# Investigating Consumer Practices and Challenges related to Metal Packaging Recycling in South Africa

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# 1 Executive Summary

**Overview of the Survey Objectives**

This report presents the findings of a survey conducted to assess consumer awareness, attitudes, and behaviours regarding metal packaging recycling in South Africa. The survey was commissioned by **MetPac-SA**, a **Producer Responsibility Organisation (EPR Registration Number: 19/7/5/P/PRO/20210720/005)**, with the primary goal of gathering insights to inform strategies that will improve the recovery and recycling of post-consumer metal packaging.

The research focused on key areas, including:

- The extent of public awareness regarding the environmental impact of metal packaging waste.

- Recycling practices and household waste management habits.

- Barriers to recycling and accessibility of recycling facilities.

- The role of waste pickers and formalised recycling infrastructure.

**Key Findings and Insights**

- **Awareness Gaps**: While a majority of respondents acknowledge the environmental impact of packaging waste, a significant portion lacks knowledge about community-based recycling programmes.

- **Household Recycling Behaviour**: Many participants indicate a willingness to recycle more frequently if collection and separation systems were more convenient.

- **Infrastructure Challenges**: Limited access to recycling centres and municipal support for waste separation were reported as key obstacles.

- **Role of Waste Pickers**: Waste pickers play a crucial role in recycling efforts, yet they often lack formal recognition, protective equipment, and necessary tools.

**Recommendations Based on Survey Results**

- **Expand Awareness Campaigns**: Increase education on proper disposal and recycling procedures through targeted outreach.

- **Enhance Recycling Accessibility**: Improve the availability of waste collection points and introduce incentive-based recycling schemes.

- **Support Waste Pickers**: Formalise and equip waste pickers with resources and training to enhance their efficiency and safety.

- **Strengthen Municipal Engagement**: Advocate for policy improvements that mandate structured household waste separation and collection.

## 2   Introduction

**Background of the Study**

South Africa generates significant amounts of metal packaging waste, which, if not properly managed, contributes to environmental pollution. **MetPac-SA**, as a dedicated organisation for promoting responsible waste management, recognises the urgent need to strengthen recycling initiatives and integrate communities into a more sustainable circular economy. The effectiveness of such initiatives depends largely on public participation, which is influenced by awareness, accessibility, and perceived benefits of recycling.

To bridge these gaps, this study aimed to assess **public attitudes and practices regarding metal packaging recycling**. By understanding existing barriers and motivations, the findings will support the development of **policy recommendations and targeted interventions** to enhance waste recovery efforts.

**Purpose and Objectives of the Survey**

The primary objective of the survey was to gather empirical data on consumer recycling behaviours and identify opportunities to improve the collection, sorting, and reuse of metal packaging materials. The specific objectives included:

1. **Assessing Awareness Levels** – Evaluating the extent to which people understand the impact of metal packaging waste and available recycling programmes.

2. **Identifying Recycling Habits** – Understanding household recycling practices, including separation and disposal methods.

3. **Exploring Barriers to Recycling** – Investigating the challenges that hinder effective recycling, such as lack of infrastructure, knowledge, or incentives.

4. **Evaluating Waste Management Systems** – Assessing the accessibility of municipal and private recycling facilities.

5. **Understanding the Role of Waste Pickers** – Analysing how informal waste collectors contribute to the recycling economy and what support they require.

**Scope and Limitations of the Study**

- **Scope**:

  o The survey targeted **households across multiple provinces in South Africa**, covering various demographic groups.

  o It focused on **metal packaging waste**, including **aerosol cans, food cans, paint cans, polish cans, soft drink cans, and beer cans**.

  o Responses were collected on aspects such as **awareness, waste disposal habits, and perceptions of waste pickers**.

- **Limitations**:

    - The survey relied on **self-reported data**, which may be subject to biases in responses.

    - Geographic representation was **not equal across all provinces**, potentially skewing the results.

    - The survey **did not measure actual recycling behaviour**, only respondents' stated habits and attitudes.

# 3   Methodology

**Description of the Survey Design**

The study adopted a **quantitative survey approach** using structured questionnaires to collect data from a diverse sample of participants. The questionnaire consisted of **two sections**:

- **Section A**: Captured demographic information, including **age, gender, race, province, type of dwelling, and estimated quantity of cans disposed of per month**.

- **Section B**: Comprised **26 Likert-scale questions** designed to assess awareness, recycling habits, barriers, and attitudes towards waste management.

**Sampling Method and Participant Demographics**

A **non-probability convenience sampling method** was used, where respondents voluntarily completed the questionnaire. The sample included individuals from different backgrounds to reflect a broad representation of South African households.

**Key Demographic Breakdown**

- **Gender**: Male and female participants were included to compare gender-based recycling habits.

- **Age Groups**: Participants ranged from **15 years to 50+ years**, allowing for a generational comparison of attitudes.

- **Race and Location**: The study included respondents from **diverse racial groups and provinces**, enabling regional and cultural analysis of recycling behaviour.

- **Dwelling Type**: Responses were categorised by **housing type (informal settlement, house, flat, etc.)** to examine whether living conditions influenced recycling accessibility.

**Data Collection Process**

- **Survey Distribution**: The questionnaire was administered through **both online and face-to-face interactions** to maximise participation.

- **Confidentiality**: Responses were collected anonymously to ensure **honest and unbiased participation**.

- **Data Entry and Cleaning**: Completed surveys were compiled into a **database**, where responses were checked for consistency and missing values were handled appropriately.

**Analysis Techniques Used**

The collected data were **statistically analysed** to identify trends and correlations. The analysis methods included:

- **Descriptive Statistics**: Used to determine **mean scores, frequency distributions, and percentages** for key questions.

- **Cross-Tabulation Analysis**: Examined relationships between **demographics and recycling behaviours** (e.g., how age influences awareness).

- **Likert Scale Analysis**: Mean and standard deviation scores were computed to assess general trends in respondents' attitudes.

# 4 Research Problem, Aims, Objectives and Questions

o **Research Problem Statement**

The Department of Forestry, Fisheries, and the Environment (DFFE) has set various goals for post-consumer metal packaging recovery. However, the extent of unaccounted post-consumer metal packaging remains unreported.

o **Aim (Purpose of the research)**

The aim of this research study is to investigate and understand post-consumer metal packaging waste.

o **Objectives**

1. To assess consumer awareness, attitudes, and knowledge regarding the recycling of post-consumer metal packaging..

2. To investigate consumer engagement with household waste management practices, focusing on local collection systems and disposal methods.

3. To analyse key operational aspects of waste management, particularly in relation to recycling centres, waste pickers, and the availability of waste management equipment.

4. To develop a strategy to enhance post -consumer metal packaging recovery

o **Research Questions**

1. What is the level of awareness, attitude, and knowledge among consumers regarding the recycling of post-consumer metal packaging?"

2. How do consumers engage with household waste management practices, including local collection systems and disposal methods?

3. What are the key operational aspects of waste management, with a focus on recycling centres, waste pickers, and the availability of equipment?

# 5   Participant Demographics

**Gender Distribution**

The survey comprised 1,023 participants, with a slightly higher representation of females (54.1%) compared to males (45.9%). This distribution highlights a balanced participation rate across genders, providing a comprehensive perspective on metal packaging recycling habits.

**Age Groups**

Participants were categorised into five age groups:

- The majority (40.0%) of participants fell within the 20–29 years age group, followed by 22.7% in the 30–39 years category.

- The older age groups, 40–49 years and ≥50 years, represented 15.1% and 14.9% of respondents, respectively.

- Younger participants aged 15–19 years constituted the smallest group, at 7.4%.
  This age distribution indicates that the survey effectively captured insights from a broad spectrum of age categories, with a significant focus on younger and middle-aged individuals.

**Racial Demographics**

The racial distribution of respondents was as follows:

- African participants accounted for the majority (69.0%), followed by Coloured respondents (16.9%).

- Indian and White participants represented 6.2% and 7.0%, respectively.

- A small percentage (0.9%) of respondents identified as "Other."
  This demographic breakdown ensures that the survey reflects the diverse racial composition of South Africa.

**Provincial Representation**

The majority of respondents (42.8%) were from KwaZulu-Natal, followed by Gauteng (21.0%) and Western Cape (20.7%).

- Eastern Cape accounted for 14.3% of the sample, while Limpopo, Mpumalanga, North West, and Free State collectively represented a marginal 1.2% of participants.

- A small fraction (1.2%) of participants came from other provinces.
  This distribution suggests that the survey concentrated primarily on the most populous and industrially significant provinces.

**Types of Dwellings**

The majority of participants (74.7%) reported living in houses, followed by 11.3% residing in flats.

- Participants from informal settlements accounted for 9.8% of the sample, while 4.2% resided in other types of dwellings.
  When grouped into broader categories, 90.2% of respondents lived in formal dwellings, with the remaining 9.8% in informal settings.
  This data indicates that a substantial portion of the survey respondents had access to structured housing, which may influence their waste management practices.

**Monthly metal packaging disposal patterns**

**Overall Central Measures Patterns**

The survey revealed general patterns of awareness, attitudes, and practices regarding recycling, particularly metal packaging. Key trends include:

- **Awareness Levels**: Most respondents demonstrated a high level of awareness regarding the environmental benefits of recycling and the importance of recycling metal packaging. However, gaps remain in knowledge about specific recycling programmes and disposal sites within their communities.

- **Recycling Practices**: A significant proportion of participants expressed willingness to recycle more if access to recycling facilities were improved. Despite this, many rely on informal waste disposal methods due to limited infrastructure or lack of municipal support.

- **Waste Picker Contribution**: Respondents generally recognise the role of waste pickers in recycling but note the lack of formal support and equipment for these individuals.

- **Barriers to Recycling**: Key barriers include inadequate access to recycling centres, insufficient awareness campaigns, and lack of formalised municipal recycling programmes.

**Quantity of cans disposed per month**

The data provided represents the central values and measures of variations of different types of metal cans disposed of per month, as collected in the **MetPac-SA survey**.

| | Mean | Standard Deviation | Median | Minimum | Maximum | Range |
|---|---|---|---|---|---|---|
| Aerosol cans | 3.45 | 4.54 | 2.00 | 1.00 | 50.00 | 49.00 |
| Food Cans | 10.41 | 19.74 | 6.00 | 1.00 | 300.00 | 299.00 |
| Paint Cans | 2.94 | 8.35 | 1.00 | 1.00 | 80.00 | 79.00 |
| Polish Cans | 2.49 | 4.82 | 1.00 | 1.00 | 55.00 | 54.00 |
| Soft Drink Cans | 12.54 | 26.28 | 6.00 | 1.00 | 400.00 | 399.00 |
| Beer Cans | 17.15 | 22.68 | 10.00 | 1.00 | 150.00 | 149.00 |

\* zero counts were omitted

**Analysis of table results**

1. **Aerosol Cans**

   o On average, households dispose of approximately 3 to 4 aerosol cans per month.

   o The standard deviation (4.54) indicates moderate variability, meaning that while most participants dispose of around this amount, some dispose of significantly more or fewer.

   o The median (2.00) suggests that at least half of the participants dispose of two or fewer aerosol cans per month.

   o A maximum disposal rate of 50 and a range of 49 indicate that some households discard significantly larger amounts, possibly due to bulk purchases or industrial use.

2. **Food Cans**

   o The mean (10.41) suggests that food cans are among the most frequently disposed of metal packaging types.

   o However, the high standard deviation (19.74) highlights significant variability, meaning that while some dispose of only a few, others discard substantially more.

   o The median (6.00) suggests that half of the households dispose of 6 or fewer food cans per month.

   o The maximum (300) and range (299) imply extreme cases where certain households discard hundreds of food cans, possibly due to bulk food purchases or commercial food processing.

3. **Paint Cans**

   o The low mean (2.94) suggests that paint cans are rarely discarded on a monthly basis.

   o A relatively high standard deviation (8.35) indicates that some households dispose of significantly more, likely due to home renovations or large-scale painting projects.

   o The median (1.00) suggests that most households dispose of very few, if any, paint cans regularly.

- o The maximum (80) and range (79) confirm that while infrequent for most, some households discard a substantial number due to specific needs.

4. **Polish Cans**

   - o With a mean of 2.49, polish cans are infrequently discarded, though slightly more than paint cans.

   - o The standard deviation (4.82) shows moderate variability, meaning some households dispose of many more than others.

   - o The median (1.00) suggests that most households dispose of very few polish cans regularly.

   - o The maximum (55) and range (54) indicate that while uncommon, some households discard large amounts.

5. **Soft Drink Cans**

   - o The mean (12.54) suggests that soft drink cans are a significant contributor to metal waste disposal.

   - o The very high standard deviation (26.28) indicates extreme variation, suggesting that while some households do not consume soft drinks at all, others discard hundreds of cans per month.

   - o The median (6.00) suggests that half of households dispose of 6 or fewer soft drink cans per month.

   - o The maximum (400) and range (399) confirm that soft drink consumption varies drastically, with some households disposing of exceptionally high amounts.

6. **Beer Cans**

   - o The highest mean (17.15) among all categories suggests that beer cans contribute the most to metal waste disposal.

   - o A high standard deviation (22.68) implies extreme variability, meaning that while some households discard very few beer cans, others dispose of large quantities.

- The median (10.00) suggests that at least half of households dispose of 10 or fewer beer cans per month.

- The maximum (150) and range (149) show that some households dispose of very high numbers, likely influenced by social gatherings, parties, or regular beer consumption.

**Key Observations**

- Soft drink and food cans remain the most commonly disposed of metal packaging types, suggesting that everyday consumption habits contribute significantly to metal waste.

- Beer cans have the highest mean disposal rate, but also show the highest variability, highlighting that while some households do not dispose of beer cans at all, others discard very high numbers.

- Paint and polish cans have low mean values, indicating infrequent disposal, likely due to longer product life cycles.

- The high standard deviations across all categories, particularly for beer and soft drink cans, indicate substantial disparities in disposal habits among different households.

- The extreme values (e.g., 400 soft drink cans, 300 food cans) suggest that certain households discard significantly higher amounts, possibly due to commercial or bulk consumption.

**Implications**

The disposal data provides valuable insights into South African metal packaging waste patterns. The significant variability suggests that targeted recycling initiatives could improve waste recovery, particularly for high-volume waste types like beer cans, soft drink cans, and food cans. Expanding recycling accessibility and awareness campaigns could help optimise waste management strategies and increase metal recycling rates.

**Biographical Influences on Central Measures**

The patterns described below refer to the tables in the Appendix relating to the effects of the biographical factors on the central values:

**Analysis of Metal Can Disposal by Demographic and Socioeconomic Factors**

**1. Gender-Based Trends**

- **Beer Cans:** Males dispose of beer cans at a higher mean (19.12) than females (14.88), with greater variability (SD = 25.55 vs 18.62), suggesting that men consume more beer or have more fluctuating consumption habits.

- **Food Cans and Soft Drink Cans:** Males also dispose of more food cans (mean = 10.81 vs 10.08) and soft drink cans (mean = 13.60 vs 11.62) than females. This may be due to different dietary habits or purchasing behaviours.

- **Paint and Polish Cans:** Females dispose of more paint cans (3.18 vs 2.69), possibly linked to home maintenance and DIY activities. Meanwhile, males discard more polish cans (2.55 vs 2.43), though the difference is minimal.

- **Aerosol Cans:** No significant difference between genders, suggesting similar usage of aerosol-based products such as sprays and deodorants.

**2. Age-Based Trends**

- **Beer Can Disposal:**

  - Older individuals (40–49 years and 30–39 years) dispose of the most beer cans (20.00 and 19.75, respectively), indicating a higher likelihood of beer consumption in these age groups.

