Save Food Packaging Design Criteria

Stakeholder Interviews of Product-Packaging Design Processes

Industry Insights Report
February 2021

FIGHT FOOD WASTE
Cooperative Research Centre
REDUCE - TRANSFORM - ENGAGE

Australian Government
Department of Industry, Science, Energy and Resources

Business
Cooperative Research
Centres Program

AIP AUSTRALIAN INSTITUTE OF PACKAGING

RMIT UNIVERSITY

About this Project

The Save Food Packaging Design Criteria and Framework research project is a four-year study funded by the Fight Food Waste Cooperative Research Centre in partnership with the Australian Institute of Packaging (AIP) Save Food Packaging Consortium .

The project integrates current research literature with industry knowledge regarding the functional properties and role of packaging in saving food from being wasted. Whilst the primary functions of packaging are to contain and protect the content and provide information about the product, the role of packaging in reducing food waste needs to be better understood by food producers, manufacturers, brand owners, retailers, and consumers. The relationship between packaging design and food waste needs to be discussed more openly within industry.

The design criteria outcome of this project aims to provide food manufacturers, brand owners and packaging suppliers with the appropriate tools to minimise food loss and waste through their NPPD processes.

This report presents the third deliverable of the project – an analysis and report of stakeholder interviews of product-packaging design processes.

The Australian Institute of Packaging (AIP) is the project leader for the Save Food Packaging Criteria and Framework 1.2.1 project which includes a Save Food Packaging Consortium that is made up of leaders in Save Food Packaging Design and innovations to ensure that the guidelines are practical for the industries they will serve.

The Save Food Packaging Consortium is made up of the AIP as project lead, RMIT as the Research Partner, Project Contributors are ZipForm Packaging, Sealed Air, Multivac and APCO, Project Partners are Plantic Technologies, Result Group and Ulma Packaging and the Extension Network consists of Australian Food Cold Chain Council (AFCCC), Australian Food and Grocery Council (AFGC), Australian Institute of Food Science and Technology (AIFST).

The Project Partners are:

AUSTRALIAN INSTITUTE OF PACKAGING

Save Food Packaging Consortium

FIGHT FOOD WASTE CRC

Project Title: Save Food Packaging Criteria and Framework 1.2.1
Project Leader: Australian Institute of Packaging (AIP)

Research Partner: RMIT UNIVERSITY

Project Contributors: APCO, MULTIVAC BETTER PACKAGING, Sealed Air, zipform PACKAGING

AIP Partners: PLANTIC Changing the nature of plastics, RESULT GROUP OF COMPANIES, ULMA

Extension Network Partners: AFCCC Australian food cold chain council, AUSTRALIAN FOOD & GROCERY COUNCIL, the australian institute of food science and technology incorporated

Front cover image. *Woolcool is an innovative packaging concept that uses coarse wool as a natural insulation for e-commerce packaging. It minimises humidity, absorbs moisture and maintains temperature to minimise food waste.*

The Fight Food Waste Cooperative Research Centre (CRC) gratefully acknowledges the Australian Government Department of Industry, Science, Energy and Resources' financial contribution through the Cooperative Research Centres program as well as the participants of this project.

Ryder, M., Verghese, K., Ryding, L., Francis, C., Lockery, S., Kelton, N., Save Food Packaging Consortium and Fight Food Waste CRC (2021) Save Food Packaging Design Criteria Stakeholder Interviews of Product-Packaging Design Processes, Industry Insights Report, Adelaide, Australia.

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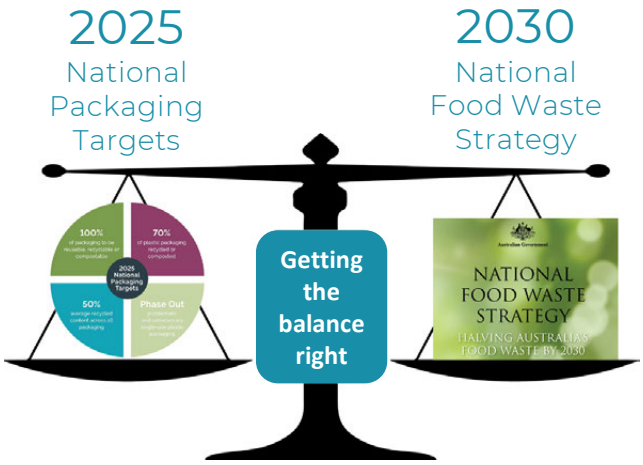
Executive summary

This insight report reviews the expert knowledge and perceptions from 12 stakeholder interviews, representing a range of organisations from the Australian food industry, evaluating current save food packaging (SFP) design and system implementation techniques.

