highlights the necessity to ensure that packaged products are offered in a context that promotes the consumption of all contents in the pack.

Though a reduction in food waste for an environmental benefit is a conscious goal for some consumers, the majority of consumers interviewed as part of this research indicated the desire to reduce food waste to save, or rather, not waste, money. This further verifies purchasing behaviour; packaged or not, consumers by their own admission are buying fresh produce based on per unit/kg value.

When looking to maximise the benefits of planned meals as a tool for reducing food waste, the core driver for consumer change is the ability to minimise wasted dollars, rather than saving the planet.

Convenience: access to fresh fruit and vegetables

Despite most consumers expressing a desire to reduce packaging, packaged produce was observed in the majority of fridges. Further, in every household, where fruits or vegetables had been cut or semi-prepared, the cut product was refrigerated and stored in a form of packaging for preservation.

Packaged fruit and vegetables regardless of their packaging format are often regarded as a 'convenience' food. The concept of convenience is often misconstrued to mean semi-prepared or pre-cut, rather than something that is easier, simpler or more efficient for a consumer. When considering the relationship between packaging and consumer convenience, it is important to note and understand this difference.

Based on the 38 fridges, freezers, pantries and kitchens observed during this research, households with fewer number of people (Single or Double Income, No Children lifestage) were observed to have more packaged product in their homes. Consumers in this category indicated that they:

- Don't shop according to a regular meal plan
- Don't cook every night of the week, often due to changing plans/lack of routine
- Shop more frequently, several times per week rather than a traditional weekly shop
- Shopping on the way home from work, often at stores located near train stations.

The other demographic groups interviewed in this study (families with either young or older children and/or less affluent households) often regard the purchase of "convenience" products as lazy and expensive.

When considering what makes a product convenient to smaller households (Single or Double Income, No Children) who report the above purchase and consumption behaviours it is due to requiring smaller portion sizes. This sentiment was supported by an interviewed consumer as "you're not buying a whole heap of stuff that will go off". Independent of food waste, there are simple logistical issues that warrant smaller portion sizes, for example offering cut pumpkin rather than a whole pumpkin to enable customers to transport the product – something that is critically important when considering the increase in consumers shopping during their daily commutes.

To create smaller portion sizes in fruit and vegetables this often requires the product to be cut. An example of this is cutting watermelon into quarters. Consumers indicated that they believed once a product had been cut, this decreased its shelf life and that their response in home to preserve and maximise freshness was to package cut product in cling film,

airtight containers or in some cases beeswax wraps. In order for retailers to appropriately portion fresh produce at a store level, the same concept is applied; produce is cut to size, packaged and stored in conditions that maximise shelf life and quality while being presented in a convenient format size.

Requiring pre-cut and therefore packaged product for portion size isn't unique to smaller households, with consumers indicating that the exception to their belief that packaged/pre-cut products are lazy in the case of larger, heavier and hard to cut items, where pre-cutting enabled better quality visibility, portion control and ease of transport – for example melon and pumpkin.

Making fresh produce convenient or portioned correctly does not always mean cutting fruits and vegetables. Larger households interviewed (Young Families, Children under 12 and Older Families, Children over 10) indicated that:

- They find shopping a hassle
- Shopping happens about once a week and on weekends, maybe with one or two top up trips during the week
- They rarely eat out and will cook at home most nights
- Have a regular meal plan to make shopping easier and manage their budget.

When shopping less frequently, the imperative when purchasing fresh produce becomes buying enough and making it last.

This is observed in these households through bulk packages observed in fridges and pantries; bags of potatoes, carrots, onions, apples, whole head lettuce etc. These customers are more confident fresh produce will be eaten, often this can be attributed to a meal plan (i.e. they have purchased ingredients), but also there are more mouths to feed. By buying in a larger volume, this enables families to shop less frequently and achieve better value.

The challenge these consumers report is the need and therefore expectation that fresh produce will stay fresh for 1-2 weeks to align with their shopping frequency. Consumers described this as 'keeping fresh', whereas the industry terminology would be extending shelf life.

Packaging fruit and vegetables enables growers and retailers to better manage how long fresh produce will 'keep fresh' for consumers. This attribute and purpose of packaging was however rarely considered by consumers interviewed. Paradoxically, many consumers report purchasing loose, unpackaged product and placing it in a 'tear-off bag' at store level and continuing to store product in this bag in the home because they perceive the tear-off bags playing a role in keeping produce fresh.

4. Discussion & key themes continues

There are opportunities for the fresh produce supply chain to better understand portion size to ensure that consumer segments are receiving product formats that meet their needs in terms of size, level of preparation and shelf life. Understanding this element of fruit and vegetable consumption has an opportunity to better target the application of packaging and ensure consumers understand the functional benefit of packaging.

Storage & Use: management of fresh fruit and vegetable quality at home

The fresh produce industry has been packaging fruit and vegetables for a number of reasons, with a core benefit demonstrated in previous research being that packaging of fresh produce extends shelf life.

However, the benefit of packaging in relation to product shelf life has only been demonstrated up until consumers purchase the product and take it home from the store.