  - Younger individuals (15–19 years and 20–29 years) show lower mean disposal rates (15.49 and 15.30), but still notable variability, possibly due to social drinking habits.

- **Food Can Disposal:**

  - The 40–49 age group discards the most food cans (mean = 13.19), with high variability (SD = 33.12), suggesting large household sizes or bulk purchasing.

o The ≥50 age group also shows moderately high disposal (mean = 11.28), possibly reflecting longer shelf-life preferences in older households.

- **Soft Drink Can Disposal:**

  o 40–49-year-olds discard the most (mean = 16.50), with extreme variability (SD = 40.08), indicating a mix of high and low soft drink consumers.

  o Younger groups (15–19 years) also have high soft drink disposal rates (14.09, SD = 48.26), possibly due to greater consumption of carbonated beverages.

- **Paint and Polish Cans:**

  o The 20–29 and ≥50 groups dispose of more paint cans (4.16 and 3.30, respectively), possibly due to DIY and home improvement activities.

  o The 40–49 group disposes of more polish cans (2.89), likely tied to higher cleaning or furniture care routines.

## 3. Race-Based Trends

- **Beer Cans:**

  o Indian and "Other" race groups dispose of the most beer cans (21.39 and 31.00, respectively).

  o African respondents (mean = 17.93) show high variability (SD = 25.43), reflecting diverse drinking habits and social consumption.

  o White respondents dispose of fewer beer cans (15.69), with lower variability, suggesting more stable consumption habits.

- **Food Cans:**

  o The "Other" group has exceptionally high disposal rates (mean = 25.60, SD = 26.40), suggesting higher canned food consumption.

  o African respondents (mean = 11.05) dispose of the most food cans compared to other racial groups.

- **Soft Drink Cans:**

  - "Other" race group (mean = 45.60, SD = 73.62) has the highest disposal rate, suggesting high consumption patterns.

  - African respondents (mean = 13.17) also dispose of more than other groups, indicating wider adoption of soft drink consumption.

- **Aerosol, Paint, and Polish Cans:**

  - Indian respondents dispose of the most paint cans (mean = 6.13, SD = 19.71), possibly reflecting higher rates of home improvement projects.

  - Polish can disposal is highest among the "Other" group (5.40, SD = 5.77), suggesting different cultural cleaning habits.

## 4. Provincial Trends

- **Beer Cans:**

  - North West province has the highest mean disposal (82.50, SD = 31.82), indicating extreme beer consumption or social drinking habits.

  - KwaZulu-Natal (mean = 19.12) and Gauteng (mean = 19.38) also exhibit high beer can disposal, reinforcing urban drinking trends.

- **Food Cans:**

  - Limpopo (mean = 15.00) and Eastern Cape (mean = 12.09) have the highest food can disposal rates, potentially reflecting greater reliance on canned food in these areas.

- **Soft Drink Cans:**

  - KwaZulu-Natal (mean = 14.30, SD = 37.03) and North West (mean = 82.50, SD = 31.82) show the highest disposal rates, indicating high soft drink consumption patterns.

- **Aerosol Cans:**

  - o Eastern Cape (mean = 5.57, SD = 7.92) has the highest disposal rate, potentially linked to higher use of aerosol products.

## 5. Dwelling Type-Based Trends

- **Beer Cans:**

  - o "Other" dwelling types (mean = 49.41, SD = 59.77) have the highest beer can disposal rates, likely influenced by higher social drinking in shared living spaces or taverns.

  - o Flats (mean = 21.93, SD = 28.16) also show high beer can disposal, suggesting younger, urban demographics with high drinking frequency.

- **Food Cans:**

  - o Informal settlements (mean = 14.55, SD = 25.88) dispose of the most, highlighting higher reliance on canned foods due to economic constraints.

- **Soft Drink Cans:**

  - o "Other" dwelling types (mean = 45.60, SD = 73.62) dispose of the most, followed by informal settlements (mean = 13.47, SD = 24.65).

- **Paint and Polish Cans:**

  - o Informal settlements dispose of more paint cans (mean = 3.63) and polish cans (mean = 3.25), possibly reflecting less frequent but larger-scale maintenance efforts.

## Key Observations & Implications

1. Beer Cans Show the Highest Variability and Mean Disposal Rates

   - o Particularly among males, older age groups (30–49 years), informal settlements, and North West province.

   - o Recycling initiatives should target high-disposal groups to improve recovery efforts.

2. **Food and Soft Drink Cans Are Major Contributors to Waste**

    o   Higher disposal rates in informal settlements, African respondents, and younger individuals suggest economic and lifestyle influences.

    o   Recycling accessibility in these areas should be improved.

3. **Paint and Polish Cans Are Less Frequently Disposed**

    o   Their low mean values suggest longer product lifecycles but indicate potential for periodic collection programmes in urban areas.

4. **Geographical Differences Matter**

    o   North West and KwaZulu-Natal show extreme disposal rates for beer and soft drink cans, requiring stronger recycling infrastructure and awareness campaigns.

    o   Limpopo and Eastern Cape dispose of more food cans, suggesting a need for better food packaging waste management.

**Conclusion**

This analysis highlights critical gender, age, racial, and geographic disparities in metal can disposal. A data-driven approach to targeted recycling initiatives, focusing on high-volume waste areas such as beer, food, and soft drink cans, could significantly enhance metal waste recovery and sustainability efforts in South Africa.

## 6   Influence of Demographic Factors

**Gender**

- **Females** were slightly more represented (54.1%) in the survey and tended to exhibit stronger attitudes toward recycling, particularly in recognising its importance for sustainability.

- **Males** were equally willing to recycle but reported slightly lower participation rates, potentially influenced by logistical or cultural factors.

**Age Groups**

- **Younger Participants (15–29 years)** were more likely to express awareness of recycling programmes and showed greater enthusiasm for recycling. This group also highlighted the need for easier access to recycling facilities and campaigns targeted at their age group.

- **Middle-aged (30–49 years)** participants displayed more consistent recycling practices, reflecting established household habits and a practical understanding of waste management.

- **Older Participants (≥50 years)** often highlighted infrastructural barriers, with some relying on traditional waste disposal methods. Despite this, they expressed support for formalised recycling programmes.

**Racial Demographics**

- **African Respondents (69.0%)** demonstrated high awareness of recycling but reported limited access to structured recycling infrastructure. Many relied on informal waste collection systems or waste pickers.

- **Coloured (16.9%) and Indian (6.2%) Respondents** exhibited a mix of formal and informal recycling practices, with a preference for incentives to encourage participation.

- **White Respondents (7.0%)** were more likely to report structured recycling habits and participation in formal programmes.

- **Other (0.9%)** participants provided varied responses, often reflecting unique cultural or geographic contexts.

**Provincial Representation**

- **KwaZulu-Natal, Gauteng, and Western Cape** respondents, representing urban and industrialised areas, reported higher awareness and access to recycling facilities. However, infrastructure gaps were still cited, particularly in underprivileged communities.

- **Eastern Cape and Smaller Provinces** participants were more likely to highlight challenges related to limited recycling access, reflecting disparities in municipal service delivery.

**Type of Dwelling**

- **Formal Housing Residents (90.2%)** reported higher participation in recycling, benefiting from better infrastructure and waste collection systems.

- **Informal Settlement Residents (9.8%)** faced significant challenges due to a lack of facilities and inconsistent municipal waste services. This group relied heavily on informal waste pickers or dumpsites.

**Conclusion**

The demographic factors significantly influenced respondents' awareness, attitudes, and recycling practices. Urban and formally housed participants were more likely to engage in structured recycling, whereas those in informal settlements and rural areas faced infrastructural barriers. Age and gender also influenced attitudes and practices, with younger and female respondents often leading in recycling awareness and advocacy. Tailored strategies addressing these demographic disparities are crucial to improving overall recycling rates.

## 7   Awareness of Metal Packaging Recycling

**Introduction**

Awareness plays a pivotal role in fostering sustainable recycling behaviours, especially in the context of metal packaging. It influences individual attitudes, perceptions, and participation in recycling initiatives. The survey evaluated various dimensions of awareness, such as understanding the environmental impact of packaging waste, knowledge of recycling programmes, preferences for recyclable products, and the perceived importance of awareness campaigns. Analysing these factors helps identify critical gaps and opportunities to design targeted interventions that promote recycling practices.

**Statement Write-Up**

**1. Awareness of the Impact of Packaging Waste on the Environment**



I am aware of the impact on packaging waste on the environment
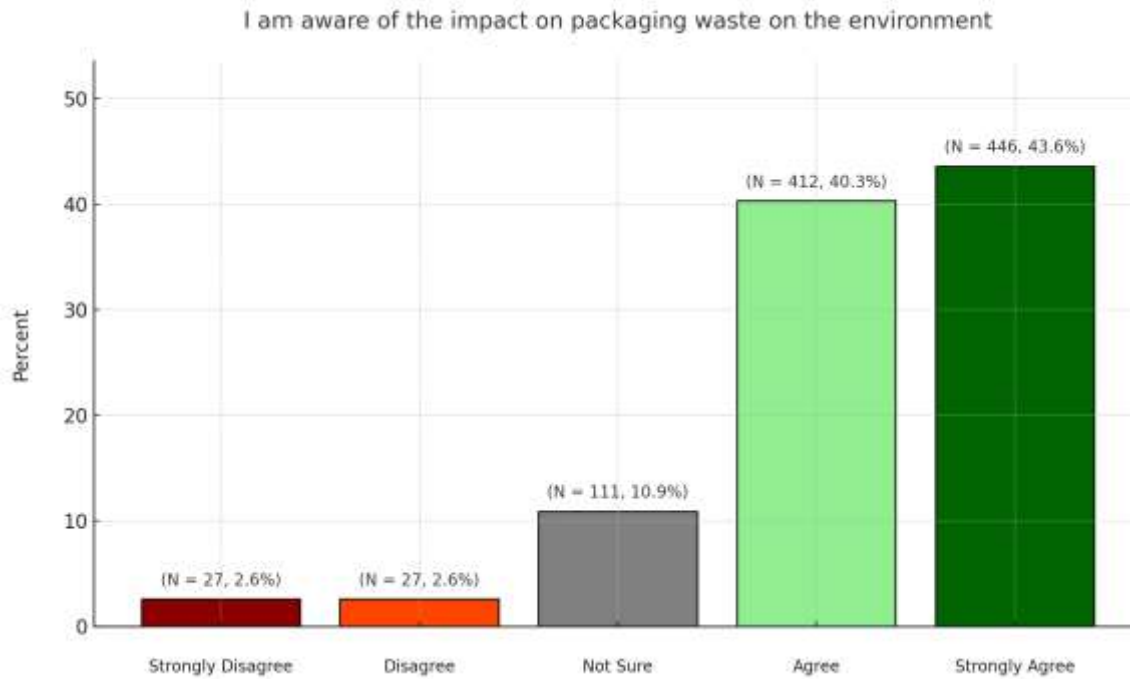
A majority of participants (84.0%, **N = 858**) agreed or strongly agreed that they were aware of the environmental impact of packaging waste. Notably, 43.6% (**N = 446**) strongly agreed, reflecting a high level of awareness among respondents. A small percentage (5.2%, **N = 54**) disagreed or strongly disagreed, while 10.9% (**N = 111**) were unsure. These results suggest that while awareness is generally high, some individuals remain uninformed, necessitating targeted educational efforts.

## 2. Awareness of the Environmental Benefits of Recycling

I am aware of the environmental benefits of recycling
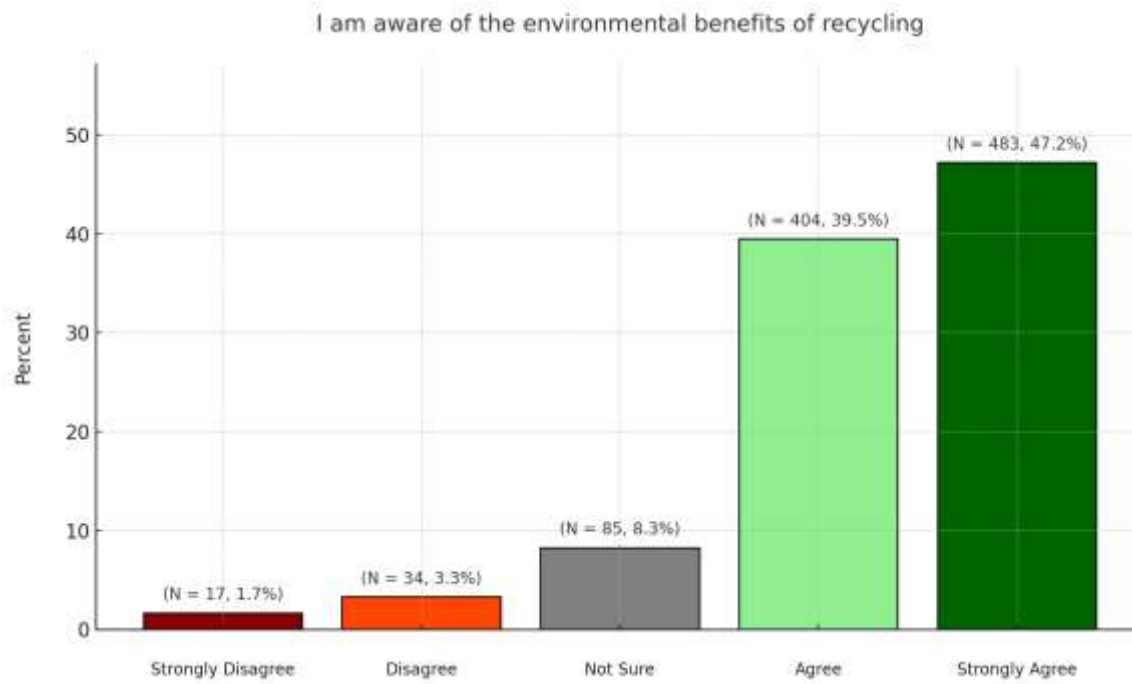


Most respondents (86.7%, **N = 887**) agreed or strongly agreed that they were aware of the environmental benefits of recycling, with 47.2% (**N = 483**) strongly agreeing. Only 5.0% (**N = 51**) disagreed or strongly disagreed, and 8.3% (**N = 85**) were unsure. These findings highlight a broad understanding of recycling's environmental benefits, though some gaps in knowledge persist.