Key insights include:

1. Considerations of SFP are currently occurring primarily at the beginning of the new product packaging development (NPPD) process.
2. Shelf life of a product is the first and most important consideration within NPPDs.
3. Consumer food waste data is relatively unknown within the industry, relying heavily on feedback and complaints for packaging design improvements.
4. Consumer demands and trends change quickly, making it difficult for the food industry to design appropriate products.
5. There is a need for enhanced consumer education on food waste versus packaging waste.
6. Organisations were divided in their marketing of SFP to consumers; some deeming it unnecessary and others essential by others. Further research on the effects of marketing SFP to consumers may be required.
7. Interviewees reported a trade-off between achieving packaging targets by 2025 and food waste targets of 2030.
8. Case studies and training modules for roles and sectors were identified as the most appropriate form of SFP design criteria to be implemented into organisations.



AIP Save Food Packaging (2020)

Botanical Food Company for Gourmet Garden Herbs and Spices. *This Australasian Packaging Innovation & Design (PIDA) Award and WorldStar Packaging Award winner saves food by offering consumers convenient life extending resealable pinch pouches, designed for portion control and minimal food waste.*

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1.0

Introduction

The Save Food Packaging Design Criteria and Framework research project is a four-year study funded by the Fight Food Waste Cooperative Research Centre in partnership with the Australian Institute of Packaging (AIP) Save Food Packaging Consortium[1].

The project integrates current research literature with industry knowledge regarding the functional properties and role of packaging in saving food from being wasted. Whilst the primary functions of packaging are to contain and protect the content and provide information about the product, the role of packaging in reducing food waste needs to be better understood by food producers, manufacturers, brand owners, retailers, and consumers. The relationship between packaging design and food waste needs to be discussed more openly within industry.

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Image above. *The PACT Group rPET Moisturelock Meat Tray is designed with Innovative dimples in bottom of tray to collect fluid, replacing soaker pads and extending the shelf life of the product.*

2.0

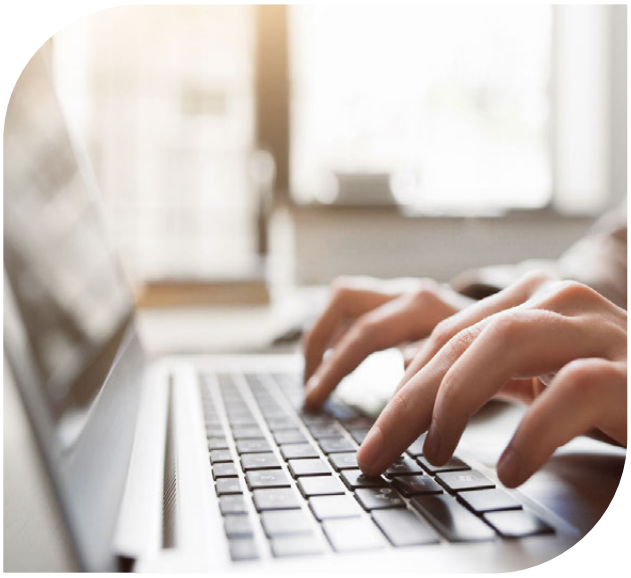
Methodology

The design of the stakeholder interviews were informed by previous stages of the project – the baseline literature review, which referenced both academic peer-reviewed articles and industry grey literature (Francis et al., 2020a), and the analysis of the stakeholder online survey (Francis et al., 2020b).

The research question posed for the stakeholder interviews was:

What are the barriers and opportunities for new product packaging developments (NPPD) and existing packaging products to implement food loss and waste reduction strategies?

A total of 48 questions were asked during the interviews, as outlined in the Appendix Table 1. Participation was voluntary and a list of potential Australian based invitees from the following food categories, meat, seafood, dairy and eggs, bakery, fresh produce, packaged and processed foods, and food and beverages were compiled by the Australian Institute of Packaging (AIP). Recruitment of 12 participants from a variety of organisations was achieved through an opt-in email invitation. The interviews were conducted online during June-July 2020. The interview audio was recorded and transcribed. Members of the research team then read through transcripts and compiled detailed notes and insights. These were further refined into the key insights presented in this report.



12 participants interviewed online during June – July 2020

1 The Save Food Packaging Consortium that comprises the Australian Institute of Packaging (AIP) as project lead; RMIT University as the Research Partner; Project Contributors are ZipForm Packaging, Sealed Air, Multivac and Australian Packaging Covenant Organisation (APCO); Project Partners are Plantic Technologies, Result Group and Ulma Packaging and the Extension Network consists of Australian Food Cold Chain Council (AFCCC), Australian Food and Grocery Council (AFGC), Australian Institute of Food Science and Technology (AIFST).