Up until this point, fruit and vegetables are managed in terms of temperature control, storage conditions and stock rotations to ensure consumers receive the best quality product. However, when fresh produce leaves the store, this becomes the consumer's responsibility.

The 38 consumer interviews conducted for this research indicated, universally, that they *do not know* how best to store product to maintain quality.

When prompted, consumers indicated that their fresh produce storage decisions are based on habit "[what my mother did](#)" and hearsay "[I read it somewhere](#)". This often results in improper storage methods that lead to spoilage (actual or perceived) and therefore waste.

Commonality among storage methods included:

- 'soft vegetables' such as tomatoes, cucumbers, lettuce, celery being stored in the fridge, usually in the crisper;
- 'hard vegetables' such as potatoes and onions being stored in a pantry/cupboard;
- 'hard fruit' such as apples, pears and bananas being stored in a bowl/on a bench;
- 'soft fruit' such mangoes, stone fruit and other seasonal items being stored in a bowl/on a bench;
- 'berries' always stored in the fridge, usually on a shelf rather than a crisper with other products.

Due to the perishable nature of fresh produce, improper storage conditions will result in increased food waste. In a home setting, expected storage conditions need to be understood to manage consumer expectations around how long produce will remain fresh.

Understanding common consumer storage methodologies also enables the design of packaging and format for products to account for and manage consumer storage methods.

Consumers are also reporting that storage conditions are driving produce use. Often poor storage conditions are responsible for early drops in product quality and therefore product value. Many consumers are very value driven and therefore, as product deteriorates so does their perception of the value of the produce. The 'use up' mentality leads to both a challenge and an opportunity in minimising food waste by providing advice on appropriate methods to keep produce fresh, or restore freshness, as well as opportunities for use.

5. Recommendations

The key themes identified from 38 in depth consumer interviews around fresh produce purchase, usage and disposal are:

- **Planning:** the relationship between spending, planned meals, impulse and bulk purchases, and food waste.
- **Convenience:** access to fresh fruit and vegetables.
- **Storage & Use:** management of fresh fruit and vegetable quality at home.

Therefore, suggested recommendations aim to address consumer behaviour and sentiment across these areas as well as future research.

5.1 Strategic recommendations

Planning: opportunities to meal plan to reduce waste

Consumers, whether they are shopping with a meal plan or not, all reported they seek meal inspiration at the point of purchase. There are opportunities to:

- Provide meal plans for the use of several co-merchandised products. For example, purchasing fresh produce and some grocery items in a quantity that will allow the use of all products over a time period.
- Provide guidance in fresh produce section around portion sizes e.g. 3 potatoes are the quantity required to make mashed potato for a family of 4.
- Co-merchandise products together in displays such as a 'meal of the week', potentially linked to a recipe in the store magazine.
- Provide meal and recipe ideas for using and combining products on special or in bulk that week.

Convenience: access to fresh fruit and vegetables

Despite most of the 38 consumers interviewed expressing a desire to reduce packaging, packaged produce was observed in the majority of fridges. Consumer feedback indicated that packaged product was purchased in many instances to consciously reduce waste, by purchasing only as much as required (portion control). The opposite however was also true, where often consumers bought in bulk and did not use all the product purchased.

Further work to manage consumer expectations around packaged food and convenience could include:

- Better understand portion size to ensure that consumer segments are receiving product formats that meet their needs in terms of size, level of preparation and shelf life.
- Better target the application of packaging to maximise its functionality.
- Reconsider portion size for items likely to be required for specific recipes and dishes.

Storage & Use: management of fresh fruit and vegetable quality at home

The 38 consumer interviews conducted for this research indicated, unanimously, that consumers do not know how best to store product to maintain quality. This means that poor storage methods may be accelerating deterioration of fresh produce and increasing food waste.

Further work that may assist in managing food waste via better fresh produce storage at a consumer level may include:

- Communication campaigns on core product lines around better storage techniques.
- Clearer and more specific explanations on packaging on how to store products.
- Advice on how to best store partially used product.
- Engagement with consumers at store level to better educate on storage.

5.2 Recommendations for further research

Following the 38 in depth household interviews conducted, quantitative research on size behaviours, mindsets and wastage levels is recommended. This may take the form of consumer diaries, or an online survey, or both.

Further research would include, but not be limited to:

- Degree of planning – specific items/units versus list of staples versus buy to recipe, how many days out
- Portions required by product and lifestage
- Specific recipe and single use items
- Channels buying from, including fresh food markets
- What buy packaged, what buy loose, by produce type
- What and how much is wasted
- Dollar value of fresh produce wasted every week
- Levels of composting
- Recycling behaviours
- Communication ideas testing.

The research would be filtered and profiled by:

- **Demographics:** lifestage, income, gender, age, location (inner metro, outer metro, regional, rural), household size, dwelling type.
- **Mindsets:** environmental conscientiousness, hygiene conscientiousness, convenience orientation, cooking skill/interest.

