

MINIMISING FOOD WASTE

**DNB311 - ID7 CAPSTONE PROJECT
RESEARCH REPORT 2025**



Authenticity Statement

This is to certify that to the best of my knowledge, the content of this report is my own work. This report has not been submitted for any subject or for other purposes. I certify that the intellectual content of this report is the product of my own work and that all the assistance received in preparing this report and sources have been acknowledged.

Name: Quruli Moon Wright

Student number: n11302674

Date: 18th August 2025

AI Use Statement

I have utilised Generative AI in this report (chatgpt.com) to assist in various ways. The way I have used AI includes;

- Prompting for interview question ideas and assistance in exploring key questions
- Assistance in rewording or adding clarity to some text and their structure or reducing word count

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Executive Summary

This report explores the concept of Food Waste and communicates the importance of understanding and being more attentive towards the prevalent problem, more specifically in a household setting. By briefly exploring the whole of the food system cycle and conducting research, it was evident that the greatest amount of waste is produced from individual households. This report aims to gain an insight and discover the challenges of individuals and communities to investigate what it is that drives food wasting behaviour.

To be able to identify the challenges and design a tangible product able to combat or minimise food waste, multiple forms of data collection methods were conducted. This includes secondary research such as researching online and benchmarking existing products, as well as looking at journal articles, statistics, and conducting my own data collection for primary research - survey and interviews with various participants. This research has opened the door to better insights to the root of the issue including understanding the perspectives of involved stakeholders, finding a gap in the market and ensuring key findings and design implications for efficient developments in terms of this focus theme.



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Introduction



Food waste has been a global problem for as long as food has been produced and consumed, and is only worsening as the population rises and planet becomes more and more at risk and impacted every day. The fact that one-fifth of food produced for human consumption is wasted on a global scale which equals one billion meals a day is enough to be alarming and urgently needs to be brought to attention by more people. Not only is this problem extremely wasteful, but the impacts this has on the society, economy and the environment is significant. Food loss and waste generates up to 10 percent of global greenhouse gas emissions.

Food waste consistently occurs at every stage of the food cycle, including agriculture and the initial production, food processing in factories, packaging, stored foods,

distribution and transportation, retail and commercial settings to end users in individual households. Despite ongoing public awareness campaigns and initiatives, household food waste especially, remains a persistent problem, costing households financially while also placing pressure on landfill and natural resources. This is evident as it is said that household level production of food waste contributes to 60 percent of all food waste, which is the majority. Current research highlights general trends, but there is still a need for more detailed insights into how much food is wasted, what types of food are most affected, and the underlying behaviours and habits driving this waste. By exploring these questions, this report aims to contribute to practical strategies for reducing waste at the household level.

Background

Food loss is defined as the loss of food before it reaches the consumer, resulting from issues in the production, storage, processing, and distribution phases. Food waste, by contrast, refers to food that was fit for consumption but was consciously discarded at the retail, commercial, or consumption stages (Food Waste, n.d.). This distinction highlights how the problem extends across every sector of the food cycle. Food loss often occurs when food is grown but not harvested—commonly due to pest infestations or unpredictable weather—or when food is lost post-harvest before reaching retail or consumers. Such losses may be further influenced by unfavourable market conditions, labour shortages, and other challenges faced by farmers (Reasons for Food Loss, n.d.).

Statistics from OzHarvest (n.d.) state that “one third of all food produced is lost or wasted – around 1.3 billion tonnes of food – costing the global economy close to \$940 billion each year.” The extent of food waste varies by country and is shaped by culture, mindset, environment, economy, and societal circumstances. The United Nations Environment Programme's 2021 Food Waste Index found that an estimated 931 million tonnes of food is wasted annually, with more than half—569 million tonnes—coming from household waste, while the remainder occurs in the food service and retail sectors (McCarthy, 2021). The Index also noted that “if food loss and waste were a country, it would be the third biggest source of greenhouse gas emissions on the planet” (McCarthy, 2021).

The graph on the right illustrates the top 10 biggest food-wasting countries globally, showing consistently high levels of waste regardless of location. Unsurprisingly, the largest contributors are countries with the highest populations. However, some findings are notable—for example, Australia produces almost double the food waste per capita compared to China, despite its much smaller population. This disparity may be influenced by factors such as infrastructure and storage, income levels, lifestyle, a sense of food abundance, education, cultural and behavioural norms, effectiveness of waste tracking, and supply chain dynamics (Kim, 2024). Age demographics are also significant; individuals aged 18–34 generate more preventable waste than any other age group, and are almost twice as likely to do so compared to those aged over 65 (Kilcooley, 2022).

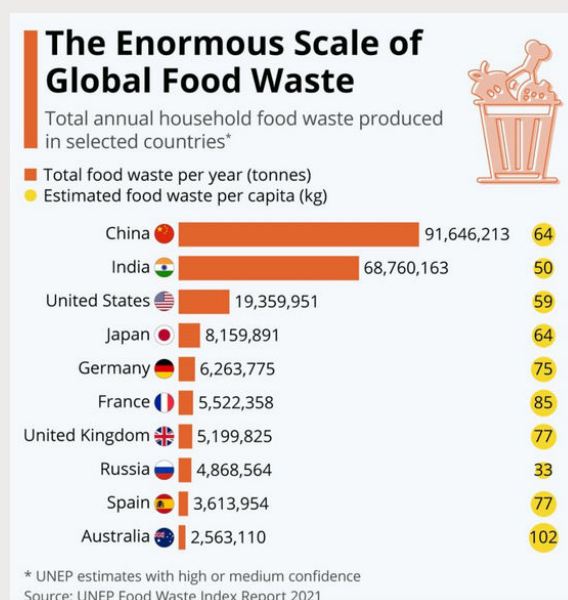


Image 1 - The enormous scale of global food waste - comparing top 10 countries (McCarthy, 2021)