## 3. Awareness of Recycling Programmes Specific to Metal Packaging

I am aware of recycling programs specific to metal packaging in my community
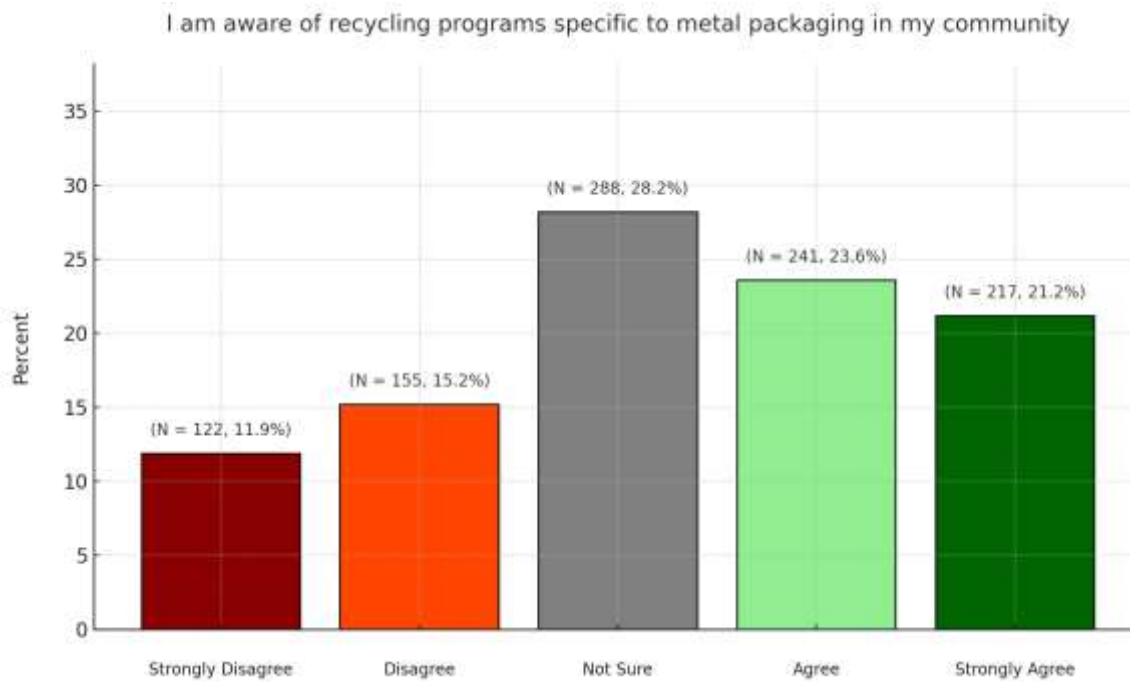


Awareness of community recycling programmes for metal packaging was notably lower compared to other awareness aspects. While 44.8% (**N = 458**) of respondents agreed or strongly agreed, a significant proportion (28.2%, **N = 288**) were unsure, and 27.1% (**N = 277**) disagreed or strongly disagreed. This indicates a substantial lack of knowledge about available programmes, underscoring the need for better communication and visibility of such initiatives.

**4. Belief in the Importance of Recycling Metal Packaging for Environmental Sustainability**



I believe recycling metal packaging is important for environmental sustainability
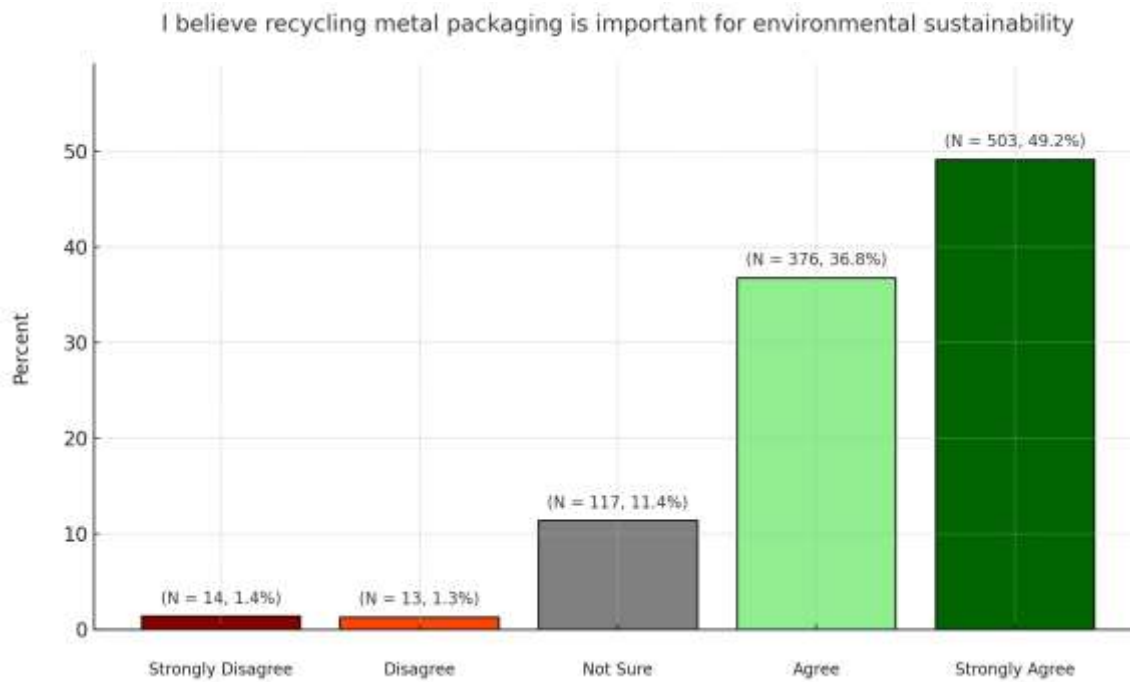
A strong consensus emerged regarding the importance of recycling metal packaging for sustainability, with 86.0% (**N = 879**) agreeing or strongly agreeing. Nearly half (49.2%, **N = 503**) of respondents strongly agreed, demonstrating a widespread recognition of recycling's value. Only 2.6% (**N = 27**) expressed disagreement, while 11.4% (**N = 117**) were unsure, suggesting a need for reinforcing the link between recycling and environmental impact for some participants.

**5. Knowledge of Where to Dispose of Metal Packaging Waste**



I know where to dispose of metal packaging waste for recycling
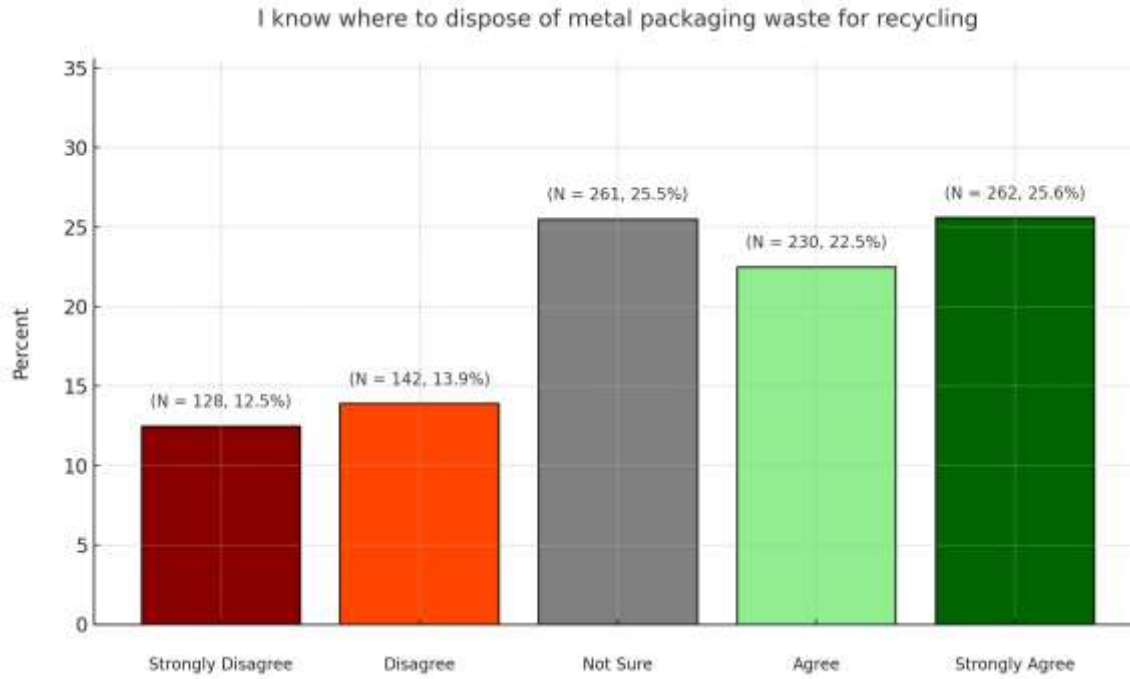
Responses revealed mixed levels of knowledge about disposal locations for metal packaging waste. While 48.1% (**N = 492**) agreed or strongly agreed, 25.5% (**N = 261**) were unsure, and a combined 26.4% (**N = 270**) disagreed or strongly disagreed. These results highlight a significant barrier to recycling, as many participants are unaware of disposal points, necessitating infrastructure improvements and better communication.

**6. Willingness to Recycle if Recycling Centres Were Easily Accessible**
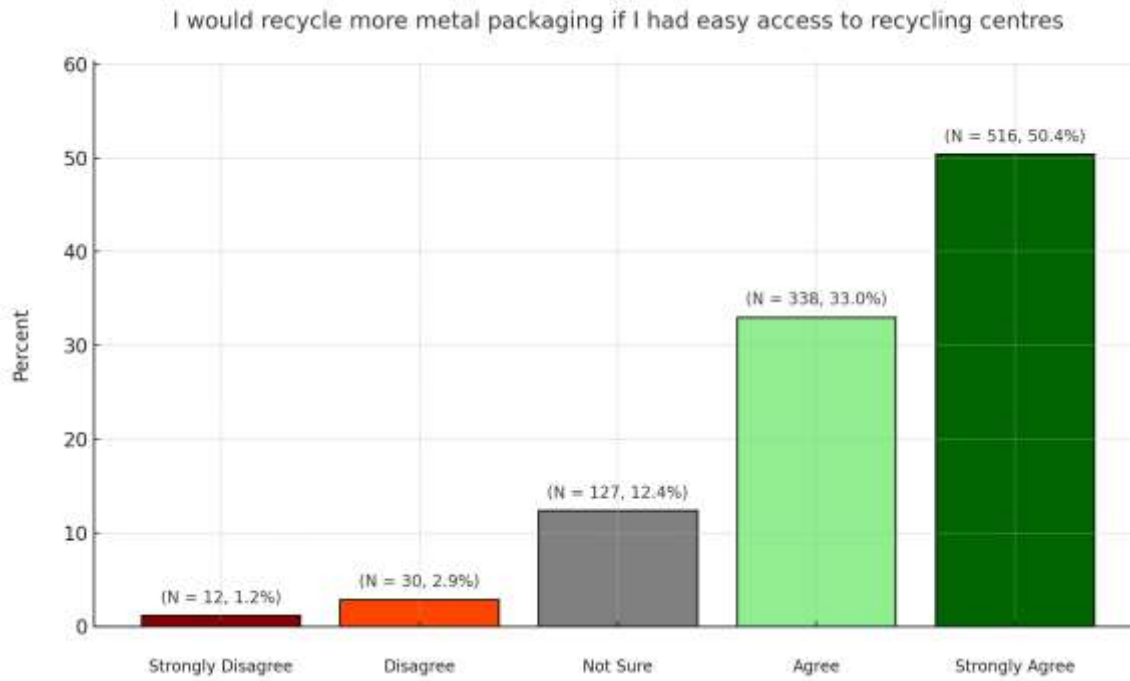


A strong majority (83.4%, **N = 854**) agreed or strongly agreed that they would recycle more if access to recycling centres were easier. Over half (50.4%, **N = 516**) strongly agreed, demonstrating a clear willingness to participate in recycling if logistical barriers are removed. Only a small fraction (4.1%, **N = 42**) disagreed or strongly disagreed, indicating that infrastructure improvements could significantly boost recycling rates.

**7. Awareness of Different Types of Metal Packaging That Can Be Recycled**

I am aware of the different types of metal packaging that can be recycled
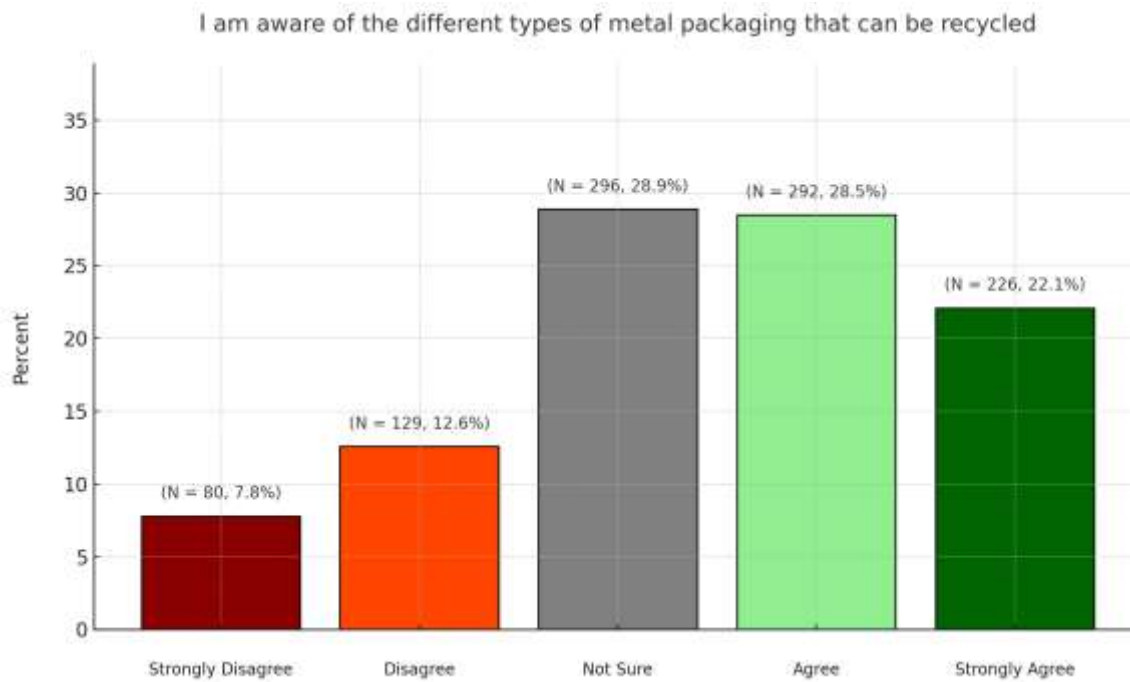


Responses to this question were varied, with 50.6% (**N = 518**) agreeing or strongly agreeing and 28.9% (**N = 296**) unsure. A notable proportion (20.4%, **N = 209**) disagreed or strongly disagreed, indicating limited awareness of recyclable metal packaging types. This highlights an opportunity for educational campaigns focusing on recyclable materials and sorting practices.

## 8. Preference for Purchasing Recyclable Packaging
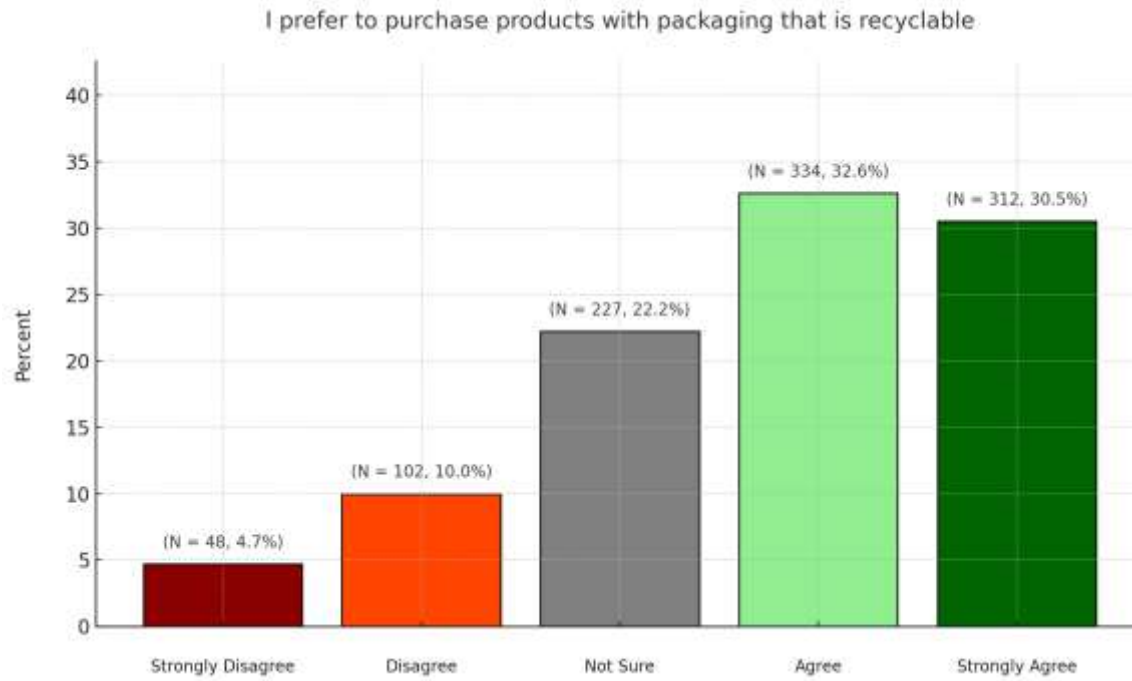


A significant majority (63.1%, **N = 646**) expressed a preference for products with recyclable packaging, with 30.5% (**N = 312**) strongly agreeing. However, 22.2% (**N = 227**) were unsure, and 14.7% (**N = 150**) disagreed or strongly disagreed. This suggests that while many consumers are inclined toward sustainable choices, a notable portion remains indifferent or unaware of the importance of recyclable packaging.