3.0

Insights and Discussion

In this section, we summarise the interview responses and discuss the broad themes that emerged from the related findings. The report highlights the current perceptions of food loss and waste, consideration of strategies to reduce food loss and waste, where these are considered in the product-packaging development process, the barriers to implementation of such strategies, and the most appropriate application for SFP criteria within the food packaging industry.

3.1

Participants profiles (role, sector, and category)

Of the 12 interviews conducted, seven participants represented food manufacturers and brand owners and five represented packaging material suppliers. Of the food manufacturers and brand owners, the roles of interviewees included packaging process, development, and application managers and innovation and procurement managers. The role of interviewees of packaging material suppliers included a broader selection of persons, ranging from special projects and sustainability managers to CEO/managing director at the executive level. Food categories that were presented included meat, seafood, dairy and eggs, bakery, fresh produce, packaged and processed foods, and more broadly food and beverages.

Perceptions of food loss and waste

For the purposes of this project, food loss and waste (FLW) was defined as the decrease in quantity and quality of food along the food supply chain (FAO, 2019). When considering an organisation's services/products within the supply chain through to the end consumer, there was variation of what the respective organisations understood as food loss and food waste. Food loss was variously defined by participants as occurring on farms, in processing and distribution, along the food supply chain before reaching the consumer, or it encompassed food that is unsellable. Participants defined food waste as food that was of commercial quality or good quality/edible food but not consumed (e.g. surpassed used-by date, food donated to charity, consumer waste). Interviewees observed their ability to reduce food loss within the industry, compared to food waste within homes

"We probably may have more control over preventing the food loss, but less control preventing the food waste, but we try our best in minimising both categories."
Food manufacturer.

With respect to FLW data collection, there were differences between food manufacturers and brand owners and packaging material suppliers. Much of the interviews centred around costs of waste, more so than the quantity or volume of waste. In the case of food manufacturers and brand owners, food loss (e.g. farm yields, manufacturing and processing operations) is tracked, while food waste (consumer waste) is largely unknown:

"Where we probably don't have a good view of food waste would be post consumer, well once it gets to the consumer, we probably lose visibility of it at that stage."
Food manufacturer.

Packaging material suppliers indicated that no FLW is associated with their business directly. As their packaging materials are used by clients, brand owners, or food manufacturers, it is these businesses who would gather such data, as packaging suppliers have no visibility of operations and supply chains:

"[Food] waste is much harder for us to measure, and we don't have as much detailed information on waste because that's about what actually happens in the consumer household, and in the food service industry."
Packaging supplier.

The Bare Bird Packaging. *This Australasian Packaging Innovation & Design (PIDA) Award and WorldStar Packaging Award winner uses Darfresh on Tray vacuum skin technology to extend shelf life by 25% and is freezer ready, offering small portion control for consumer convenience.*

3.3

Food loss and waste reduction strategies

Food manufacturers and brand owners must take many factors into consideration when designing their product-packaging. This project seeks to understand existing strategies that aim to reduce food loss and waste that are taken into account in these processes. All companies represented in the interviews consider and are aware of SFP elements which could reduce FLW generated within their supply chains.

One of the core strategies across the interviewees was improving shelf life. Participants described differences in packaging formats and requirements regarding shelf life for perishable foods and processed foods. Each has its unique characteristics and requirements.

Other examples provided included scavenger, barrier, and moisture absorption. Resealability and portion size/control were the two most mentioned strategies:

"I spend a good portion of my day developing and working on trying to convince customers that they need to incorporate resealability into their packaging for that very reason, to reduce food waste."
Packaging supplier.

There are, however, trade-offs between consumer demand for smaller serves and the increased amount of packaging per unit this requires:

"From a food waste point of view, a single serve pack, if you will, is the ideal format so no food is wasted. However... how many kilograms of packaging do you need for every kilogram of food? In the old days, we had big packs of things for so called 'big families', that ratio was very favourable.
Favourable in the sense of how much packaging do you use? Now, the pack sizes are coming down because the demographics of the households are such that they're much smaller."
Food manufacturer

Other participants spoke to the importance of rigorous training on proper packaging techniques for packaging staff, as simple mistakes can lead to loss and sub-optimal packaging. Standardising conditions for machines, such as to ensure packaging seals are correct, further prevents wastage.

In many organisations, SFP strategies are measured for success through real time testing and trialling; such as through feedback from retailers through shrink loss rates, or utilising consumer complaints to re-design product-packaging formats and on-pack communication to consumers through storage guidance:

"I think the essence goes back to, you really need to be maintaining consumer's best interest. Because at the end of the day, you want them to come back and buy your product again."
Food manufacturer.