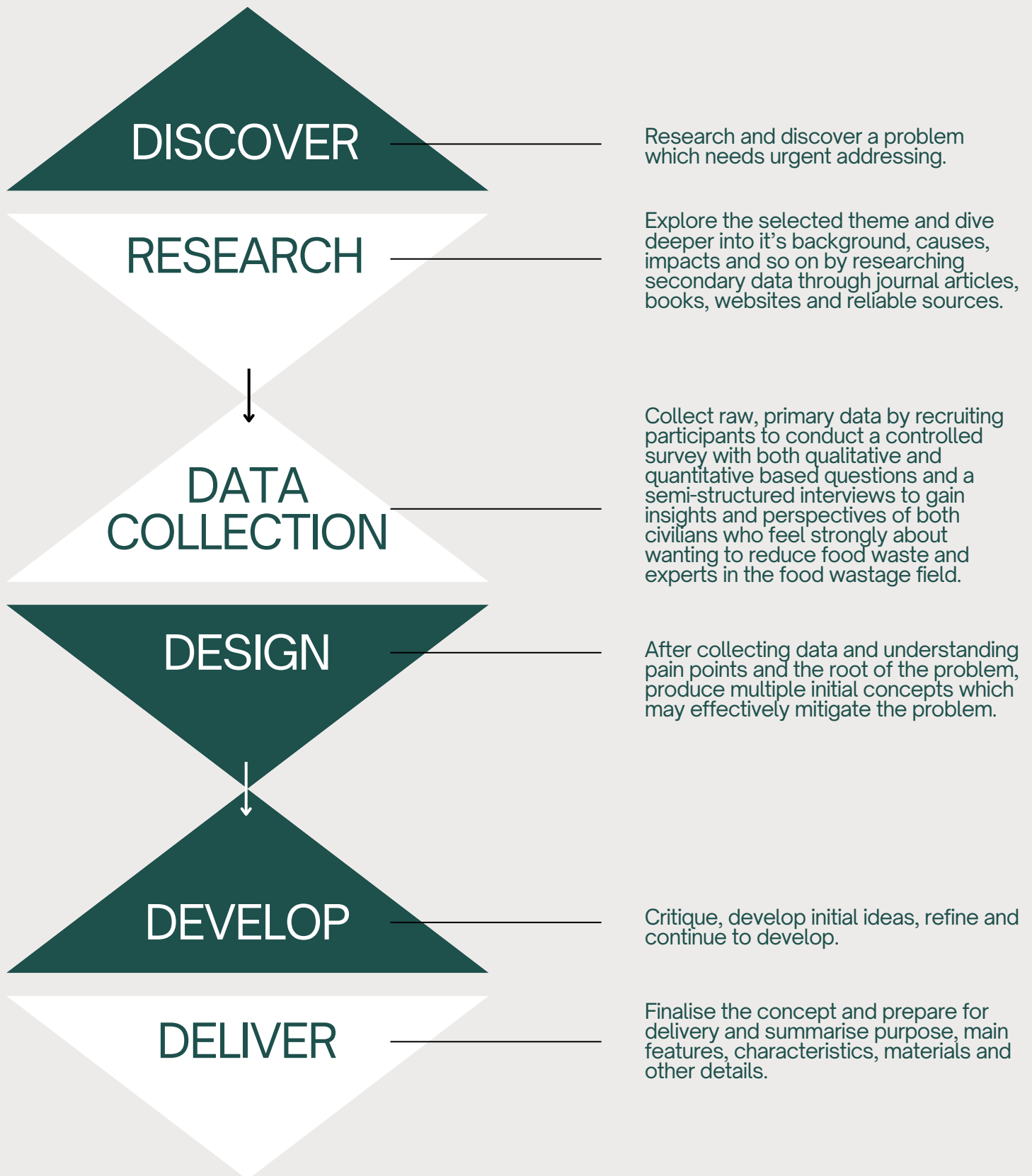
The root causes of food loss stem from a range of factors that prevent food from reaching consumers. These include uncontrollable natural elements such as severe or unpredictable weather, pests, and diseases (Quinton, 2019); inadequate infrastructure (Beasley, 2024); inefficient harvesting techniques (deliverect, n.d.); overproduction (Stuart et al., 2011); logistical constraints (World Food Program USA, 2022); and overly strict quality standards (Move for Hunger, n.d.). Food waste, in contrast, occurs further along the cycle at the retail and consumer level. Common causes include overconsumption and purchasing more than necessary (Goodwin, 2023), poor inventory management, wasteful household habits, confusion over date labels (Conservation Law Foundation, 2025), and general consumer attitudes.

The impacts of food waste are equally vast, spanning environmental, economic, and social dimensions. Environmentally, food waste is a leading contributor to greenhouse gas emissions, accounting for one-third of all human-generated emissions (Lewis, 2022). Beyond emissions, it contributes to climate change, land degradation, loss of biodiversity, and wasted natural resources such as water, energy, fertiliser, and pesticides. Economically, the implications are immense: food waste costs food producers an estimated \$750 billion annually and represents \$940 billion in lost value globally. Skip Shapiro Enterprises (2024) further estimates that “a 20–50% reduction in consumer food waste on a global level could save an estimated \$120–300 billion per year,” underscoring the urgency of this issue.

Socially, food waste compounds issues such as food insecurity, which disproportionately affects individuals based on income, race, location, marital or parental status, and age. For instance, “two million Australian households ran out of food at some point in the preceding 12 months as a result of financial hardship” (enrich360, 2023), demonstrating how food insecurity is exacerbated by systemic inequalities.

In response, a growing number of initiatives have emerged across different levels of the food system. These range from household-focused products to retail and commercial strategies, as well as large-scale organisational efforts. Notable examples include OzHarvest, Foodbank, and End Food Waste Australia, all of which share the common objective of reducing food waste nationwide (Queensland Government, 2023). These organisations have made significant contributions not only in reducing physical waste but also in shifting public mindsets and attitudes toward more sustainable food practices. More detailed benchmarking of such products and organisations will be presented later in this report.

Overall Project Structure



Benchmarking

Benchmarking is the process of identifying existing products, services and processes on the market and analysing them in depth and comparing them to each other to understand strengths and flaws. This method is used especially in scenarios where a new design is to be created, therefore understanding the competition and gaining an insight can be extremely beneficial. This can include factors such as usability, effectiveness, accessibility, durability, price point and so on.