6. Conclusion

Minimising food waste is a challenge and understanding how consumers use fresh produce in the home will be core to addressing this challenge. A better understanding of fresh produce usage in the home was achieved by:

- Conducting 38 consumer interviews in households across Sydney and Melbourne.
- Observing the fridges, pantries and bins at these households to better understand storage, consumption and disposal behaviours.

This research determined that there were three key themes among the findings:

- **Planning:** the relationship between spending, planned meals, and food waste.
- **Convenience:** access to fresh fruit and vegetables.
- **Storage & Use:** management of fresh fruit and vegetable quality at home.

The insights gained through this research highlight that consumers when presented with the risk of food spoiling prior to usage, report feeling a financial rather than environmental/ethical penalty.

The financial implication of wasting food that is felt by consumers provides an opportunity for the fresh produce supply chain to leverage. Ultimately, the goal for the fresh produce supply chain should be to work with Australian consumers to reduce the financial and environmental burden of food waste, while increasing access to fresh fruit and vegetables.

7. Appendix

Participant ideas to reduce waste and increase recycling

Behaviour incentives

- Rebates for reusable bags
- Pricing – make loose markedly cheaper than packaged to disincentivise packaged
- Charge for plastic bags available in store to encourage BYO bag
- Promote string bags
- Consumer incentives (ie Points) to bring own bags & containers
- Get people to buy little and often. Preventive – forward thinking in preventing waste in a way that's convenient
- Bonus flybuys points for buying fruit and vegetable as incentive for more purchase/consumption

Transport

- Reusable, washable vege bags that don't add to item cost
- Transport/at store: reusable washable material bag with dividers. Consumers bring own fruit and vegetable bags. (Issue – may cost more in weight – plastic is lighter)
- Brown paper bags
- Biodegradable tear-off bags
- Education campaign – YouTube, at shelf. Quantify how much/what would be saved by not using plastic bags. Suggest alternatives
- Bag/box own lettuce
- Small bags i.e. \$1 each for different fruit and vegetables e.g. longer bags for herbs, smaller bags for onions. Bags as portion control? Campaign to buy the bags then phase out packaging. Range the right bag next to the right product
- BYO bag/container and weigh it. BYO mesh/net bag. Range mesh/net bags in fruit and vegetable for a small amount i.e. 20cents per
- Cardboard trays/boxes for transport (some fruit and vegetable shops provide these)
- Reusable vege bags whose weight doesn't add to the item cost

Storage

- Labels on veg and at shelf – 'for optimal life store me here', 'take plastic off me before fridge'
- Pamphlets in supermarket
- Fridges nitrogen device
- More comms on fridges/smart fridges – what settings to put your fridge on for optimum life. Instructions in fridge for keeping fresh
- Communications campaign – guidelines for what keeps best in what format e.g. how to keep mushrooms
- Free trial of wax cloth bags and wrapping
- Communicate use of paper towels/water in veg to maintain moisture
- Social media 'tips' – how to extend life. Videos. 'Mum hacks, daily hacks, life hacks'
- Alternatives to glad wrap ie beeswax cloths, plant-based cloths, reusable organic material that is compostable
- Resealable bags for storage (or promote the BYO zip)

Waste & Recycling

- Social media opportunities for local area Facebook pages – council could post what it is doing wastewise and put on rates notices
- Make the supermarket recycling bins more prominent – put at front of store. Put on it what happens to it once collected
- Danish model – generate energy by incinerating rubbish (capture the nasty chemicals)
- State level waste management – not just council?
- Drive awareness of council recycling programs. (Some councils could be more proactive in their communication)
- Community compost (particularly for apartments and housing estates with small yards)/compost collection for scraps
- Advertising for what can be recycled

7. Appendix continued

Product and Packaging

- Recyclable containers with peel off tops
- Cryovac
- Loose/bulk in store, not packaged. Like The Source
- Biodegradable (i.e. USA berry cartons)
- Reusable/refillable berry punnets – BYO back to store to refill on spot
- Organically based (recyclable/biodegradable) packaging. Packaging doesn't have to be 'bad' (plastic)
- Reduce/change trays to cardboard – so long as can see produce
- Make herb bunches smaller
- Recyclable Styrofoam bases and trays
- Creative ways to package like sugarcane mulch some of the UberEats restaurants use
- Paper bags (common mention), but acknowledgement things can get squashed or bag falls apart if gets wet

Meal ideas

- Meal ideas on packs and at shelf 1 + 1 + 1. Merchandised meal with components together
- Substitutes for fruit and vegetable – if you don't have this in the fridge/can't eat this, try this instead
- Different ways to use X up. I.e. fried rice, omelettes

Other

- Portion for the target audience and household size – options without price per kilo are skewing the decision that ends up with waste
- Awareness campaigns for odd bunch
- Grower to consumer – cut out the retailers, who are creating the packaging. The more steps in the chain the more transport issues requiring storage/packaging. Appetite to buy from farmers direct and not via supermarkets ie to lessen steps in the supply chain – perceived to be fresher that way and less packaging
- Prevention (vs cure): How much you can save in wastage and \$ by shopping more frequently (several times a week) – comms campaign



www.freshproduce.org.au

info@freshproduce.org.au

PO Box 636, Collins Street West, Victoria 8007