**9. Willingness to Recycle More if Steps and Processes Were Clear**

I would recycle more metal packaging if I knew the steps and processes involved
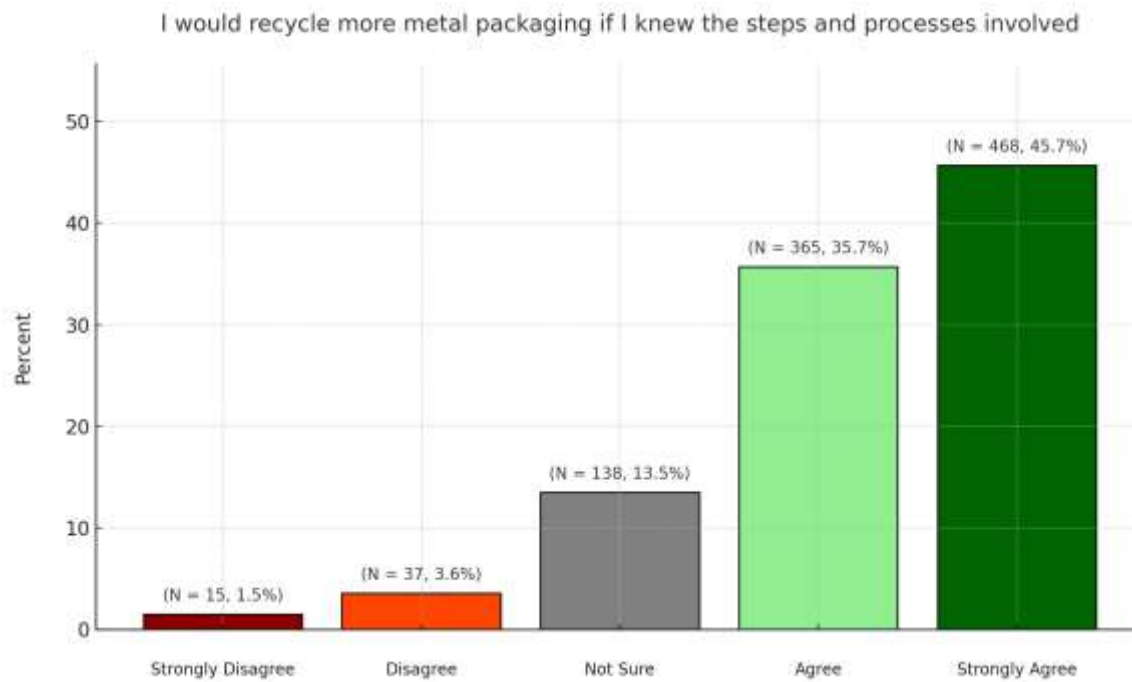


Most respondents (81.4%, **N = 833**) agreed or strongly agreed that they would recycle more if they understood the steps and processes involved, with 45.7% (**N = 468**) strongly agreeing. Only a small proportion (5.1%, **N = 52**) disagreed or strongly disagreed, while 13.5% (**N = 138**) were unsure. These findings underscore the importance of simplifying and communicating the recycling process to encourage broader participation.

**10. Perceived Need for More Awareness Campaigns**

I think more awareness campaigns are needed to encourage metal packaging recycling
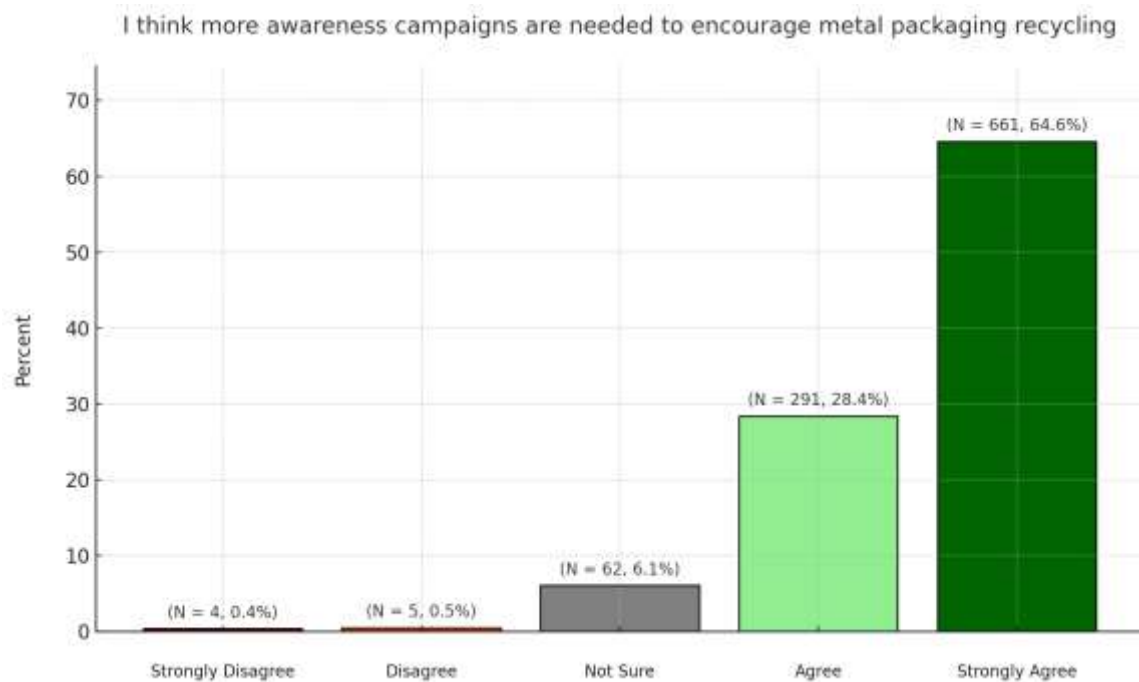


The strongest consensus emerged for this statement, with 93.0% (**N = 952**) of respondents agreeing or strongly agreeing that more awareness campaigns are needed to encourage metal packaging recycling. A significant majority (64.6%, **N = 661**) strongly agreed, reflecting a clear demand for enhanced outreach efforts. Only 0.9% (**N = 9**) disagreed or strongly disagreed, indicating near-universal recognition of the need for awareness initiatives.

**Concluding Comments**

The survey findings indicate generally high levels of awareness regarding the environmental impact of packaging waste, the benefits of recycling, and the importance of recycling for sustainability. However, significant gaps persist in knowledge about specific recycling programmes, disposal locations, and the types of metal packaging that can be recycled. While respondents express a strong willingness to recycle more if access to facilities and information were improved, these logistical and informational barriers remain key challenges. The overwhelming support for increased awareness campaigns underscores the critical need for targeted educational efforts to bridge these gaps. By addressing these disparities, particularly among those

uncertain or unaware, recycling behaviours can be significantly enhanced, contributing to broader environmental sustainability goals.

# 8   Household Waste Management

**Introduction**

Effective household waste management plays a critical role in fostering sustainable recycling behaviours. This section examines the availability of waste collection systems, separation practices, and disposal methods reported by survey participants. The findings provide insight into the current state of waste management infrastructure and individual habits, highlighting key areas for improvement and intervention.

**Statement Write-Up**

## 1. There is a Municipality Collection System in My Area

There is a municipality collection system in my area
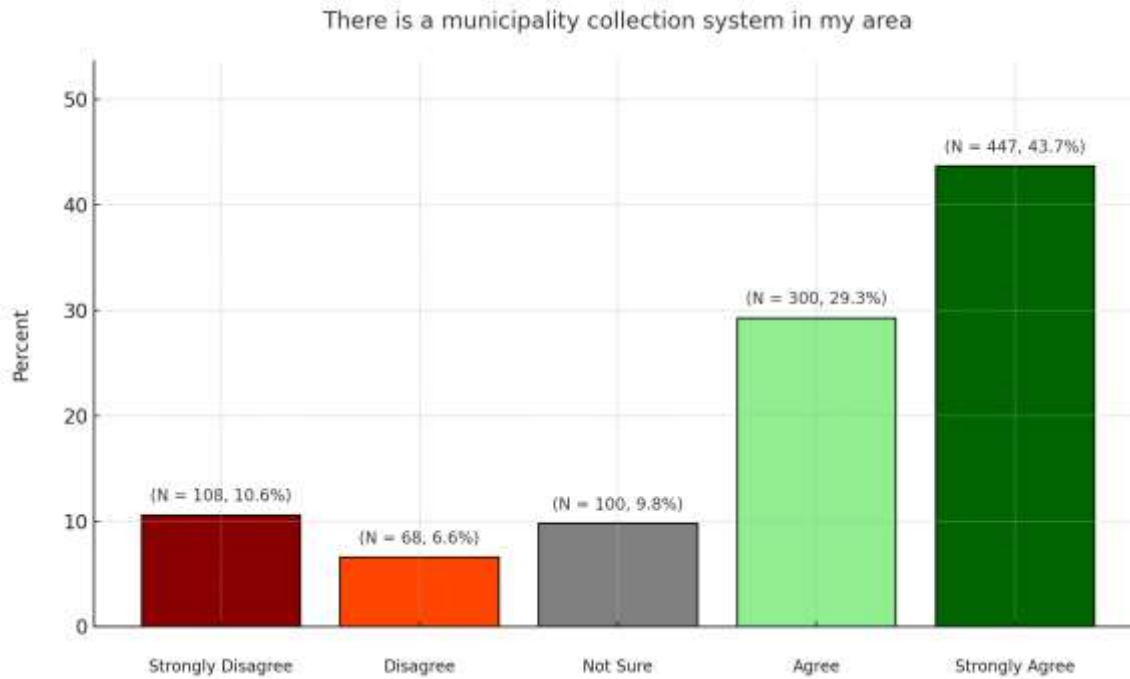


A majority of participants (73.0%, **N = 747**) agreed or strongly agreed that there is a municipality collection system in their area. Of these, 43.7% (**N = 447**) strongly agreed, indicating broad access to municipal services. However, 17.2% (**N = 176**) disagreed or strongly disagreed, while 9.8% (**N = 100**) were unsure. These findings suggest that while most respondents benefit from municipal collection, service gaps persist in certain areas.

**2. There is a Multiple Bag Separation System in My Area**



There is multiple bag separation system in my area
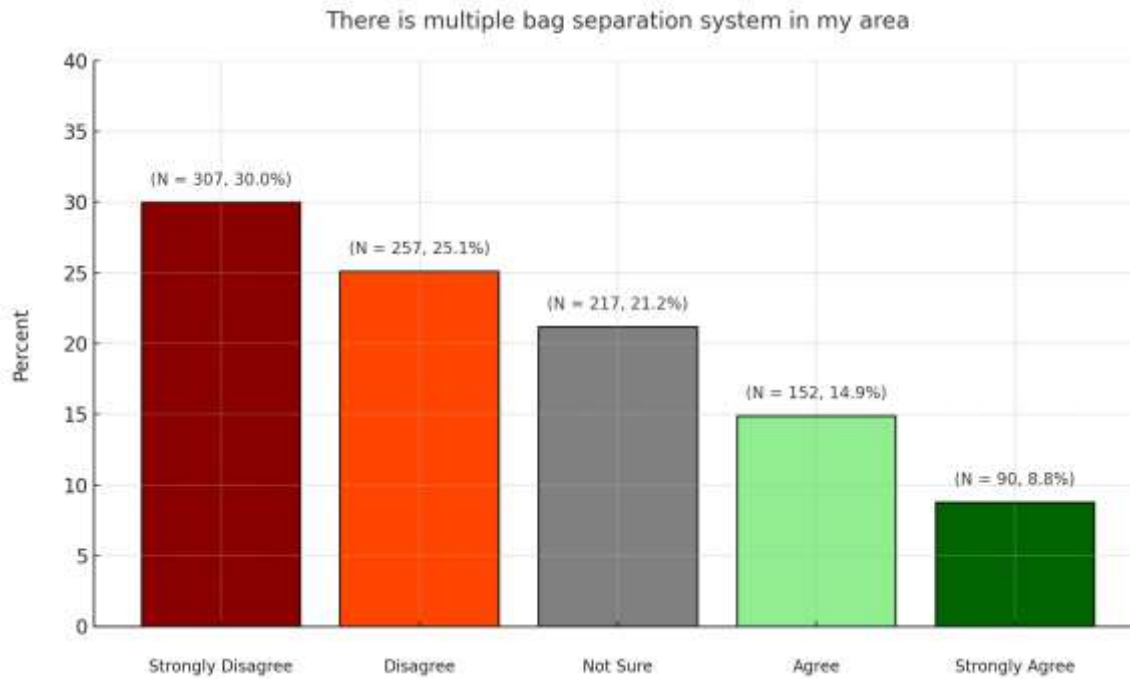
A significant portion of participants (55.1%, **N = 564**) disagreed or strongly disagreed with the availability of a multiple bag separation system in their area. Only 23.7% (**N = 242**) agreed or strongly agreed, while 21.2% (**N = 217**) were unsure. This indicates that waste separation systems are not widely implemented, limiting the potential for effective recycling at the household level.

## 3. I Separate My Household Packaging Waste



I separate my household packaging waste
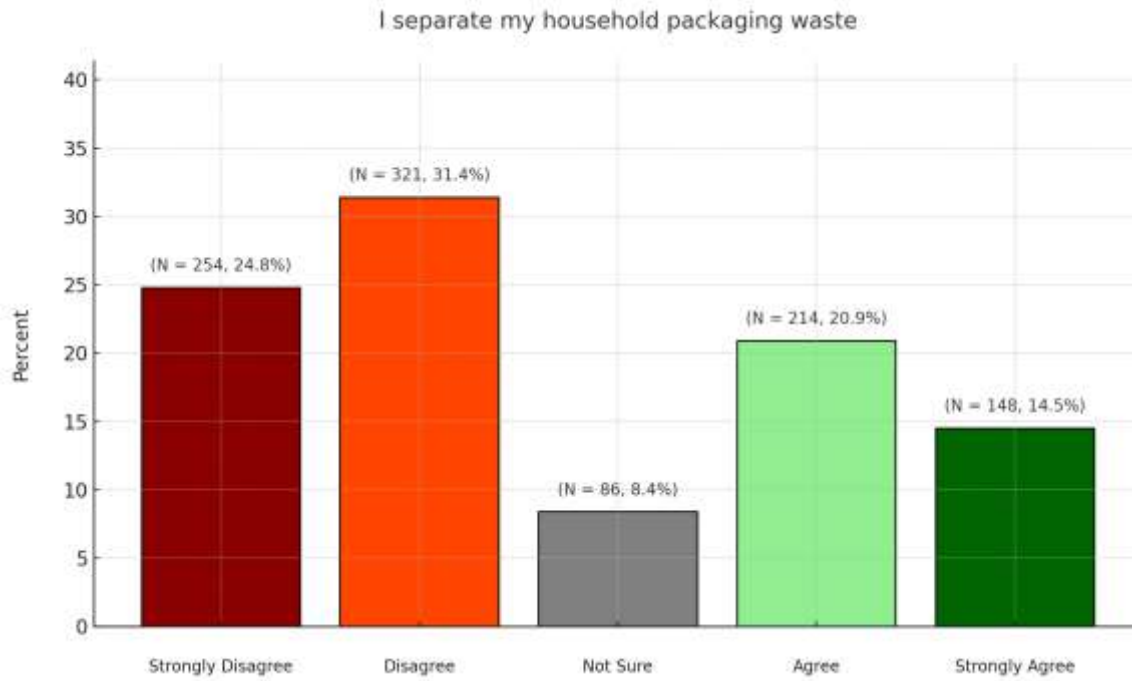
Less than half of the participants (35.4%, **N = 362**) agreed or strongly agreed that they separate their household packaging waste. A substantial proportion (56.2%, **N = 575**) disagreed or strongly disagreed, and 8.4% (**N = 86**) were unsure. These results highlight the need for educational campaigns and support systems to encourage waste separation practices.