As reported by some organisations, consumer patterns also generated support for broader options in pack sizes including single serves. Driving change towards implementing SFP strategies was reported as both a response to consumer feedback and to extend shelf life in existing and new markets.

3.4

SFP considerations in product-packaging development

SFP features (see Appendix Table 2) are generally considered by packaging technologists and designers in the early stages of the NPPD process, where decisions are made on formats, materials, shelf life etc. This includes setting the minimum shelf life for the product at the very beginning, and this factor has heavy influence on subsequent decisions such as packaging format, material selection, and the level of barrier protection. For example, most participants explained that the feasibility of the product is continually reviewed as it travels through the design process, while product review stage post product launch are other ways of capturing insights:

"We conduct trials at different stages to make sure that our assumption and our assessment at the start of the project actually stands up throughout the supply chain."
Food manufacturer.

From a packaging material perspective, the design of the consumer pack such as volume, shape, and capabilities will impact retailer and consumer losses and waste. Higher barrier protection and resealability featured prominently as the design elements used by participants' organisations :

"[SFP is] embedded in at least two ways, first off the performance of the primary packaging material itself, and then the design of the final shape of the pack."
Packaging supplier.

There were some features that participants did not consider (e.g. no resealability on portion packs). There were also features, like retaining nutrition, that participants felt should be considered more significantly:

"I think there is certainly scope for a lot more education and a lot more research on the nutritional value versus food safety implications."
Packaging supplier.

Regarding consumer communications, some of the participants' organisations include features such as on-pack communication, date labelling, and usage and storage instructions at later stages of the design process or as defined by clients/retailers.

Interviewees were involved in all stages of their organisation's NPPD processes. This included working with consumer research and marketing teams, managing teams of packaging technologists, ensuring packaging allowed for the required minimum shelf life, and managing customer interaction and information development for marketing. Packaging suppliers identified that they play a critical role in providing appropriate information to food manufacturers and brand owners regarding packaging material performance, identifying opportunities to support their clients' NPPD process such as advice on compatibility of materials, and background technical and engineering information.

Maintaining shelf life was identified as a priority, with potentially conflicting decisions needing to be made with the selection of appropriate materials. Recyclability of packaging materials at the end of a product's life is another consideration; food packaging businesses are required to align with the 2025 National Packaging Targets of 100% reusable, recyclable or compostable packaging. Food manufacturers, brand owners, and packaging suppliers must constantly deal with the trade-off between reducing food waste and minimising packaging. Some participants voiced that they are struggling to find this balance:

"...that question around making sure that packaging is 100% recyclable and single use on the go type packaging is very frowned upon in that space. Versus it is suitable and serving a purpose for people that are eating out of home and particularly the serving size that they require, etcetera. With all the new government regulations around 2025 and then around single use packaging as well. How do you strike that balance?"
Food manufacturer.

There was broad agreement across interviewees that financial benefits and consumer feedback were key triggers for redesign. Food safety, sustainability, the desire to increase brand awareness, and a commitment to the 2025 National Packaging Targets and 2030 food waste targets were also mentioned:

"Generally, reducing food losses through supply chain has been a target on everyone's agenda for a long time, food waste however, at the consumer level and food service level, is less obvious and growing".
Packaging supplier.

Moana New Zealand Packaging: *This Australasian Packaging Innovation & Design (PIDA) Award and WorldStar Packaging Award winner uses PLANTIC RV packaging that extends the shelf life over 85% and designed for small portion control..*

3.5

Barriers for SFP criteria implementation

The cost of implementing the necessary changes emerged as a key barrier to the consideration of SFP design criteria. These costs include investments in equipment against the level of profit return generated after investment. Packaging sector interviewees reported variations across their clients' desire to include SFP design criteria. Some stated that their clients view implementing SFP features as costly and decreases consumers' value for money. Current trends show a consumer focus that demonises packaging rather than food waste and these preferences influence decision making. These participants indicated this presents an opportunity for consumer education:

"[Consumer education] is going to be a key issue, because in the end the organisation is motivated by profit, and boards and management structures that sit under boards are responsible for the interests of the shareholders and promoting shareholder value.

So, if we are going to align those things with reductions in food waste, improve food waste performance and the profitability of the enterprise, then it has to be because consumers recognise those improvements and the benefits that flow from them and therefore buy more of the product or support that brand or organisation. It has got to be an influencing factor. So communicating to those consumers is key to that."
Packaging supplier.

"An example of sustainability in packaging design, it has been done by the use of recycling logos for example, and more consumer and public information about the key factors in improving sustainability. Very important, on pack is obviously one aspect, but a much broader approach needs to be taken through public education and publicly-funded awareness campaigns and the like."
Packaging supplier.