Existing organisations/products

that focuses on reducing food waste

Organisations/services



Too good to go app
aiming to sell leftover retail food for much cheaper rather than throwing it away



The Odd Bunch campaign
aiming to commercially sell “aesthetically unappealing” vegetables that usually would not even make it from the farms to the supermarkets



Cold chain logistics
provider of cold storage warehouses and transport services



Supercook website
aiming to reduce food waste by acting as an effortless and quick recipe generator from identifying leftover ingredients



Community fridge
anonymously provided food in a public 24/7 access fridge welcoming most foods by anyone. Found in countries eg. Estonia

(Community Fridges: What They Are and How to Find Them, n.d.)



Food2Soil
aiming to reduce waste to landfill and contribution to greenhouse gas emissions by producing fertiliser from recycled food waste

Products



Tupperware
stores leftover meals or any kind of food with ease and efficient organisation



Esky
Insulated storage allowing food and beverages to stay hot or cold for an extended period of time, on the go



TetraPak packaging
Food & beverage packaging which is aseptic, has multi-layer cartons that protect perishable foods without refrigeration



StixFresh fruit stickers
Sticker designed to add a protective layer, slowing the ripening process to keep fruits fresher for up to 2 weeks longer



Smart refrigerator samsung
stores food in cold environment to extend food lifespan. able to check inside the fridge on the go using app



Compost bin Joseph Joseph
Bin providing contained environment for leftover foods or food scraps to become compost, with odour prevention filters



Beeswax wraps
An eco-sustainable alternative for cling-wrap with anti-microbial properties which extends food shelf life



Purifie by Fridgemate
Ethylene gas absorbing filter designed to keep inside the fridge to extend shelf life of fruits and vegetables



Freezer
stores food in a freezing cold environment to expand food lifespan, for months, especially useful for meat or fish



Ever Eco silicone food covers
Versatile and stretchy food covers replacing single-use plastic, keeping food fresh for longer with airtight seal

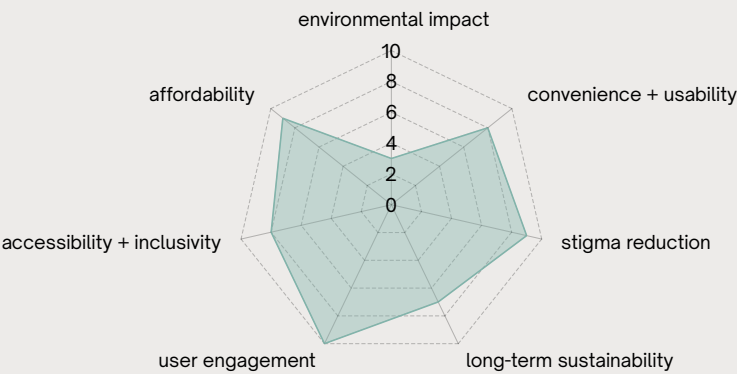


SoilFood food recycling machine
Turns organic waste into fertiliser. (improve soil condition as well as significantly reducing volume of food waste)