**4. I Am Supplied with Sufficient Waste Bags**
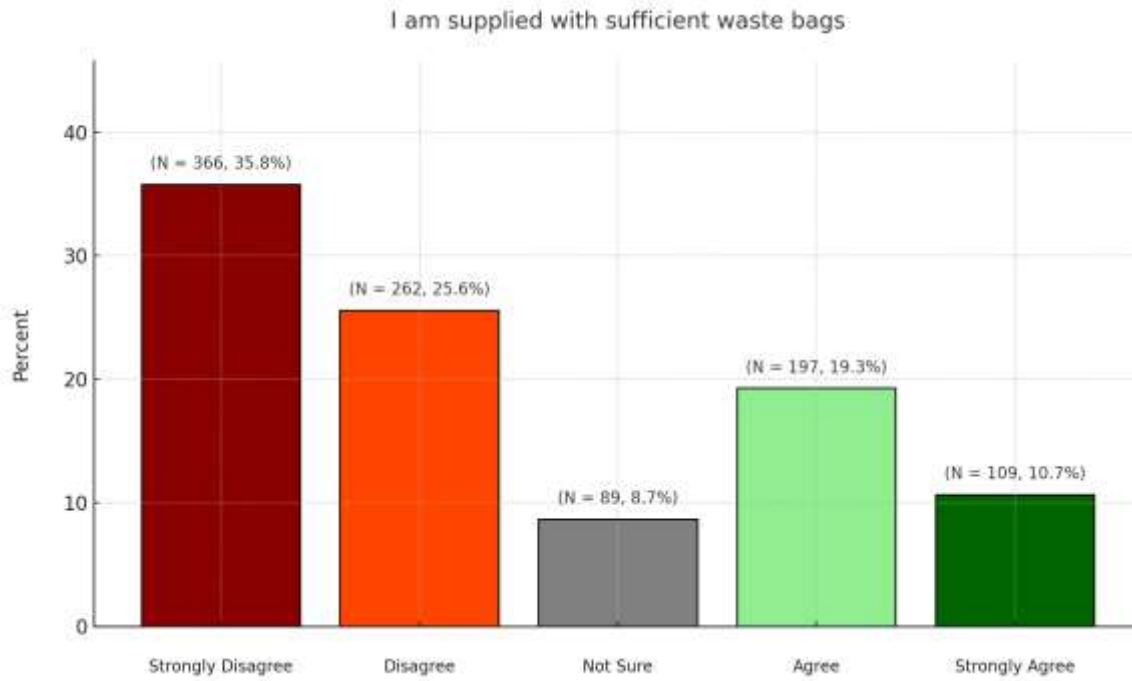


A majority of respondents (61.4%, **N = 628**) disagreed or strongly disagreed that they are supplied with sufficient waste bags. Only 30.0% (**N = 306**) agreed or strongly agreed, while 8.7% (**N = 89**) were unsure. These findings suggest a significant shortfall in the provision of resources necessary for effective household waste management.

**5. My Household Waste Is Collected Weekly**
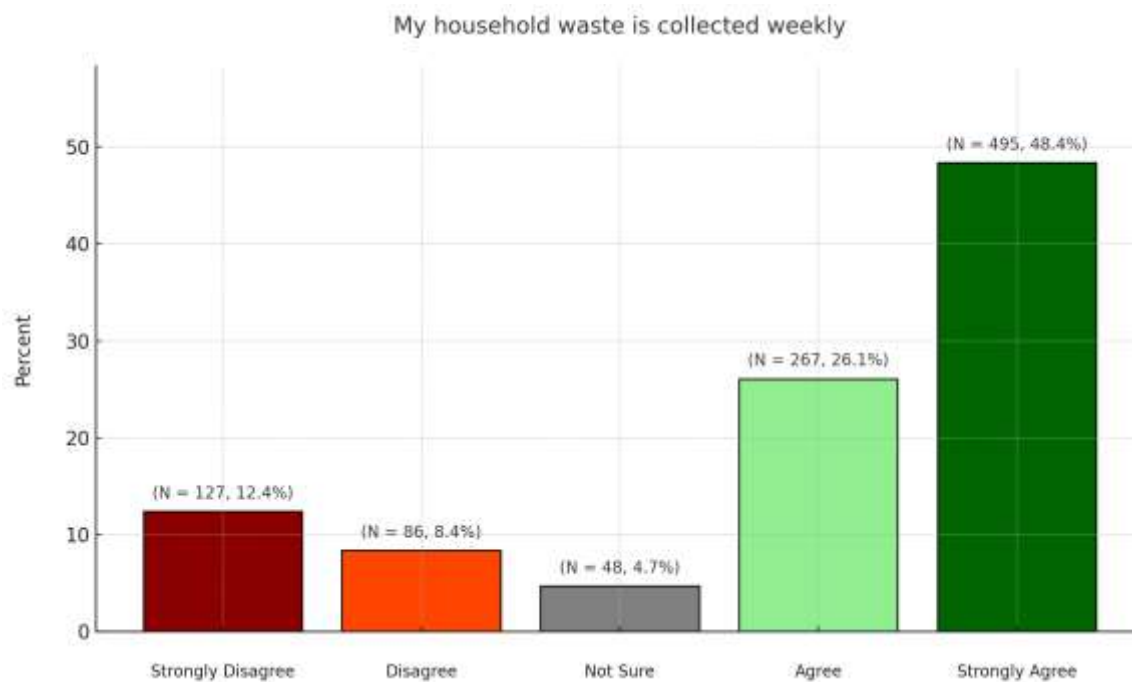


Most participants (74.5%, **N = 762**) agreed or strongly agreed that their household waste is collected weekly, with 48.4% (**N = 495**) strongly agreeing. A smaller proportion (20.8%, **N = 213**) disagreed or strongly disagreed, and 4.7% (**N = 48**) were unsure. This indicates that weekly collection is widely available, though not universally consistent.

**6. I Deliver My Packaging Waste to a Recycling Centre**



A majority of respondents (79.1%, **N = 809**) disagreed or strongly disagreed that they deliver their packaging waste to a recycling centre. Only 15.8% (**N = 162**) agreed or strongly agreed, while 5.1% (**N = 52**) were unsure. These results suggest logistical or infrastructural barriers to delivering waste for recycling.

## 7. I Dispose of My Packaging Waste in a Local Dumpsite



I dispose of my packaging waste in a local dumpsite
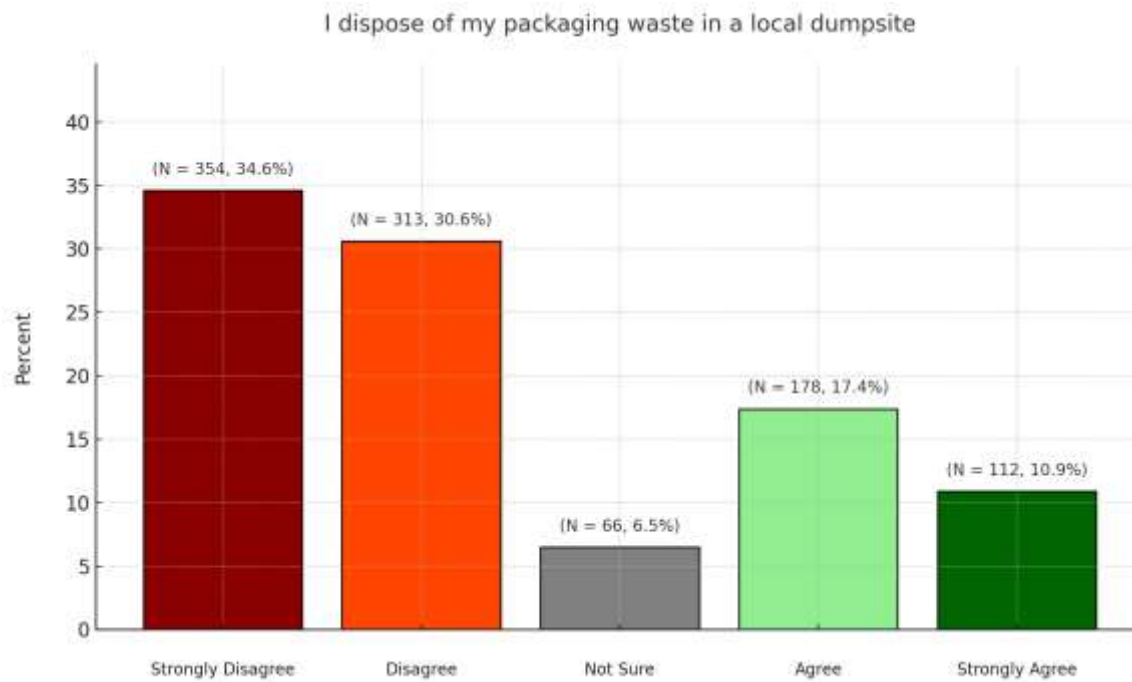
Most participants (65.2%, **N = 667**) disagreed or strongly disagreed that they dispose of packaging waste in a local dumpsite. However, a notable 28.3% (**N = 290**) agreed or strongly agreed, indicating a reliance on informal disposal methods for a significant minority. Additionally, 6.5% (**N = 66**) were unsure.

## 8. I Burn My Packaging Waste
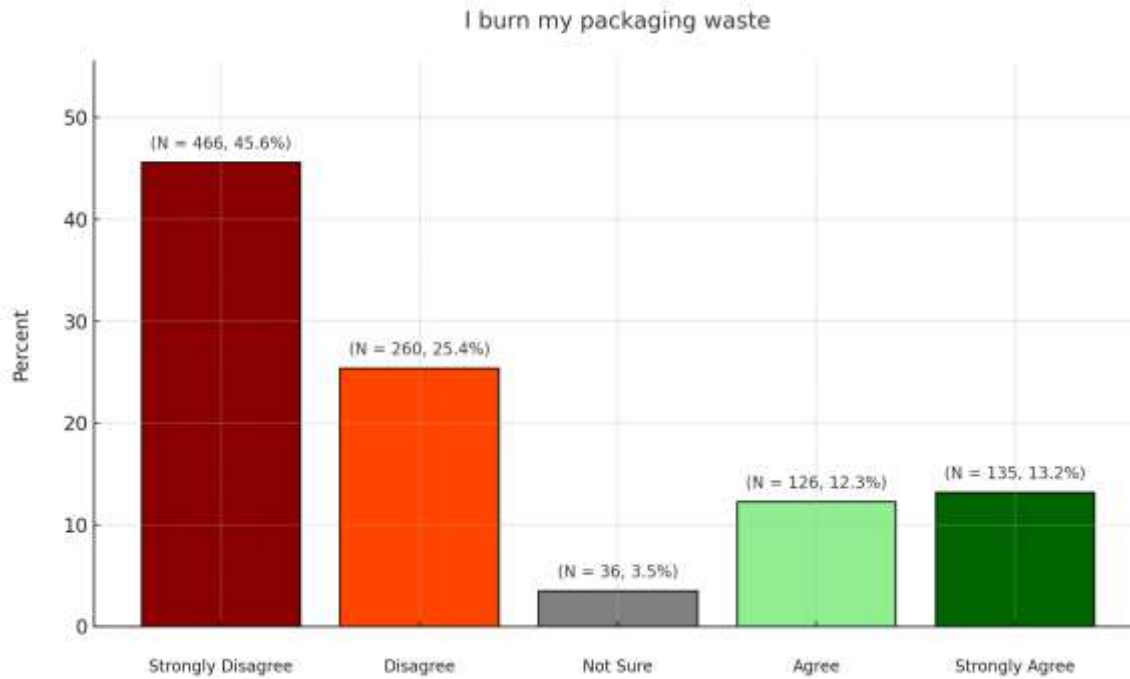


The majority of participants (71.0%, **N = 726**) disagreed or strongly disagreed with burning their packaging waste, while 25.5% (**N = 261**) agreed or strongly agreed. Only 3.5% (**N = 36**) were unsure. This suggests that while burning waste is not the dominant method, it remains a notable practice for some respondents, potentially due to limited alternatives.

**9. I Supply My Packaging Waste to the Street Collection Waste Picker**



I supply my packaging waste to the street collection waste picker

Half of the participants (50.6%, **N = 517**) agreed or strongly agreed that they supply their packaging waste to street collection waste pickers. A smaller proportion (39.3%, **N = 402**) disagreed or strongly disagreed, while 10.2% (**N = 104**) were unsure. These findings highlight the important role of informal waste collectors in recycling efforts, particularly in areas where formal systems are lacking.

**Concluding Comments**

The survey findings reveal a mixed state of household waste management. While municipal collection systems are widely accessible, gaps in separation systems and the provision of resources like waste bags hinder recycling efforts. Additionally, many respondents rely on informal methods such as street collection waste pickers or burning and dumping waste. Addressing these challenges through improved infrastructure, resource allocation, and public education will be critical to fostering more sustainable waste management practices.

# 9 Waste Management

**Introduction**

The management and support of waste recycling infrastructure are crucial for enhancing recycling practices and promoting environmental sustainability. This section explores perceptions regarding the role of metal packaging recycling in job creation, the accessibility of recycling facilities, and the operations of waste pickers. Additionally, it examines the availability of necessary equipment and formalisation of waste picker organisations to improve efficiency and safety.