3.6

Marketing SFP features to clients and consumers

Discussing whether marketing SFP features to consumers is required within the industry demonstrated a divide between the food manufacturers and brand owners interviewed. Participants from two companies expressed directly marketing these features is not required, as their consumers already expect high quality and safe food products, listing this as a selling point that encourages consumer brand loyalty. Participants from other food manufacturers and brand owners observed the benefit of marketing SFP to consumers to encourage returning customers and develop brand loyalty:

"So even the ones where maybe your specific consumer might not be choosing the product based on food waste. If that's part of your identity, there's a trust that actually, as the consumer, I don't need to worry about it because I know the company is a good company."
Food manufacturer.

Packaging suppliers stated they commonly distribute information about the benefits of their packaging to their clients, including food waste reduction techniques. This is also used as a selling point of the product. However, it is up to the discretion of the brand owner whether this information is then relayed to the consumer. Some packaging suppliers said they present their food saving technologies on their own website and social media platforms, acting as an additional form of communication with consumers:

"...being a B2B business, we, other than through our social media channels, don't have a ton of direct consumer interaction in real time. So what we do is we provide our clients with an informational flyer that explains what they're receiving. So explains... how it works, how to dispose of it, how to reuse it if they want to, things of that nature. And I would say 90% of our clients will take that flyer and will provide it to their customers.."
Packaging supplier.

Although conscious of the importance of consumers understanding SFP features of food packaging, for packaging suppliers, the design of product-packaging is centred around the products distribution through the supply chain, rather than how consumers interact with their products:

"The design and consideration of packaging is more about facilitating the production process than it is about the end user interface."
Packaging supplier.

SPC Provital Jelly Packaging. *This Australasian Packaging Innovation & Design (PIDA) Award and WorldStar Packaging Award winner is designed for easy to grip, one-serve portion control, and has achieved a +8 accessibility rating.*

Implementing SFP criteria

All five criteria elements (interactive online tool, best practice award-winning examples and case studies, briefing documents for roles and sectors, guidelines and checklists, training and education modules for roles and sectors) were mostly accepted by participants. Training and education modules for roles and sectors were seen as the most beneficial to contributing to skills, knowledge, and culture:

"...if there's some training involved and gets more people to understand the importance of considering that save food packaging design criteria really early in the process, then I think that will be beneficial."
Food manufacturer.

Participants showed an interest for specific guidelines and checklists to provide product category information and general information that can be embedded into existing company processes.

All interviewees were aware of the existence of the Australasian Packaging Innovation & Design (PIDA) Awards and WorldStar Packaging Awards.

4.0

Recommendations

1. **Clear definitions of food loss and waste:**

   There are still varying interpretations of what constitutes food loss and waste. A position paper needs to be prepared by the Australian Institute of Packaging (AIP) and Fight Food Waste CRC in conjunction with CRC participants, to clearly lay out these definitions.

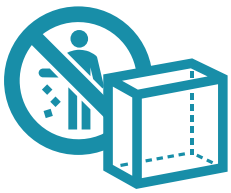
2. **Shelf life is the key to NPPD:**

   The shelf-life of new product-packaging should be considered throughout the design process. Achieving the set shelf-life, determined during the brief stage of product-packaging design, will ensure quality and safety throughout the supply chain and ultimately within users' homes.

3. **Overcoming barriers to the adoption of SFP criteria:**

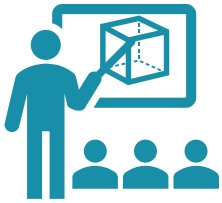
   The costs of implementing SFP and the returns on investment are key barriers to the adoption of SFP design. More examples of the business case and value for organisations to adopt this way of thinking are therefore recommended. This can be supported through leading organisations sharing their insights and experiences. There is also a need to further understand, through research and dialogue with stakeholders, additional barriers that prevent adoption and investment of SFP designs. Insights from such research would inform the refinement of the criteria, case studies, and training materials (see Recommendation 8).

4. **Consumer food waste education vs packaging:**



   Participants communicated their concerns on the current consumer trend that vilifies packaging, specifically plastic packaging. This highlights the need for enhanced consumer education on both the environmental and food safety elements embedded within the design of current and new product-packaging. The Australian Institute of Packaging (AIP), Save Food Packaging Consortium, and the Fight Food Waste CRC will play a critical role in the dissemination of SFP design criteria. This can then be integrated into other research across the CRC Programs and communicated more broadly among food supply chain industry stakeholders, governments, and consumers.