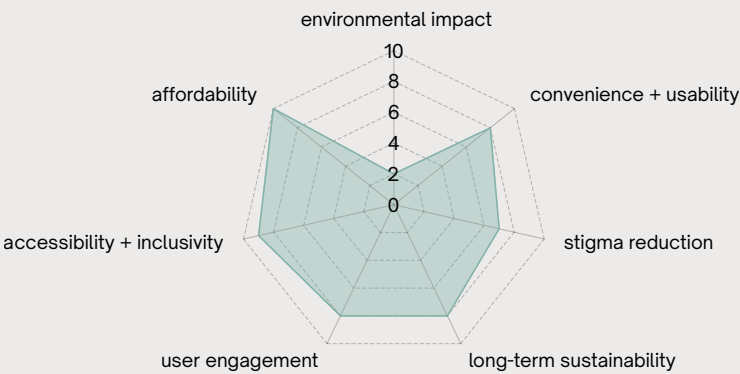
Benchmarking organisations/services

using spider graph

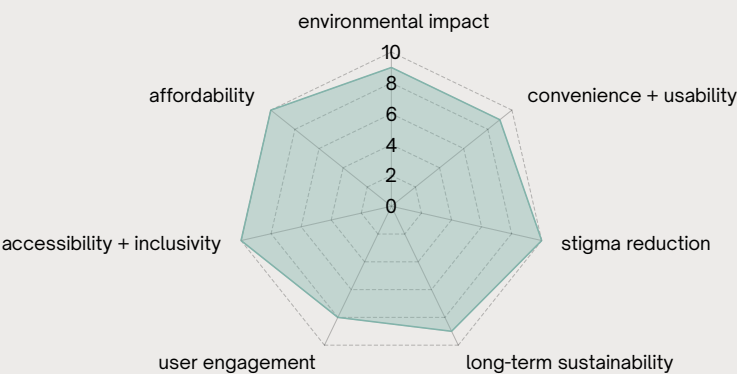
Too good to go



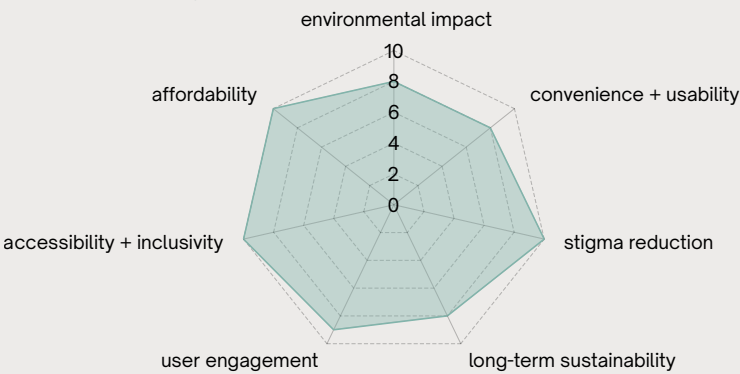
Supercook



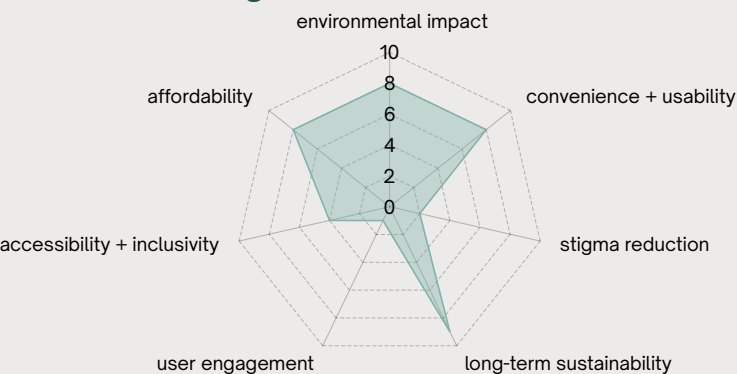
The Odd Bunch



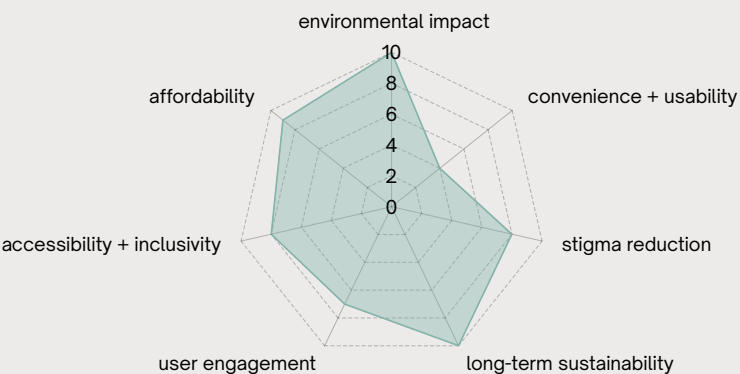
Community fridge



Cold Chain Logistics



Food2Soil



Data figure 1 - Spider graph scaling multiple criteria for organisations aiming towards reduction of food waste

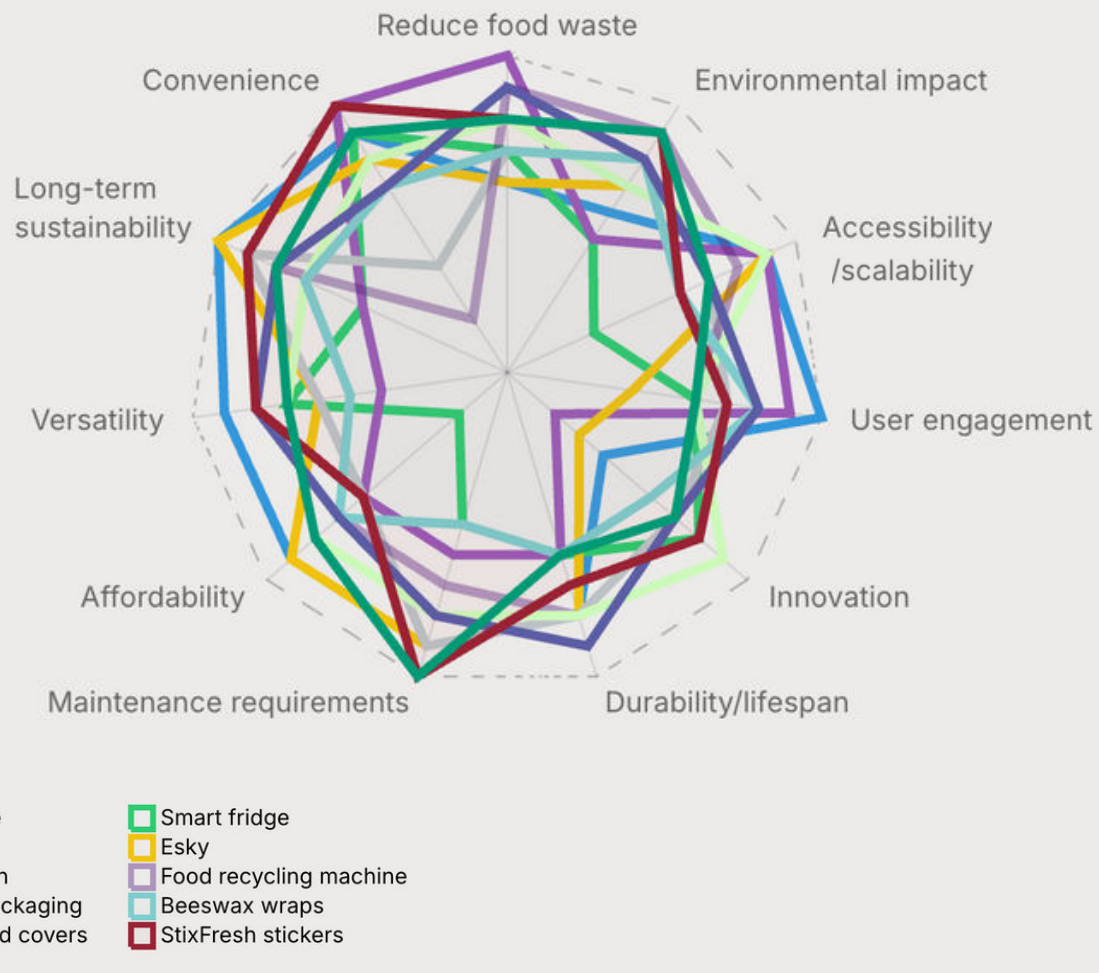
Benchmarking products

	Tupperware	Smart fridge	Freezer	Esky	Compost bin	Food recycling machine	TetraPak packaging	Beeswax wraps	Silicone food covers	StixFresh fruit stickers	Purifie
Effectiveness in Reducing Food Waste	6	7	10	6	7	9	8	7	9	8	8
Environmental impact	6	5	5	7	8	9	7	8	8	9	9
Accessibility/scalability	9	3	9	9	7	8	9	6	7	6	7
User engagement	10	6	9	4	7	6	6	8	8	7	6
Innovation level	4	8	2	3	7	9	9	6	7	8	7
Durability/lifespan	8	6	6	8	8	8	8	6	9	7	6
Maintenance requirements	9	5	6	9	9	7	8	5	8	10	10
Affordability	9	2	6	9	6	7	8	7	7	6	8
Versatility	9	7	4	6	6	8	7	5	8	8	7
Long-term sustainability	10	5	5	10	9	8	7	7	8	9	8
Convenience	9	9	10	8	4	2	8	7	7	10	9
TOTAL /110	89	63	72	79	78	81	85	72	86	88	85

● 1-3 ● 4-6 ● 7+

Data figure 2 - Table displaying ratings of multiple criteria for existing products out of 10, then from a total of 110

The figure 2 table communicates coherent critiquing of strengths, weaknesses and level of innovation to be able to compare and contrast various aspects of these existing products on the current market. Followed by this, to conclude the benchmarking section with clarity and a presentation of depth of understanding of research, the spider graph below offers a further comprehensible representation of the differences between products in terms of the criteria to be able to easily determine the gaps in the market, therefore the opportunities.