**Statement Write-Up**

**1. I Believe That Metal Packaging Recycling Can Help Create Jobs in My Community**



I believe that metal packaging recycling can help create jobs in my community
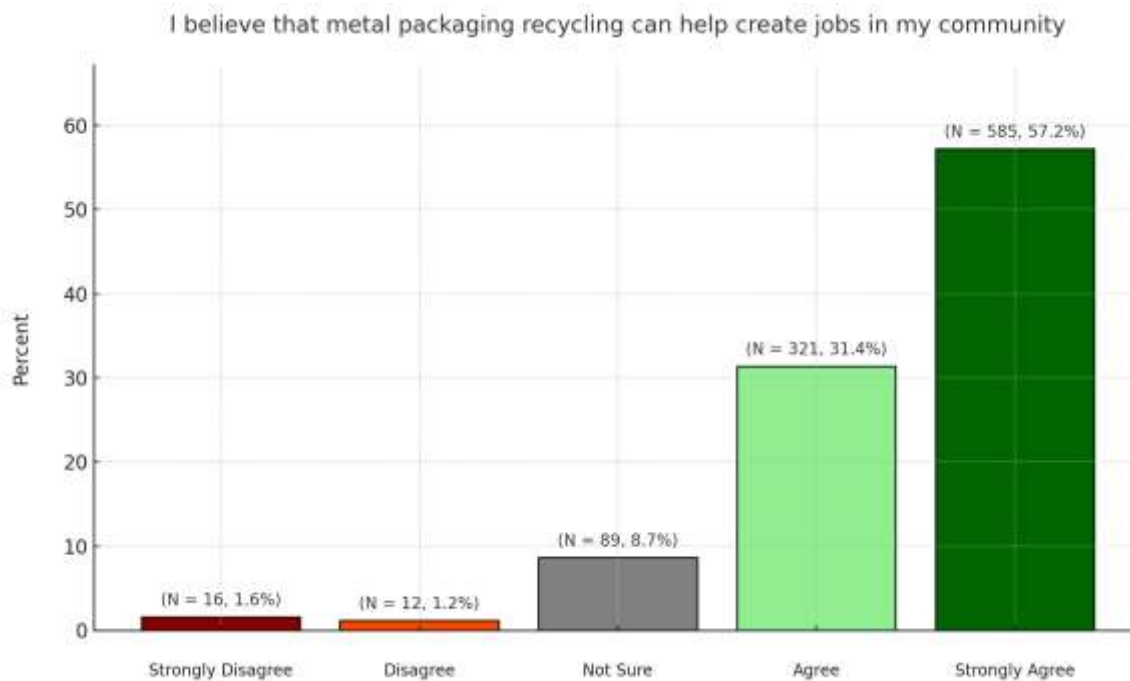
A significant majority of participants (88.6%, **N = 906**) agreed or strongly agreed that metal packaging recycling can help create jobs in their community. Among these, 57.2% (**N = 585**) strongly agreed. Only 2.8% (**N = 28**) disagreed or strongly disagreed, and 8.7% (**N = 89**) were unsure. These results demonstrate widespread recognition of the economic benefits of recycling, particularly in terms of employment opportunities.

## 2. Packaging Buy-Back Centres/Recyclers Are Conveniently Located in My Area


Packaging buy back centre / recyclers are conveniently located in my area
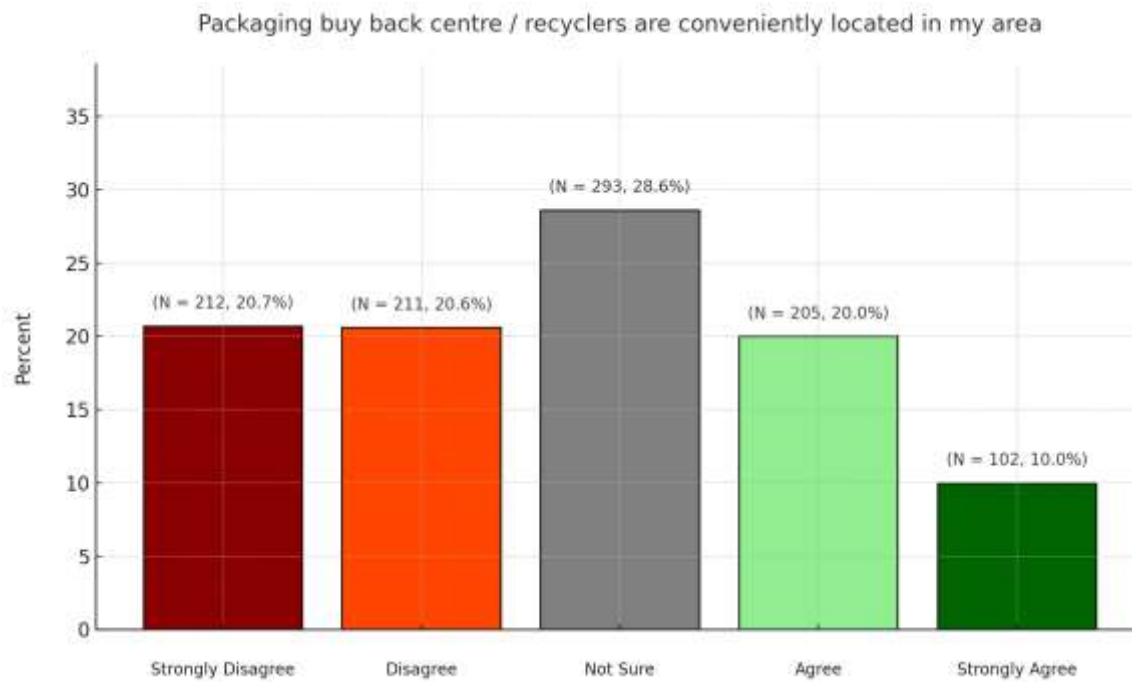
The responses indicate mixed perceptions regarding the accessibility of packaging buy-back centres or recyclers. While 30.0% (**N = 307**) agreed or strongly agreed, a substantial 41.3% (**N = 423**) disagreed or strongly disagreed, and 28.6% (**N = 293**) were unsure. These findings highlight a potential barrier to recycling participation due to the limited availability of convenient recycling facilities.

**3. There Are Waste Pickers Operating in My Area**



There are waste pickers operating in my area
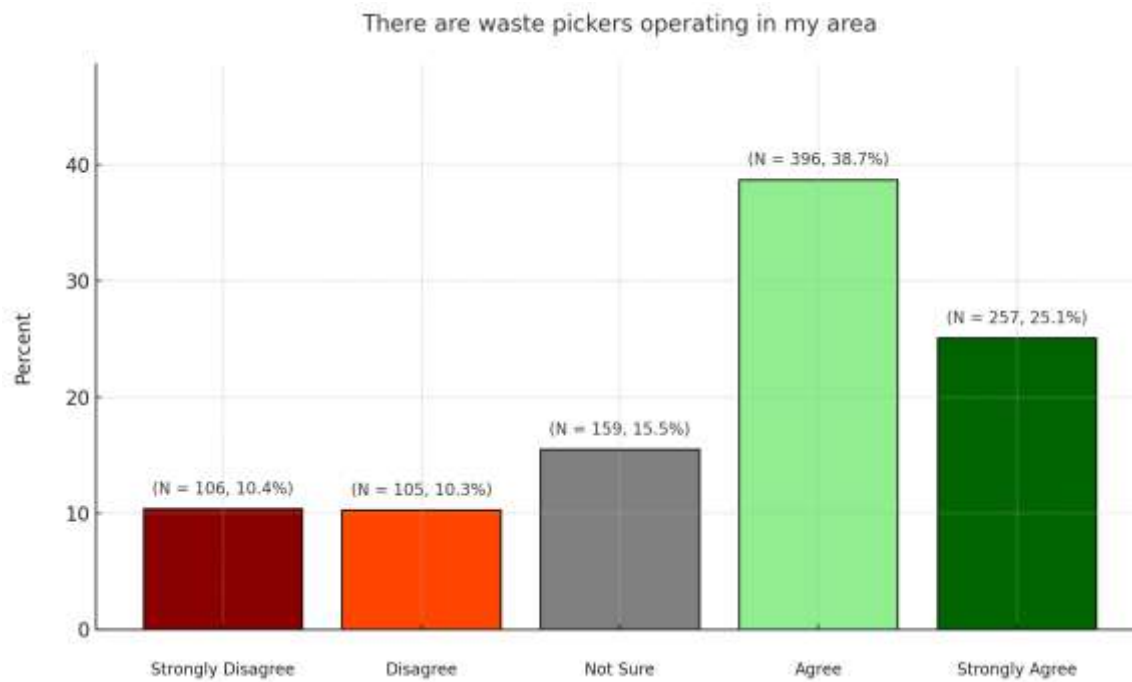
The majority of participants (63.8%, **N = 653**) agreed or strongly agreed that waste pickers operate in their area. Among these, 25.1% (**N = 257**) strongly agreed. A smaller proportion (20.7%, **N = 211**) disagreed or strongly disagreed, while 15.5% (**N = 159**) were unsure. This reflects the visible presence of waste pickers in many communities, which is an essential aspect of informal recycling systems.

**4. Waste Pickers Are Equipped with Necessary Personal Protective Equipment**

Waste pickers are equipped with necessary personal protective equipment
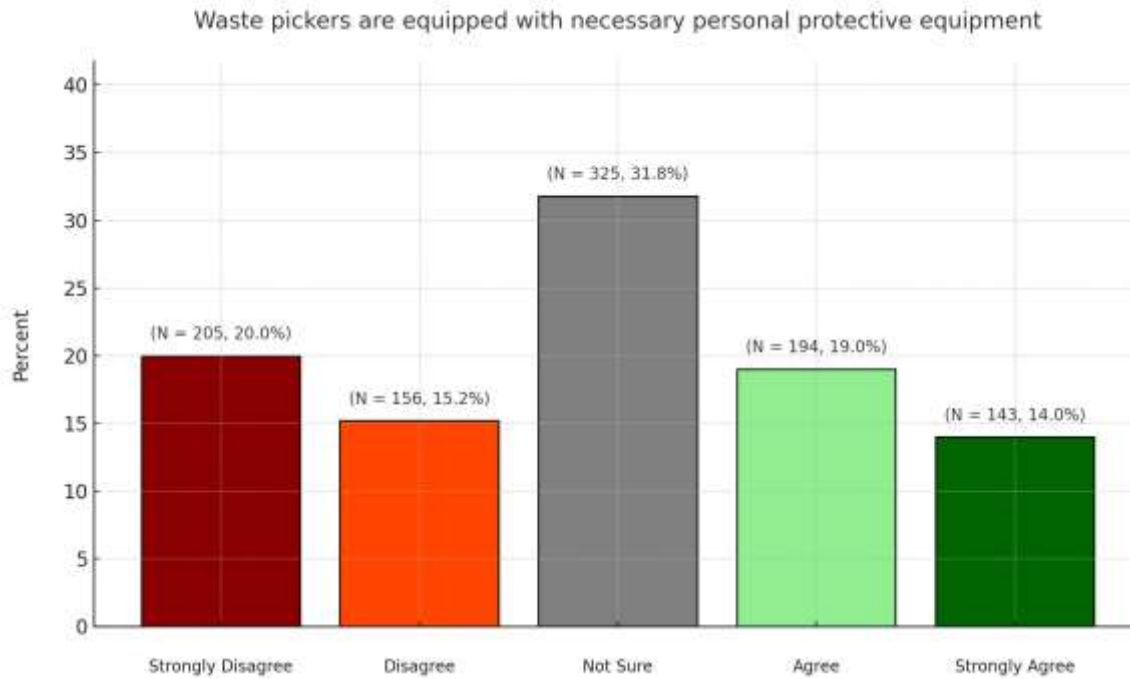


Responses revealed concerns about the availability of personal protective equipment for waste pickers. While 33.0% (**N = 337**) agreed or strongly agreed, a larger proportion (35.2%, **N = 361**) disagreed or strongly disagreed, and 31.8% (**N = 325**) were unsure. These findings suggest that many participants perceive a lack of adequate protection for waste pickers, which poses safety risks.

**5. Waste Pickers Are Equipped with Necessary Equipment (Carts, Bags)**



Waste pickers are equipped with necessary equipment (Carts, bags,)
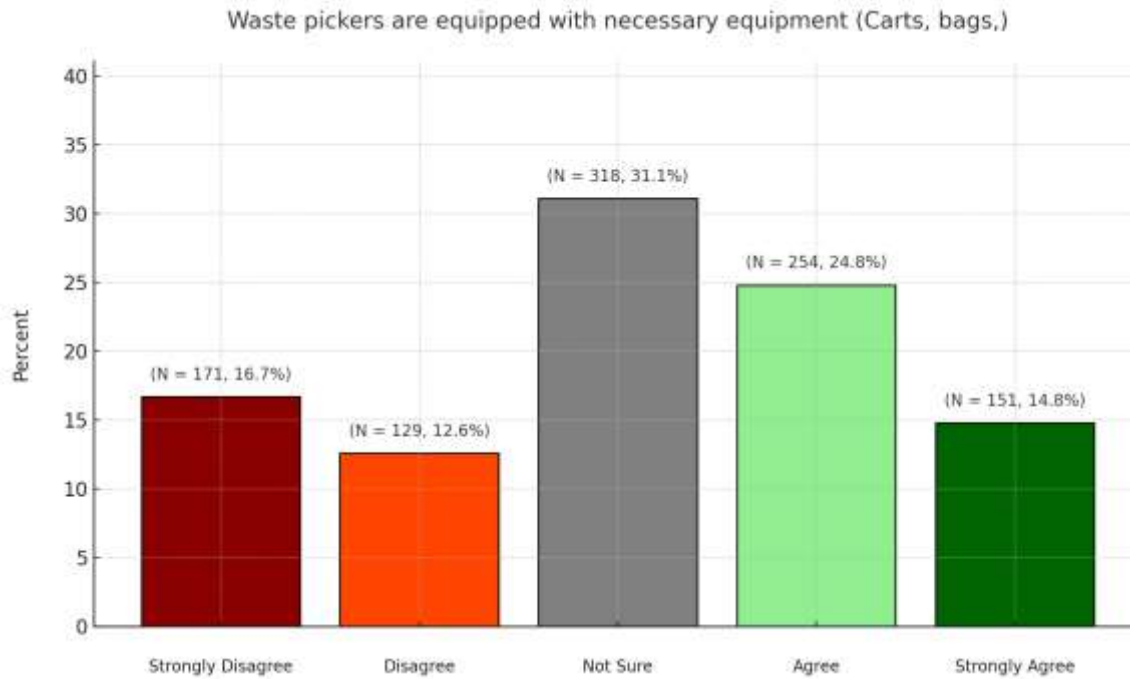
A similar trend was observed regarding the provision of essential equipment for waste pickers. Although 39.6% (**N = 405**) agreed or strongly agreed that waste pickers are adequately equipped, 29.3% (**N = 300**) disagreed or strongly disagreed, and 31.1% (**N = 318**) were unsure. These results indicate that equipping waste pickers with better tools could improve their efficiency and safety.

**6. Waste Pickers Are Formalised (Registered with Waste Picker Organisations)**



Waste pickers are formalised (registered with waste picker organisation eg. ARO and SAWPA)
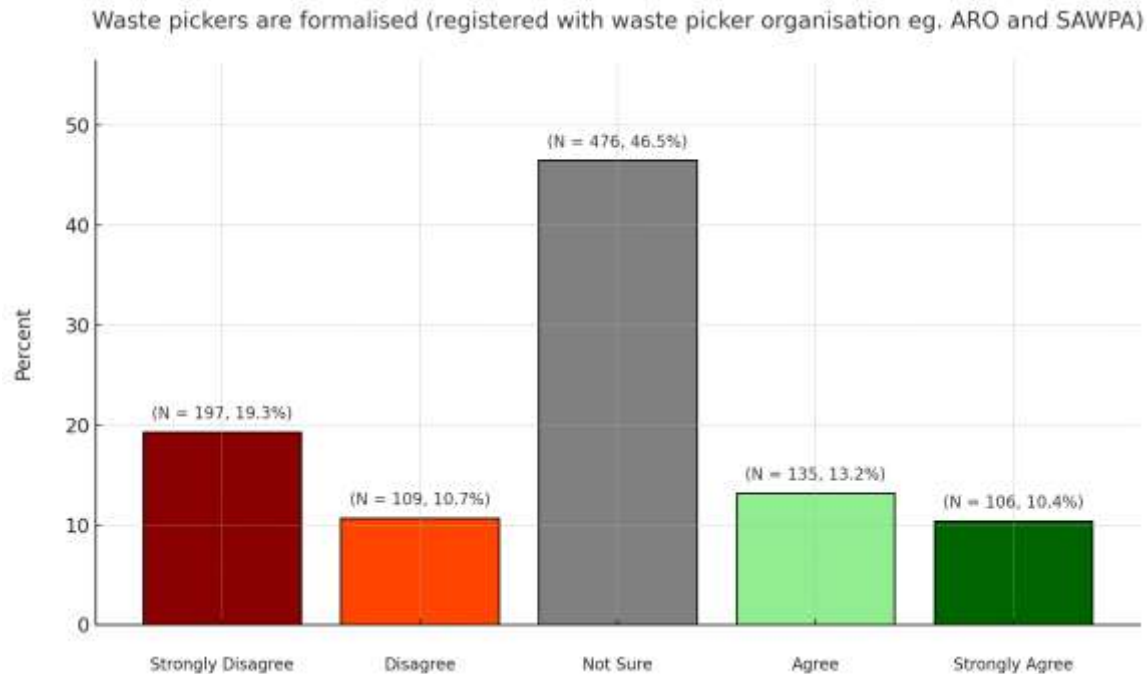
The formalisation of waste pickers appears to be a significant area of uncertainty. Nearly half of the participants (46.5%, **N = 476**) were unsure whether waste pickers are formalised, while 19.3% (**N = 197**) strongly disagreed, and 10.7% (**N = 109**) disagreed. Only 23.6% (**N = 241**) agreed or strongly agreed, indicating limited awareness or implementation of formalisation efforts.