5. **Marketing SFP benefits to consumers:**



   It is encouraged that marketing focuses more on SFP features to assist in consumer education of food waste issues. On-pack communication was demonstrated as one form of communication, however as the demand for smaller pack sizes increases, there is an opportunity to explore alternative techniques. Smart packaging (e.g. QR codes) and retail marketing (e.g. shop talkers, which utilise the retail space rather than on-pack information) should be considered when designing product information communications. It is also important to note improving education around packaging's role in reducing food waste through marketing the brands' SFP techniques could encourage consumer re-purchases and brand loyalty.

6. Understanding how consumers use packaging:

More assessment is required of how packaging features and SFP strategies are understood and used by consumers. Research is currently underway by the Fight Food Waste CRC, Sustainability Victoria, Woolworths, and RMIT University, laying a foundation of baseline data of Australian consumers' perceptions of the role of packaging in minimising food waste. The important connections between packaging design and their actual use could be strengthened through new collaborations and opportunities.

7. Save Food Packaging (SFP) Design Criteria design and deployment:

There is significant appetite in Australia's food and packaging sector for the deployment of the Save Food Packaging Design Criteria and supporting material amongst food and packaging supply chain stakeholders. Building upon the work currently undertaken by the Australian Institute of Packaging (AIP), the criteria will provide detailed explanations of the core SFP strategies such as portion control, resealability, on-pack communication, and extension of shelf life and barriers, arming packaging technologists, innovation managers, research and development managers, and marketing managers with the tools to integrate SFP their product-packaging design.

8. SFP case studies and training material:

The interviews demonstrated how organisations want practical examples to illustrate how packaging features can reduce food waste. Delivery of such assets through case studies and training courses was viewed as beneficial, rather than generic checklists. Product-specific guides to how save food features can be integrated into product packaging formats should also be encouraged. The Australian Institute of Packaging (AIP) have already commenced this work, which they will continually develop and expand. Consideration should also be given to how training materials can be designed so that organisations can integrate key SFP concepts into their design briefs and NPPD processes. These materials much ensure SFP design is considered in early stages of product-packaging development as this is where key decisions are made. Guidance on how to assess and adjust designs at in later stages of the NPPD process should also be developed.

5.0

Acknowledgements

This research project is funded by the Fight Food Waste Cooperative Research Centre in partnership with the Save Food Packaging Consortium that comprises the Australian Institute of Packaging (AIP) as project lead; RMIT University as the Research Partner; Project Contributors are ZipForm Packaging, Sealed Air, Multivac and Australian Packaging Covenant Organisation (APCO); Project Partners are Plantic Technologies, Result Group and Ulma Packaging and the Extension Network consists of Australian Food Cold Chain Council (AFCCC), Australian Food and Grocery Council (AFGC), Australian Institute of Food Science and Technology (AIFST).

The project is a four-year study to further develop Save Food Packaging Design Criteria and Framework project. The work has been supported by the Fight Food Waste Cooperative Research Centre whose activities are funded by the Australian Government's Cooperative Research Centre Program. We would like to thank those who participated in the interviews and Dr Carol Kilcullen-Lawrence from the AIP for assisting with conducting interviews.

6.0

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7.0

Appendix

Table 1:
Survey design for the Stakeholder Interviews

Section	Question	Response options
Section 1.1	Q1. What is the name of the company you work for?	Text entry
Section 1.2	Q2. What is the size of the company?	SMN (small & medium enterprise)
		MNE (multinational enterprise)
Section 1.3	Q3. What is your role within your organisation?	CEO/MD executive level
		Research & development
		Packaging manager
		Packaging technologist/designer
		Innovation manager
		Marketing
		Sustainability manager
		Operations manager
		Corporate affairs
Section 1.4	Q4. What company sector does your organisation operate in?	Food or beverage manufacturer/producer
		Packaging manufacturer/supplier
		Wholesaler/retailer
		Consultant
		Packaging design agency
		Catering & hospitality
		Government/industry association/researcher
Section 1.5	Q5. What is the main food/product category in your organisation?	Packaging supplier/designer/consultant
		Food or beverages
		Processed foods
		Dairy & eggs
		Fresh produce
		Bakery
		Seafood
		Meat
		Ready meals

Table 1 continued.