Data figure 3 - A more comprehensible visualisation of what is presented in the table above, in a Spider graph format

Benchmarking summary

The benchmarking research and analysis was conducted across various food contexts - commercial, retail and household level, as well as existing products, services and organisations to grasp useful insight into the entire food chain and cycle in general.

Organisations/services: To highlight, majority of the organisations scored very high overall, especially The Odd bunch and Community fridges, especially in factors such as user engagement and fighting stigma around saving food mindfulness. In comparison to this, Cold Chain Logistics and Supercook also perform well overall however is severely lacking in certain areas, especially lack of real cause and effect or results and a lack of convenience or relevance for end users which let them down for being short on crucial points.

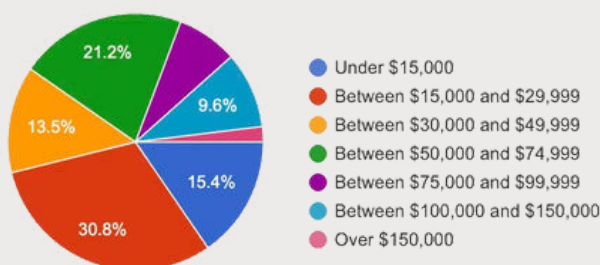
Products: The two graphs communicates the overall effectiveness of majority of existing products. It can also be seen that there is a gap in the market of products which excels in all areas in general, especially when it comes to focusing on the most important factor - effectiveness of reducing food waste, then convenience. These two needs to be excelled as well as every other criteria overall to be determined decent design for serving it's main purpose, being convenient and effortless enough to stay engaging and will be utilised on a long term basis.

Primary Data Collection

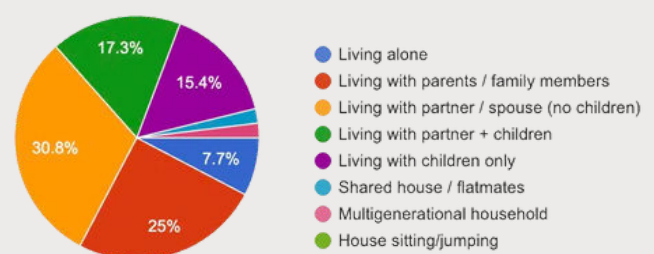
The survey

A survey served as the primary method of data collection for this report, with a focus on household food waste as a central area of investigation. The survey was developed using Google Forms and distributed through social media platforms, allowing voluntary participation from individuals willing to contribute to the research. While the survey design was intended to remain unbiased, the method of distribution naturally influenced the demographic of respondents. In total, 52 responses were collected, providing valuable insights into household behaviours, attitudes, and practices relating to food waste. The survey collected data of respondents reporting the data below;

- Age group of **18-34**
- Majority - **employed students or working full time** (therefore likely to be busy individuals who **prioritise their academic or professional commitments and responsibilities**)
- 46%, of respondents reported **low income** which is categorised to fit \$29,999 or under annually, indicating they are **more likely to have higher motivation for preventing food waste due to financial constraints or limitations**. On the other hand, the other half of respondents who have reported \$30,000 and above, may tend to have **more financial freedom therefore less concern for food waste due to a sense of abundance of resources and the lack of consequence**, however, their busy lifestyles and being occupied with their professional commitments may play a big role in making it **difficult to prioritise being mindful and organised with their lifestyle revolved around food**
- Just over half of respondents reported to be **living with other family members** and one thirds reported **living alone or in a sharehouse setting**, indicating these groups have **varying responsibilities, commitments, mindsets, priorities and difficulties which all impact their behaviour encouraging or discouraging food waste**



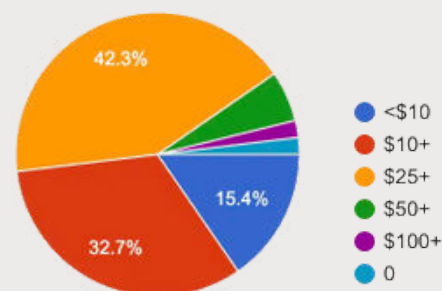
Data figure 4 - Reported level of annual income from 52 responses



Data figure 5 - Reported level of how many people resides in their household - from 52 responses

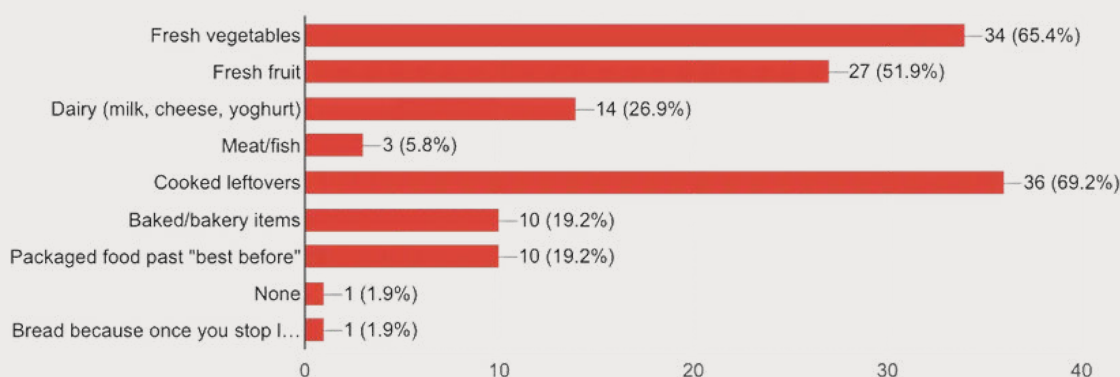
KEY STATISTICS

- At least 75% of respondents reported to **waste over \$10 per week due to food waste** in their household
- The category of the **most wasted food were fresh vegetables, fruits and cooked leftovers**
- 92% of respondents either **agree or strongly agree that reducing food waste is important** to them on a personal level = **good intentions + willingness to contribute to working for the cause if it's convenient** enough for them