**Concluding Comments**

The findings highlight several critical areas for improvement in waste management. While participants recognise the potential of metal packaging recycling to create jobs, challenges remain regarding the accessibility of buy-back centres and recyclers. Moreover, there is a lack of confidence in the availability of necessary equipment and formalisation for waste pickers. Addressing these gaps through better infrastructure, resource allocation, and formalisation programmes can enhance the efficiency and safety of recycling systems while supporting broader environmental and economic goals.

## 10  Impact of the Biographical Factors

This analysis investigates the impact of biographical factors on individuals' awareness, attitudes, and behaviours concerning metal packaging recycling. By examining the data, patterns and trends are identified to determine whether specific demographic groups are more likely to engage in recycling practices, demonstrate awareness of recycling programmes, or exhibit particular attitudes toward environmental sustainability. These insights provide a deeper understanding of the factors influencing recycling behaviours and guide the development of targeted strategies to improve participation in recycling initiatives.

The results highlight significant relationships between biographical factors and various recycling-related metrics, such as awareness of recycling programmes, recycling frequency, and attitudes toward environmental sustainability.

**Key Trends in the Impact of Biographical Factors**

**1. Perceived Importance of Recycling and Biographical Factors**

- **Dwelling Type**: A significant association exists between **dwelling type** and the belief that **recycling metal packaging is important for environmental sustainability**. Respondents in **formal housing** (houses and flats) are more likely to acknowledge the importance of recycling compared to those in **informal settlements**.

- **Province**: Perceptions of the **importance of recycling** vary significantly by **geographic location**. Respondents from urbanised provinces such as **Gauteng and Western Cape** report higher recognition of sustainability benefits compared to those in **rural provinces such as Limpopo and the Eastern Cape**.

**2. Awareness of Multiple Bag Separation System and Race**

- **Race** is significantly correlated with **awareness of multiple bag separation systems**.

- Some racial groups report **higher access to or awareness of multi-bag separation systems**, likely reflecting disparities in municipal waste management services across different communities.

- This highlights the need for **equitable waste management policies** to ensure equal access to recycling infrastructure across racial groups.

**3. Accessibility of Recycling Infrastructure by Province**

- The perceived convenience of **packaging buy-back centres** is significantly associated with **province**.

- Respondents from **urban provinces** such as **Gauteng and Western Cape** report better access to **buy-back centres and recyclers**, whereas respondents from **rural areas (Limpopo, Eastern Cape, and Mpumalanga)** report limited availability of such facilities.

- This suggests that recycling efforts need to focus on expanding infrastructure in underserved regions.

**4. Household Waste Management Practices and Age**

- **Age** significantly influences **household waste disposal habits**, particularly **waste separation, dumpsite usage, and weekly collection reliability**.

- **Younger respondents (15–29 years)** are less likely to **separate their household waste**, whereas **older respondents (40+ years)** are more likely to engage in structured waste disposal practices.

- This highlights the need for **educational campaigns targeting younger individuals** to encourage participation in recycling efforts.

**5. The Role and Formalisation of Waste Pickers**

- **Race and Province** significantly impact perceptions of **waste pickers' role and formalisation**.

- Respondents from certain racial groups and provinces are **less likely to believe that waste pickers are formally recognised**.

- This perception gap may be linked to the **lack of visibility of structured waste picker programmes** in some regions.

- Addressing this issue requires **policy interventions to integrate waste pickers into formal waste management systems**.

**6. Need for Awareness Campaigns and Province**

- There is a statistically significant relationship between **province** and the belief that **more awareness campaigns are needed to encourage metal packaging recycling**.

- Respondents from provinces with lower **recycling infrastructure and access to municipal services** are more likely to **demand additional awareness initiatives**.

- This suggests that **targeted educational campaigns** in underserved regions can help bridge knowledge gaps and improve recycling participation.

**Conclusion: Addressing Biographical Disparities in Recycling Participation**

The analysis highlights significant disparities in **recycling awareness, access to infrastructure, and waste management behaviours** based on **biographical factors**. **Dwelling type, province, race, and age** all shape how individuals engage with recycling programmes and sustainability efforts.

To enhance participation in recycling initiatives:

- **Infrastructure development** should focus on **expanding buy-back centres in rural areas**.

- **Educational campaigns** should **target younger demographics** to encourage sustainable waste practices.

- **Equitable waste management policies** should **ensure that multiple bag separation systems and formal waste picker recognition** are available across all racial and geographic groups.

# 11 Relationship Between the 3 Factors: Awareness, Household Waste and Waste Management

The results highlight significant relationships between household waste practices, waste management systems, and recycling awareness. A moderate positive correlation (0.4222) exists between household waste practices and awareness, indicating that individuals who manage their household waste more effectively tend to exhibit higher levels of awareness regarding recycling and sustainability. This relationship is supported by a highly significant p-value (p = 0.0000) and a robust t-statistic (9.7927), confirming its reliability.

In contrast, the correlation between waste management systems and awareness is weaker, with a correlation value of 0.1287. While the relationship is statistically significant (p = 0.0019; t = 3.1151), it suggests that broader waste management systems, such as infrastructure and municipal services, play a lesser role in directly influencing awareness compared to individual household practices.

The strongest relationship observed is between waste management systems and household waste practices, with a high positive correlation (0.5909). This indicates that effective and accessible waste management systems are strongly associated with better household waste disposal behaviours. The significance of this relationship is underscored by a very high t-statistic (11.4701) and a p-value of 0.0000.

In summary, the results emphasise the interplay between systemic support and individual behaviour in promoting recycling awareness and effective waste management. While waste management systems strongly influence household practices, improving individual waste habits may have a greater impact on enhancing overall recycling awareness.
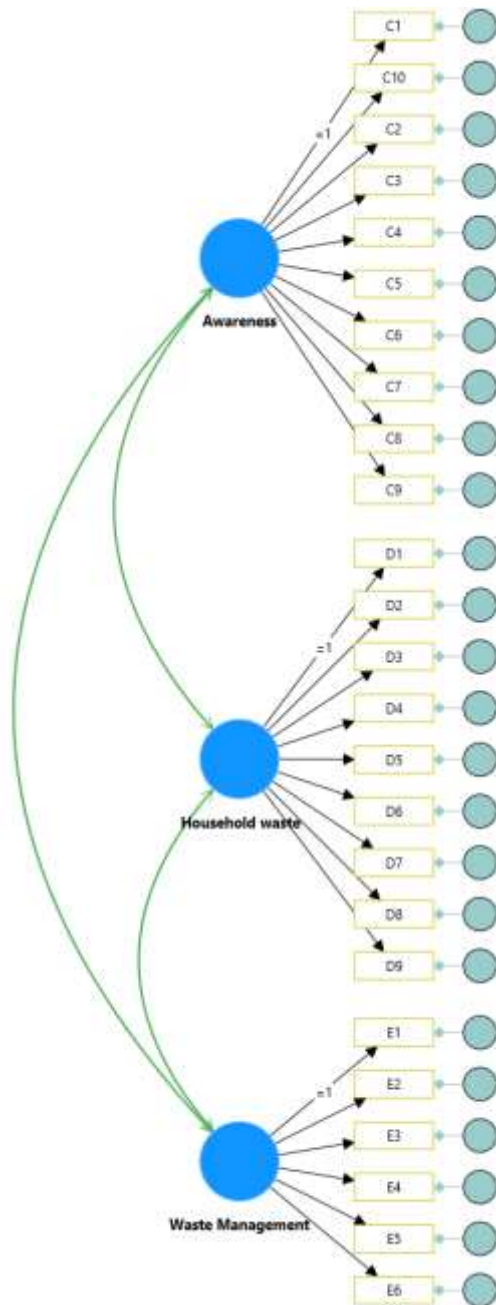
## 12  Summary of Aims, Objectives and Research Questions

**Research Problem Statement**

The Department of Forestry, Fisheries, and the Environment (DFFE) has set various goals for post-consumer metal packaging recovery. However, the extent of unaccounted post-consumer metal packaging remains unreported. This study addresses gaps in recycling awareness, waste management practices, and infrastructure deficiencies that hinder efficient recycling in South Africa.

**Research Aim**

The aim of this study is to investigate and understand post-consumer metal packaging waste and its management in South Africa, focusing on consumer awareness, attitudes, and practices.

**Research Objectives and Findings**

**1. Assess consumer awareness, attitudes, and knowledge regarding the recycling of post-consumer metal packaging.**

Findings:

- A **majority (84.0%)** of participants were aware of the environmental impact of packaging waste, but **44.8% were unaware of specific recycling programmes**.

- While **86.7% acknowledged recycling's environmental benefits**, a **significant portion lacked knowledge about disposal locations**.

- **93.0% of respondents strongly supported awareness campaigns**, highlighting the need for targeted educational outreach.

- A **strong positive correlation** was found between household waste practices and awareness levels, indicating that informed individuals are more likely to recycle.

**2. Investigate consumer engagement with household waste management practices, focusing on local collection systems and disposal methods.**

Findings:

- **73.0% of participants reported having a municipal collection system**, but **only 23.7% had access to a multiple bag separation system**.

- **35.4% of households separated waste**, while **79.1% did not deliver waste to recycling centres due to accessibility challenges**.

- **50.6% supplied waste to street pickers**, indicating their vital role in the recycling chain.

- **Significant disparities** were found based on dwelling type, with formal housing residents having better waste management options than those in informal settlements.

**3. Analyse key operational aspects of waste management, particularly in relation to recycling centres, waste pickers, and the availability of waste management equipment.**

Findings:

- **88.6% of respondents believed recycling could create jobs**, supporting the need for integrating waste pickers into formal systems.

- **41.3% of respondents lacked convenient access to recycling centres**, with rural areas being most affected.

- **63.8% confirmed the presence of waste pickers**, but **many lacked necessary protective equipment and formal employment status**.

- Waste picker formalisation remains **low (23.6%)**, indicating a need for better policy implementation and integration.

**4. Develop a strategy to enhance post-consumer metal packaging recovery.**

Findings:

- The study identified **high variability in metal can disposal across demographics**, necessitating **targeted recycling interventions**.

- **Beer, food, and soft drink cans were the most disposed of**, making them **prime targets for recycling efforts**.

- **Recycling infrastructure was unevenly distributed**, with **urban areas benefiting more than rural locations**.

- **Younger age groups (15–29 years) were less likely to separate waste**, highlighting the need for educational campaigns.

- **Recycling awareness correlated with better waste management practices**, suggesting that **educational outreach and infrastructure development must go hand-in-hand**.

**Research Questions and Answers**

**1. What is the level of awareness, attitude, and knowledge among consumers regarding the recycling of post-consumer metal packaging?**

- Awareness of recycling's environmental benefits is high (**86.7%**), but programme-specific knowledge remains limited (**44.8% awareness of metal packaging recycling initiatives**).

- Most respondents **support awareness campaigns (93.0%)**, indicating a need for improved education and outreach.

- **Younger individuals (15–29 years)** exhibit lower recycling participation rates, suggesting a need for targeted youth engagement.

**2. How do consumers engage with household waste management practices, including local collection systems and disposal methods?**

- **73.0% had municipal collection services**, but multi-bag separation was rare (**23.7% availability**).

- **79.1% did not deliver packaging waste to recycling centres**, pointing to accessibility and logistical challenges.

- **50.6% relied on waste pickers**, emphasizing their critical role in metal packaging recovery.

- **Informal settlements faced the greatest infrastructure challenges**, limiting their ability to recycle effectively.

**3. What are the key operational aspects of waste management, with a focus on recycling centres, waste pickers, and the availability of equipment?**

- **41.3% of respondents reported that recycling centres were not conveniently located**, restricting participation in recycling.

- **Waste picker presence was noted by 63.8% of participants**, but most lacked formal recognition and equipment.

- **Only 23.6% of respondents believed waste pickers were part of formal organisations**, highlighting the need for policy changes.

- **Rural and informal settlements had significantly lower recycling participation**, due to limited infrastructure and awareness.

**Conclusion**

The study highlights key gaps in metal packaging recycling, including limited programme awareness, accessibility barriers, and operational inefficiencies. Addressing these issues through education, infrastructure improvements, and policy interventions is critical to enhancing recycling rates in South Africa. Formalising waste picker roles and improving municipal waste services will be essential in achieving sustainable waste management solutions. The findings suggest that targeted recycling efforts, particularly for beer, food, and soft drink cans, would significantly improve recovery rates and support national recycling objectives.

# 13  Recommendations for Improving Metal Packaging Recycling

**Strategies to Enhance Public Awareness and Education**

1. **Targeted Awareness Campaigns**: Implement region-specific campaigns to address gaps in recycling knowledge, focusing on underserved areas such as informal settlements and rural provinces.

2. **Educational Programmes**: Introduce recycling education in schools and community centres, emphasising the importance of metal packaging recycling for environmental sustainability and job creation.

3. **Social Media Engagement**: Leverage social media platforms to share information on recycling programmes, the benefits of recycling, and the steps to participate.

4. **Workshops and Training**: Conduct workshops for community leaders to become recycling ambassadors, spreading awareness within their communities.

**Recommendations for Improving Accessibility to Recycling Facilities**

1. **Expansion of Buy-Back Centres**: Establish more buy-back centres in rural and peri-urban areas to ensure accessibility for all communities.

2. **Infrastructure Investments**: Enhance recycling infrastructure, such as drop-off points and collection services, particularly in provinces with limited access.

3. **Mobile Collection Services**: Introduce mobile recycling units to serve remote communities where fixed facilities are not viable.

4. **Incentive Programmes**: Provide financial incentives, such as rebates or discounts, to encourage participation in recycling.

**Policy Suggestions for Better Integration of Waste Pickers**

1. **Formalisation of Waste Pickers**: Register waste pickers with recognised organisations such as ARO and SAWPA, offering them access to training and resources.

2. **Provision of Equipment**: Supply waste pickers with essential tools, including carts, protective gear, and collection bags, to improve efficiency and safety.

3. **Inclusion in Municipal Systems**: Integrate waste pickers into municipal waste management systems, ensuring they are fairly compensated for their contributions.

4. **Public Awareness of Waste Pickers' Role**: Promote the recognition of waste pickers' contributions through public campaigns, reducing stigma and fostering community collaboration.

**Enhancing Municipal Waste Management Systems**

1. **Improved Collection Services**: Ensure consistent and reliable waste collection services, particularly in informal settlements and underdeveloped areas.

2. **Segregation at Source**: Implement multi-bag systems for waste separation at the household level, supported by clear guidelines and resources.

3. **Monitoring and Accountability**: Establish performance metrics for municipal waste management services to ensure efficient operations.

4. **Collaboration with Private Sector**: Partner with private companies to fund and support municipal recycling programmes, leveraging their expertise and resources.