Section	Question	Response options
Section 2.1	Q6. When considering your services/products within the supply chain through to the end-consumer. What is your organisation's understanding of "food loss" AND "food waste"?	Yes, often
		Yes, rarely
		No
Section 2.2	Q7. What information does your organisation already collect on "food loss and waste" levels?	
Section 2.3	Q8. What would be your estimated percentage of "food loss and waste" generated within your operations, retail and consumer?	
Section 3.1	Q9. Does your organisation consider how the design of a product's packaging could reduce food loss and waste generated within the supply chain through to the end user?	
Section 3.2	Q10. Are you aware of any designs or strategies that aim to reduce food loss and waste?	
Section 3.3	Q11. Does your organisation use any of these strategies/features in new product packaging development (NPPD) processes?	Yes
		No (Skip to Q13)
Section 3.4	Q12. Can you explain these strategies/features? How are they implemented, measured for success? Is SFP a high priority in your organisation?	
Section 4.1	Q13. In this section we are interested in understanding when and how you consider food loss and waste when developing new product packaging?	
Section 4.2	Q14. Which stages of your product-packaging development process does your organisation consider potential food loss and waste implications?	Briefing stage
		Innovation/research stage
		Conceptual design stage
		Development/detail stage
		Prototyping/testing stage
		Consumer testing stage
		Marketing stage
		Commercial evaluation stage
		Launch stage
Section 4.3	Q15. Are you directly involved in these stages?	Yes
		No (Skip to Q17)
Section 4.4	Q16. Please explain your involvement. What are the stages? Do you have a role to play in food loss and waste reduction techniques within new products/services?	
Section 4.5	Q17. Do you believe you should be involved in the stages of product-packaging development? Who is involved? (If "No" in Q15)	

Table 1 continued.

Section	Question	Response options
Section 5.1	A recent online survey has been conducted by the research partners. Findings suggest that save food packaging (SFP) features are often considered in the early stages of new product packaging development (NPPD) process, however, are less considered in the later stages. Q18. Which SFP features do you consider in the early stages of NPPD?	Portion control
		Openability
		Resealability
		Controlled dispensing
		On-pack communication
		Date labelling
		Usage and storage instructions
		Extension of shelf-life and barrier
		Active and intelligent packaging
		Portion control
Section 5.2	Q19. Which SFP features, if any, flow through to the later stages of product development?	
Section 5.3	Q20. Which SFP features, if any, DO NOT flow through to the later stages of product development?	
Section 5.4	From the research, food loss and waste within new product packaging development (NPPD) was somewhat considered in the marketing, consumer trialling, commercial evaluation & launch stages. Q21 - Why do you think marketing and consumer trialling stages rarely consider SFP design features?	
Section 5.5	Q22. Should some SFP design be considered and at what stages?	
Section 5.6	Q23. Should they market SFP design features to consumers? And how?	
Section 5.7	Q24. Thinking now about your organisation, are SFP design features less considered within these later stages? (marketing, consumer trialling, commercial evaluation & launch stages)	Yes
		No (skip to Q26)
Section 5.8	Q25. What are the barriers causing this?	
Section 5.8	Q26. Is consumer awareness of SFP features within product-packaging a priority?	Yes
		No (skip to Q28)
Section 5.9	Q27. Why is marketing not involved?	
Section 5.10	Q28. (If “No” in Q26) Why is consumer awareness of SFP not a priority?	
Section 6.1	Q29. If packaging could be re-designed to reduce food loss and waste, what would be the triggers for your organisation to make these changes? Can you please list the triggers?	Yes
		No (skip to Q32)
Section 6.2	Q30. Do you have an example of a product-packaging that has implemented SFP features? Either your company or other companies?	
Section 6.3	Q31. Are there any other factors that would make you re-design a product?	
Section 6.4	Q32. (If “No” in Q29) Why can't packaging be redesigned to reduce food waste and loss?	

Table 1 continued.

Section	Question	Response options
Section 7.1	Q33. Are there any barriers in stopping your organisation from considering 'save food packaging design criteria' within your product-packaging development process? Can you list and explain the barriers?	Not included in the design brief
		Lack of stakeholder alignment
		Lack of capabilities
		Lack of resources
		Adds cost
		Adds time
		Negative brand integrity impact
		Economic perspective
		Technical perspective
		Not included in the design brief
Section 7.2	Q34. Do you have the ability to overcome these barriers?	
Section 7.3	Q35. Do you think it is your role to assist with save food packaging design in your organisation?	Yes (skip to Q38)
		No
Section 7.4	Q36. Why is it not your responsibility?	
Section 7.5	Q37. Who do you believe is currently placed to make executive decisions about food loss and waste in your NPPD processes?	CEO/MD executive level
		Research & development
		Packaging manager
		Packaging technologist/designer
		Innovation manager
		Marketing
		Sustainability manager
		Operations manager
		Corporate affairs
Section 8.1	Q38. As part of the CRC project, we are developing save food packaging criteria guidelines. Of the list below, we are interested to know how you would see the saved food packaging design criteria for new product-packaging development (NPPD) to be implemented in your organisation?	Interactive online tool
		Access to best practice award-winning examples and case studies
		Briefing documents for roles and sectors
		SFP criteria guidelines and check lists
		Training and education modules for roles and sectors