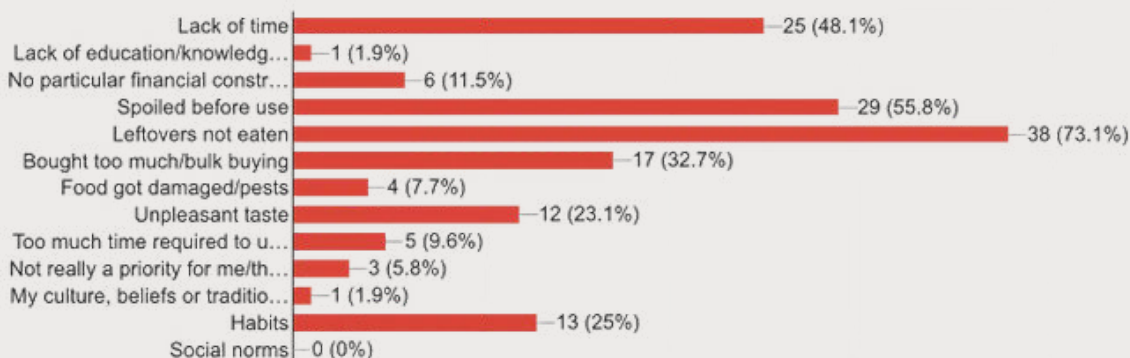


Data figure 6 - Self-reported amount of money wasted weekly due to food waste - from 52 responses

- Biggest annoyance reported with food waste - 27% short food lifespan, 21% laziness and disorganisation, 17% forgetfulness, 12% lack of knowledge and 6% lack of storage.
- Biggest motivators for reducing food waste in their household - 94% saving money, 64% environmental concerns and 42% household organisation and convenience
- 29% reported wanting a product or service design which combat food waste which involves features that saves time, effort or includes reminders.



Data figure 7 - Most commonly wasted categories of food - from 52 responses



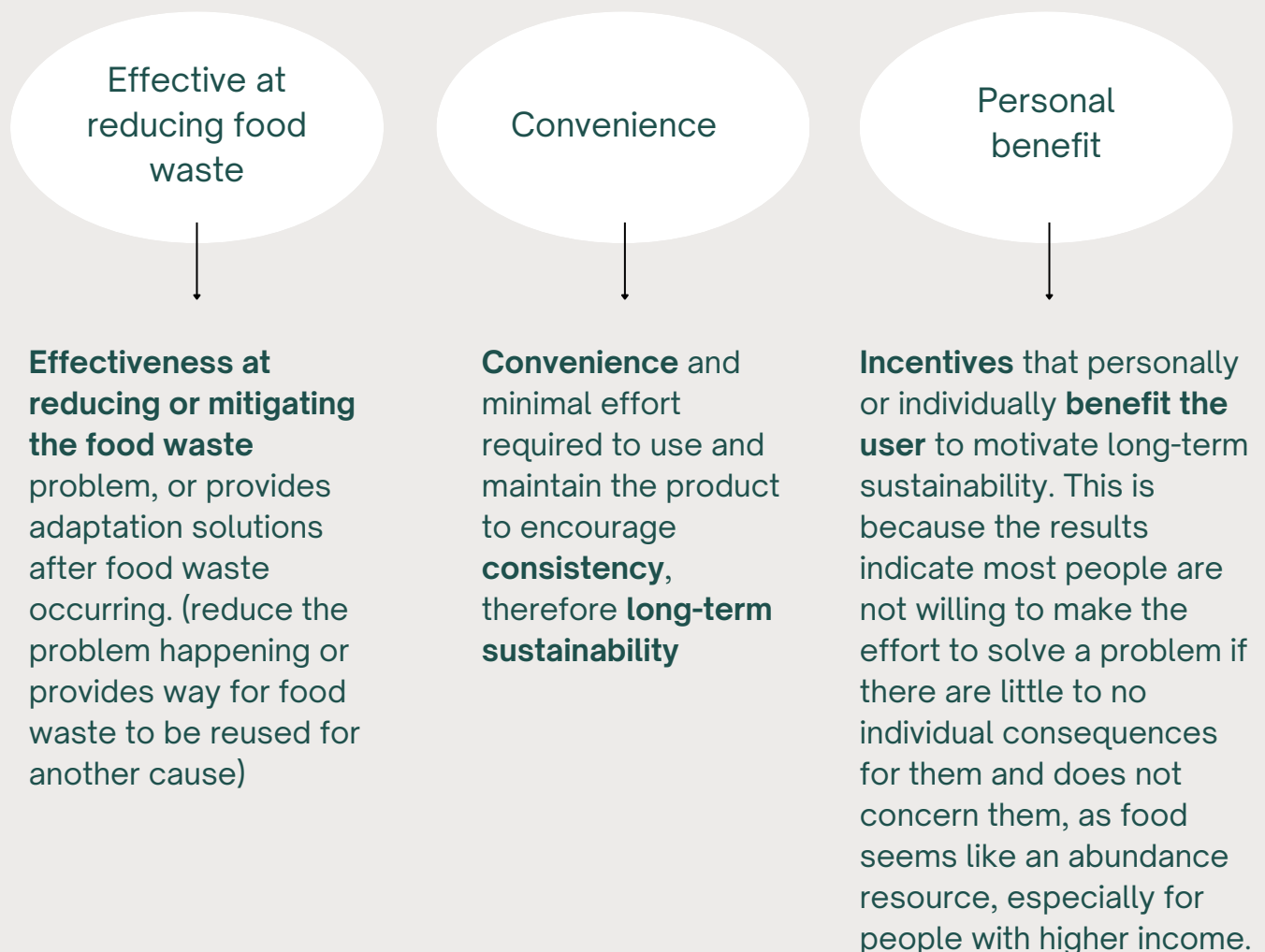
Data figure 8 - Main barriers that leads to food wasting behaviour - from 52 responses

KEY REASONS FOR FOOD WASTING BEHAVIOUR

- **Forgetfulness** - very frequently repeated keyword
- Most people have positive intentions and attempts to maintain organisation such as through methods like freezing, meal planning and prepping, or being mindful with spending habits. This indicates their **consciousness** to this existing problem, however is **not effective enough** as statistics still display a huge amount of food being wasted. This shows evidence that **intentions does not necessarily equal outcome**.
- **Lack of communication about food** and grocery shopping amongst members in the same household and share food.
- Issues with **short food lifespan**, **lack of organisation and planning**, **improper storage** and **lack of knowledge**, bad habits such as accidentally **purchasing more than necessary**, **overestimating portions**, **misunderstanding expiry date labels**, being **unsure of food freshness and safety** and **laziness**.
- Unsurprisingly, many respondents emphasised their **busy lifestyles**, **lack of time**, and a want to reduce food waste however, it was **not worth the effort** due to a **lack of convenience** and difficulty to align good habits with their schedules.

WHAT DOES THIS MEAN?

The survey results determine three very clear points a good, effective design would require to target the food wastage problem after learning what the the root of the causes are;



The interviews

The interviews were conducted with participants selected for their capacity to provide valuable insights into food waste, drawing either from personal lifestyle experiences or from professional roles within business and commercial contexts. The recruitment process included one individual living independently and three experts with experience in the food waste sector. A semi-structured interview format was adopted, with tailored questions prepared in advance to capture each participant's unique perspectives, goals, and experiences. The methodology combined both qualitative and quantitative questioning, encouraging participants to provide not only reflective opinions but also concrete examples and figures to more effectively communicate their beliefs, concerns, and lived experiences.

Participant selection focused on individuals considered experts in food waste within the local Brisbane context, to gain an understanding of current national initiatives and the broader landscape in Australia. Their insights were intended to help clarify the causes and effects of food waste, as well as its wider impacts across the food system. In addition, participants were chosen based on their direct exposure to the challenges of food waste—either through personal experience or through professional roles centred on addressing and reducing it. The four participants selected for this study were:

- Manager at local Brisbane cafe (food waste expert)
- Organiser of food and meal donation events (food waste expert)
- Supervisor at food festivals (food waste expert)
- Twenty one year old woman who lives on her own (household food waste insights)

The text bubbles on the following page represents summarised interview insights, keywords and information gathered from each conversation.

Alma - cafe manager

Main source/barrier of waste

1.Customer leftovers

- Portions that may not suit every customer
- Likes, preferences and meal satisfaction
- Occasional errors which could be stemming from cooking or seasoning process
- Ethical and safety issues prevent reuse/recycling of leftovers

2.Unsold foods being discarded at the end of day

- Preparing/cooking more than customer demand
- Not being able to predict level of demand
- Legal and safety issue preventing donation of these foods or being sold the next day

3.Meals has to be freshly cooked legally.

- However ingredients also has to be stored well to prevent spoilage

Current tactics

- Portion adjusting, observing customers' behaviour
- Giving away some food waste to friends for fertiliser purposes

Design opportunities

- Indicates small businesses most likely wants to and are willing to work for food waste reduction/recycle if its not at the cost of business sustainability and efficiency (convenience is key) = design to make recycling wasted food low effort and convenient
- Design to keep ingredients fresh for longer
- Design to encourage customers to finish meal or take home leftovers

Jimmy - Food festival supervisor

Main source/barrier of waste

- Over-suppliance to cater for enough people - protect brand image and reputation rather than attempt to reduce food waste
- High value food being discarded due to the high food standards law
- No guilt as they have essentially paid for everything and there are no consequences of food waste for their business sustainability
- Easier and more convenient to waste food
- Lack of education and a sense of urgency
- Over-reliance on date labels, lack of will to determine freshness themselves
- Correlation between income and wasting food
- Experiences, education, culture and perspective all play a large role in impacting behaviour and beliefs
- Mindsets, systems and privilege cannot be changed by design

Current tactics

- Catering accuracy is key - tailoring portions and knowing how many people to provide for, not over-supplying
- Some leftovers go to Foodbank or is donated however, there are limitations as it costs extra for logistics, transportation, delivery, refrigeration and so on which businesses only see as a disadvantage financially

Design opportunities

- Better portion planning
- Improve food literacy
- Improve food saving more convenient and stigma free
- Convenience focused tools/products that makes saving food just as easy as discarding
- Behavioural/educational products

John - Food donation event organiser

Current tactics to save food

- Communicating with various organisations who offer food to John's organisation - Village Mosaic, and either giving these groceries away as they are or recruiting volunteers to cook bulk meals to donate to those in need
- Being creative with food recycling and distribution before expiry

Barriers they experience

- Limitations in storage capacity due to the large quantities of food received
- Short shelf life of donated food, as most items are received free of charge because they are damaged, close to expiry, or otherwise need to be distributed rapidly
- Insufficient resources and funding to expand support and sustain long-term operations. While the organisation relies on donations, funding, and in-kind support, essential activities such as volunteer recruitment, event coordination, communication with partner organisations, and food transportation all require ongoing investment
- Contrasting priorities with other organisations, where many businesses prioritise profit, efficiency, and operational goals over food waste reduction. Addressing waste involves unavoidable constraints related to finances, time, resources, equipment, and logistics

Design opportunities

- Enhance storage efficiency and extend the shelf life of food
- Streamline processes for food repurposing
- Improve logistics to preserve freshness, appearance, and quality during transportation, minimising waste from minor packaging or cosmetic damage.