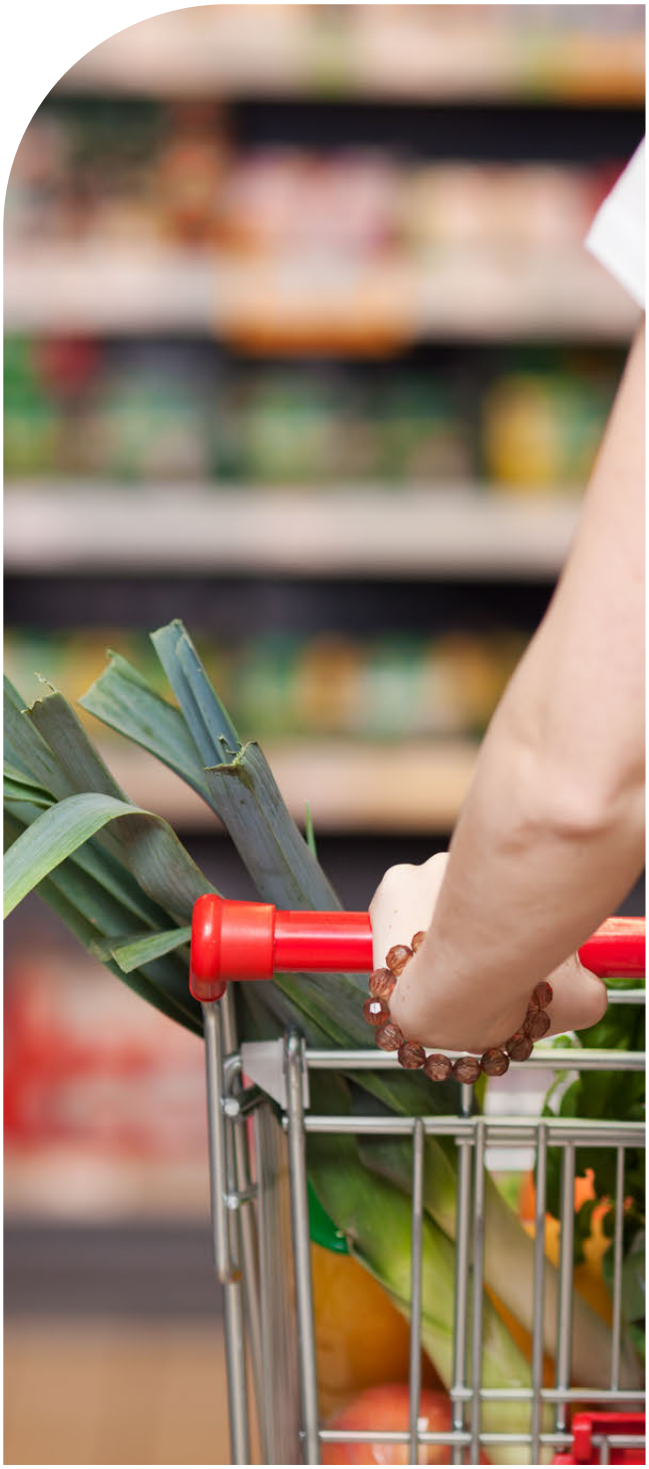
Table 1 continued.

Section	Question	Response options
Section 9.1	Q39. Thinking now about your current packaging products/services, can you explain their food loss and waste reduction design strategies? Can you provide some examples and describe the strategies you have used?	(If "No", skip to Q42)
Section 9.2	Q40. What are the main reasons for this design change?	
Section 9.3	Q41. What was the design/system prior? What has been the response to the new packaging-product/system?	
Section 9.4	Q42. (If "No" in Q39) Thinking now about your current packaging products/services, can you identify where food loss and waste may occur or is occurring?	
Section 9.5	Q43. What waste reduction design strategies could be implemented and why?	
Section 10.1	Q44. Are you aware that there are local and global packaging innovation design awards?	Yes
		No (skip to Q48)
Section 10.2	Q45. Can you name these awards?	
Section 10.3	Q46. Have you entered a Packaging Design Award Program before?	Yes
		No (skip to Q48)
Section 10.4	Q47. When and which product did you enter? Which program? Why did you participate in the program?	
Section 10.5	Q48. (If "No" in Q46) Would you consider entering a Packaging Design Award program if you have implemented SFP within your product-packaging?	Yes
		No

Appendix

Table 2:
List of Save Food Packaging (SFP) Features

SFP Features
Portion Control
Openability
Resealability
Controlled dispensing
On-pack communication
Date labelling
Usage and storage instructions
Extension of shelf-life and barrier
Active and intelligent packaging
Retaining nutrition



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