Bella - individual living

Main source/barrier of waste

- Not being able to finish food in time, food going off too fast (especially vegetables and perishables)
- Forgetting what is in the fridge or not being able to see it (solo living people can only rely on themselves to keep track and remember)
- Small fridge = not enough space for food storage
- Being unsure how to properly store certain foods
- Being unsure if certain foods are fresh enough to consume safely
- Misunderstanding or being unsure what different date labels mean
- Being unsure of what to cook each time, and it's too effort and time consuming

Current tactics

- Briefly planning day by day based on available ingredients
- Cooking for three or four meal portions to save cooking time over a period of time
- Cooking instead of purchasing takeaway to save money
- Being mindful about not purchasing more than necessary to stay organised and save money
- Storing vegetables in containers so they don't lose moisture - alternative for having a crisper box in fridge
- Growing DIY plants and vegetables in small pots to last longer
- Empathetic mindset and caring about food waste, guilt
- Considering the direct financial impacts of wasting food

Design opportunities

- Reminders/design to prevent forgetfulness
- Expand food shelf-life/perishable friendly storage design
- On the go fridge tracker or more effortless way to keep track of groceries
- Better fridge storage in terms of organisation, visibility and easy tracking
- Convenience, low maintenance and affordable design

Limitations and future improvements

Limitations

- Time constraints - the short project timeline restricted the ability to explore the issue in greater depth.
- Sample size and bias - although 52 participants completed the survey, responses reflected similarities in financial circumstances, lifestyle, and mindset, limiting the diversity of perspectives. A more representative sample across income levels, age groups, and living arrangements would have produced broader insights.
- Geographical focus - while the survey aimed to capture perspectives from any location or age group, the majority of responses came from Brisbane, reducing the generalisability of the findings.
- Self-reported data - reliance on participants' honesty and memory may have led to under- or over-estimations, as responses often reflected short-term or recent behaviours.
- Breadth of the issue - despite combining primary and secondary research, food waste is a highly complex, interconnected problem. It was not possible to accurately capture data across all sectors of the food cycle within the scope of this report.

Future improvements

- Extended timeframe - with longer deadlines, the research could be explored in greater depth, allowing for more comprehensive data collection and stronger design outcomes.
- Additional resources - greater access to funding and support would enable wider participant recruitment, providing a clearer picture of the challenges individuals face in managing food waste.
- Longitudinal study - repeating the survey with the same participants at multiple points in time would allow for the tracking of behavioural changes and provide more accurate, meaningful insights than a one-off survey.

Discussion

The combination of research, benchmarking, and data collected through surveys and interviews has been synthesised to reveal several key findings, each considered in relation to one another.

Extensive secondary research into food waste across various sectors and contexts indicates that household food waste is the largest contributing factor overall, particularly among younger generations. This conclusion is supported by global statistics, as well as the observation that most existing organisations and products target households and end consumers. Despite this focus, food waste remains a highly complex problem that can be approached from multiple angles, including systemic complications, rules and regulations, consumer behaviour, and more. Nonetheless, the available data demonstrates a clear lack of effectiveness, as food waste continues to increase, causing significant environmental impact. Analysis of the benchmarking data highlights an opportunity to design solutions that not only combine effectiveness and convenience but also bridge the gap between awareness and action, while ensuring long-term engagement and adaptability across diverse lifestyles.

Primary research findings align with gaps identified in the benchmarking analysis, indicating that existing initiatives require certain factors to achieve long-term success in combating food waste. Effective designs should reduce food waste or provide a practical way to manage it, offer convenience and require minimal effort to maintain, ensuring sustainability over time, and deliver a personal incentive or benefit. Food waste experts consistently emphasised that society rarely prioritises food waste until it directly affects individuals, despite most people expressing concern and good intentions regarding its reduction. This suggests that individuals are unlikely to invest effort unless there is a tangible benefit or no compromise to their wellbeing, efficiency, or convenience. Commonly reported reasons for household food waste include forgetfulness due to low prioritisation and busy lifestyles, lack of time and motivation, poor organisation and planning, improper storage, misunderstandings or lack of knowledge, and habitual behaviours.

Overall, the collected data identifies household food waste as the most urgent issue, with a particular focus on younger populations aged 18 to 34. The findings emphasise that the most effective strategies to address this problem should prioritise measurable effectiveness in reducing food waste, convenience, and direct personal incentives or benefits.

Design implications

As determined in the discussion, the most crucial factors to consider and implicate into a successful design are the following three;

- Effective in reducing food waste
- Provides a convenient, low-maintenance, low effort therefore consistent and sustainable long-term solution
- Provides a personal level incentive or benefit

The design will be created for end-consumers of food on a household level mainly targeting people aged 18 to 34 due to this age group statistically contributing the most to food waste. Primary research reports also indicate this due to the nature of their generational mindset, habits, income levels, norms and others.

Criteria

MUST

- Be effective in reducing food waste (measurable numbers)
- Be convenient and align with the target age group's very busy and demanding lifestyle and schedules, whether they are academic or professional commitments
- Require low effort and maintenance
- Lead to direct incentive or reward system for user (by reducing food waste for example, saving money, or encouraging household convenience or organisation)
- Be appropriate and suitable for the target age group, ergonomic, trend and convenience-wise

SHOULD

- encourage positive mindsets or positive education input
- encourage appreciation in food
- reduce stigma in practicing food saving
- Reduce food wasting behaviour or habits

MUST/SHOULD NOT

- Reinforce the mindset of food abundance and lack of appreciation

Conclusion

Food waste has been a global issue for as long as food has been produced and consumed, and it continues to worsen as populations rise and the planet faces increasing environmental strain. Currently, one-fifth of all food produced for human consumption is wasted, equivalent to one billion meals per day, generating up to 10 percent of global greenhouse gas emissions. This problem has significant environmental, economic, and social consequences, occurring at every stage of the food cycle—from agriculture and production to processing, retail, and consumption. Despite numerous campaigns and initiatives, household food waste remains the largest contributor, accounting for around 60 percent of total waste worldwide. This not only places pressure on natural resources and landfill but also costs households financially.

This research has shown that although individuals express strong intentions to reduce food waste, many struggle with practical barriers such as time constraints, forgetfulness, poor organisation, and the short shelf life of perishable foods. Financial considerations emerged as the strongest motivator for change, while cultural attitudes and lifestyle pressures also shaped household behaviours. These findings emphasise the importance of design in addressing food waste at the household level. Effective solutions must combine convenience and practicality with meaningful waste reduction, while also ensuring long-term user engagement, which the benchmarking section has clearly identified as gap in currently existing tactics and initiatives.

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