# 14  Conclusion

**Summary of Major Findings**

The analysis revealed significant disparities in recycling awareness, behaviours, and access to infrastructure across different demographic groups. Key findings include:

- **Biographical factors** such as dwelling type, race, and province strongly influence recycling participation and awareness.

- **Household waste practices** are moderately correlated with awareness, highlighting the importance of individual actions in fostering sustainable behaviours.

- **Waste management systems** have a strong impact on household waste practices, demonstrating the need for robust infrastructure to support recycling efforts.

- **Waste pickers** play a critical role in informal recycling systems, but their integration into formal systems remains limited.

**Final Thoughts on Improving Metal Packaging Recycling in South Africa**

To improve metal packaging recycling, South Africa must adopt a multifaceted approach that addresses systemic and behavioural barriers. Investing in public awareness campaigns and recycling infrastructure will ensure greater participation across diverse communities. Formalising and supporting waste pickers will enhance the efficiency and inclusivity of recycling systems. By addressing these challenges, South Africa can move towards a more sustainable future, where metal packaging recycling plays a vital role in environmental conservation and economic empowerment.

## 15 About the Authors

**Author 1**

**Dr Kishan Singh**

Kishan earned his BSc from the University of Durban Westville in 1987 and a post graduate qualification in Management Sciences in 1995. In 2016, he achieved Lean Six Sigma Black Belt status through the Six Sigma Management Institute, USA, under the guidance of Dr. Mikel Harry. Additionally, Kishan achieved the Certified Packaging Professional (CPP) through the Institute of Packaging Professionals, USA in 2018. Kishan also holds a Masters Degree in Quality Management / Business Process Re-engineering and a PhD in Sustainable Development. With 37 years of experience in training and consulting, Kishan specialises in business systems design, quality management, supply chain management, business risk management, environmental sustainability and packaging technology. He is currently the CEO of MetPac-SA, focusing on Extended Producer Responsibility, promoting the circular economy of metal packaging in South Africa.

**Author 2**

**Dr Manikam Michael Nadar (Ravi)**

Manikam Michael Nadar is a lecturer at the Durban University of Technology, Department of Operations and Quality Management. His qualifications include a Diploma and a BTech degree in Human Resource Management, a Masters and a Doctor of Philosophy degree in Quality Management. Additionally, Ravi achieved the Certified Packaging Professional (CPP) through the Institute of Packaging Professionals, USA in 2025. Ravi has 39 years of industry experience and 15 years of lecturing experience in business management systems, quality management, supply chain management, business risk management, environmental sustainability and packaging technology. His expertise extends beyond the classroom, as he has published articles in the fields of Safety, Health, Environment, and Quality Management, and has presented research papers at prestigious conferences such as the 2021 Mbali Virtual International Conference hosted by the University of Zululand and the 2023 BRICS Research Virtual International Conference hosted by the University of Kota, India.

**Author 3**

**Deepak Singh**

Deepak earned his Bachelor of Paedagogics (Science) and Bachelor of Science Honours (Physics) from the University of Durban-Westville. He later completed his Master of Science (Physics) at Northern Illinois University, USA. With over 35 years of experience in academia, Deepak has made significant contributions to physics education, quantitative methods, and renewable energy research. Deepak has been a Senior Lecturer in Physics at the Durban University of Technology (DUT) since 1991, where he has pioneered innovative teaching methodologies, mentored students, and developed curricula that integrate real-world applications. His expertise extends to quantitative techniques, statistics, and renewable energy technologies, as demonstrated by his role as a moderator for Quantitative Methods in the MBA Programme at the University of KwaZulu-Natal (2010–2018).

# 16 Appendix

## Combined Responses to Recycling Awareness
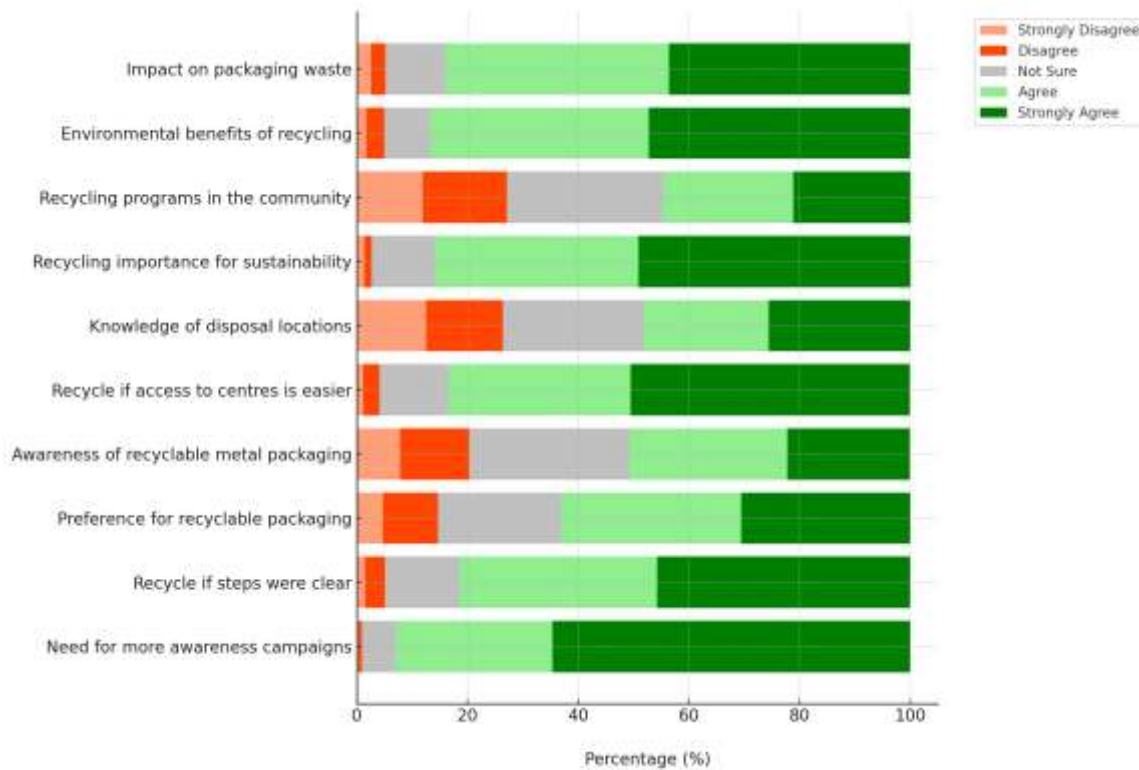


| | | Strongly Disagree | Disagree | Not Sure | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| I am aware of the impact on packaging waste on the environment | C1 | 2.6% | 2.6% | 10.9% | 40.3% | 43.6% |
| I am aware of the environmental benefits of recycling | C2 | 1.7% | 3.3% | 8.3% | 39.5% | 47.2% |
| I am aware of recycling programs specific to metal packaging in my community | C3 | 11.9% | 15.2% | 28.2% | 23.6% | 21.2% |
| I believe recycling metal packaging is important for environmental sustainability | C4 | 1.4% | 1.3% | 11.4% | 36.8% | 49.2% |
| I know where to dispose of metal packaging waste for recycling | C5 | 12.5% | 13.9% | 25.5% | 22.5% | 25.6% |
| I would recycle more metal packaging if I had easy access to recycling centres | C6 | 1.2% | 2.9% | 12.4% | 33.0% | 50.4% |
| I am aware of the different types of metal packaging that can be recycled | C7 | 7.8% | 12.6% | 28.9% | 28.5% | 22.1% |
| I prefer to purchase products with packaging that is recyclable | C8 | 4.7% | 10.0% | 22.2% | 32.6% | 30.5% |
| I would recycle more metal packaging if I knew the steps and processes involved | C9 | 1.5% | 3.6% | 13.5% | 35.7% | 45.7% |
| I think more awareness campaigns are needed to encourage metal packaging recycling | C10 | 0.4% | 0.5% | 6.1% | 28.4% | 64.6% |
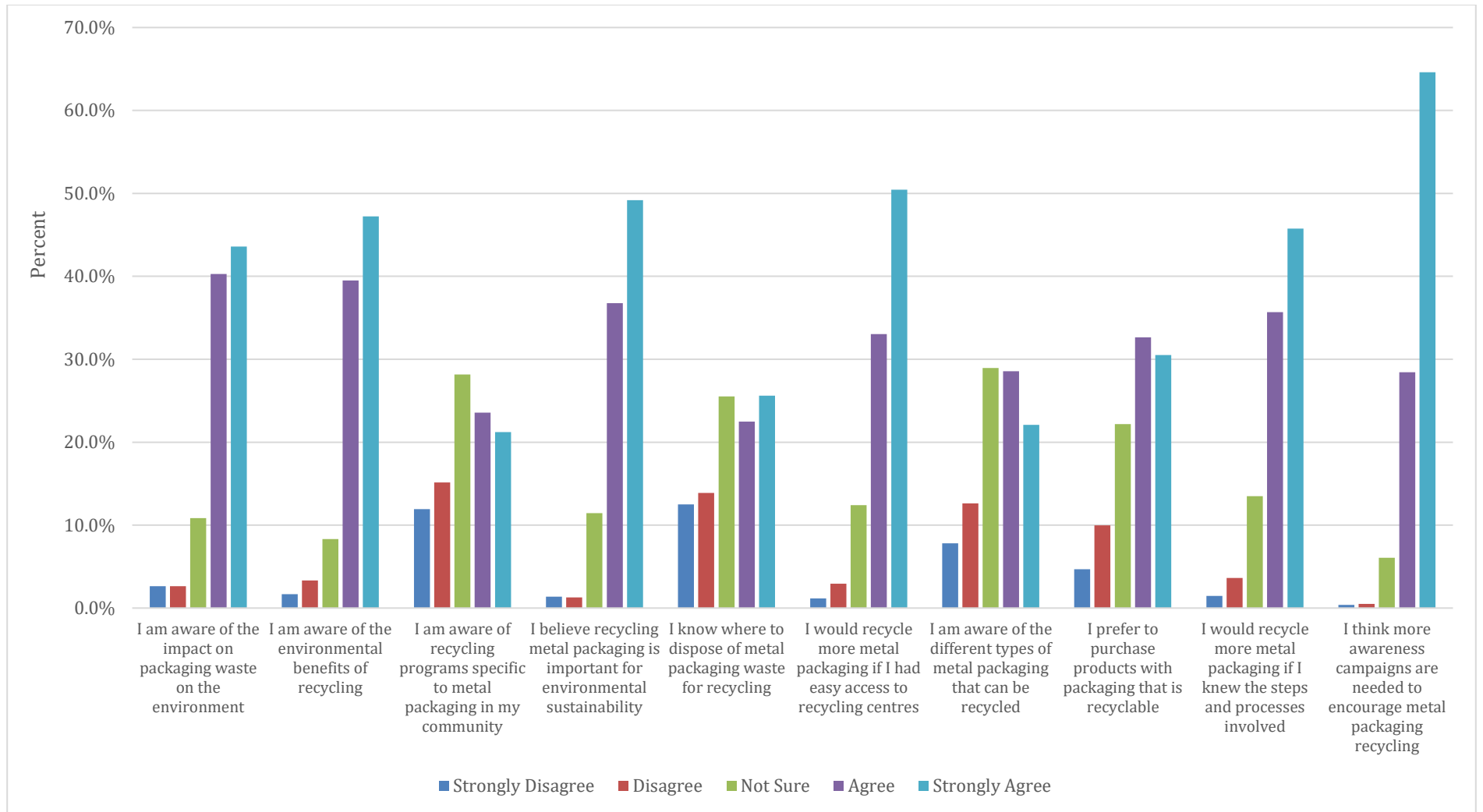
## Combined Responses to Household Waste
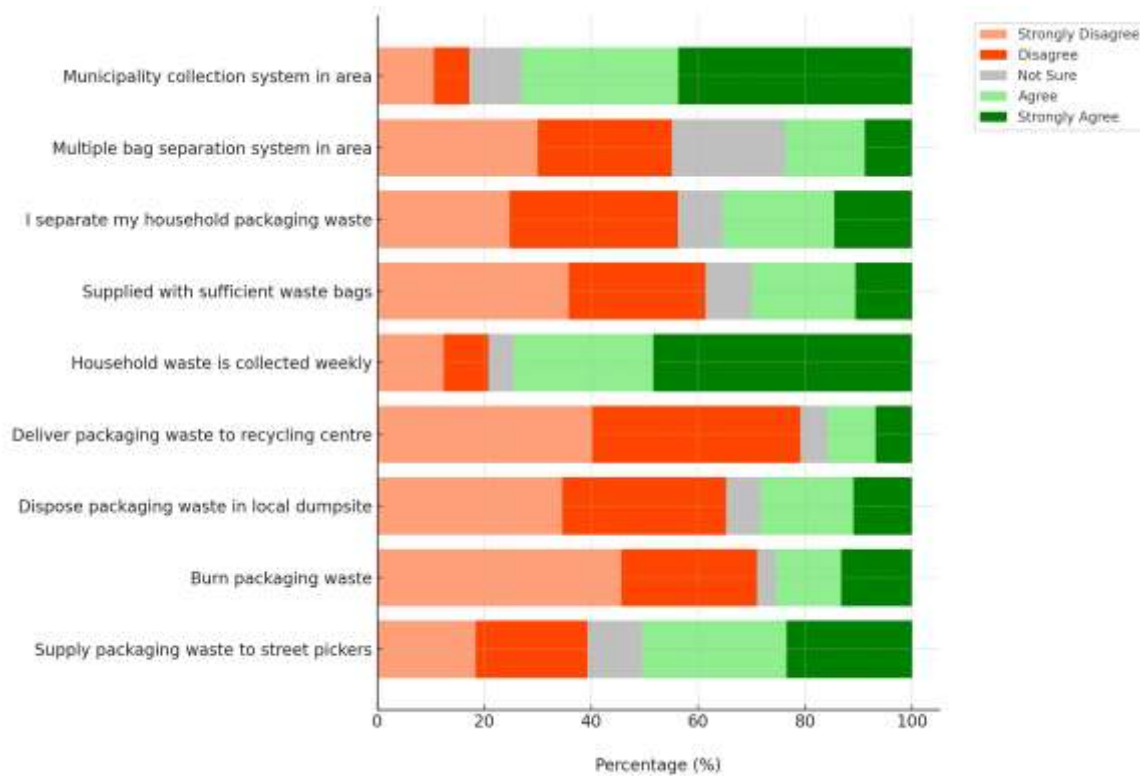


|  |  | Strongly Disagree | Disagree | Not Sure | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| There is a municipality collection system in my area | D1 | 10.6% | 6.6% | 9.8% | 29.3% | 43.7% |
| There is multiple bag separation system in my area | D2 | 30.0% | 25.1% | 21.2% | 14.9% | 8.8% |
| I separate my household packaging waste | D3 | 24.8% | 31.4% | 8.4% | 20.9% | 14.5% |
| I am supplied with sufficient waste bags | D4 | 35.8% | 25.6% | 8.7% | 19.3% | 10.7% |
| My household waste is collected weekly | D5 | 12.4% | 8.4% | 4.7% | 26.1% | 48.4% |
| I deliver my packaging waste to a recycling centre | D6 | 40.2% | 38.9% | 5.1% | 9.0% | 6.8% |
| I dispose of my packaging waste in a local dumpsite | D7 | 34.6% | 30.6% | 6.5% | 17.4% | 10.9% |
| I burn my packaging waste | D8 | 45.6% | 25.4% | 3.5% | 12.3% | 13.2% |
| I supply my packaging waste to the street collection waste picker | D9 | 18.4% | 20.9% | 10.2% | 27.0% | 23.6% |
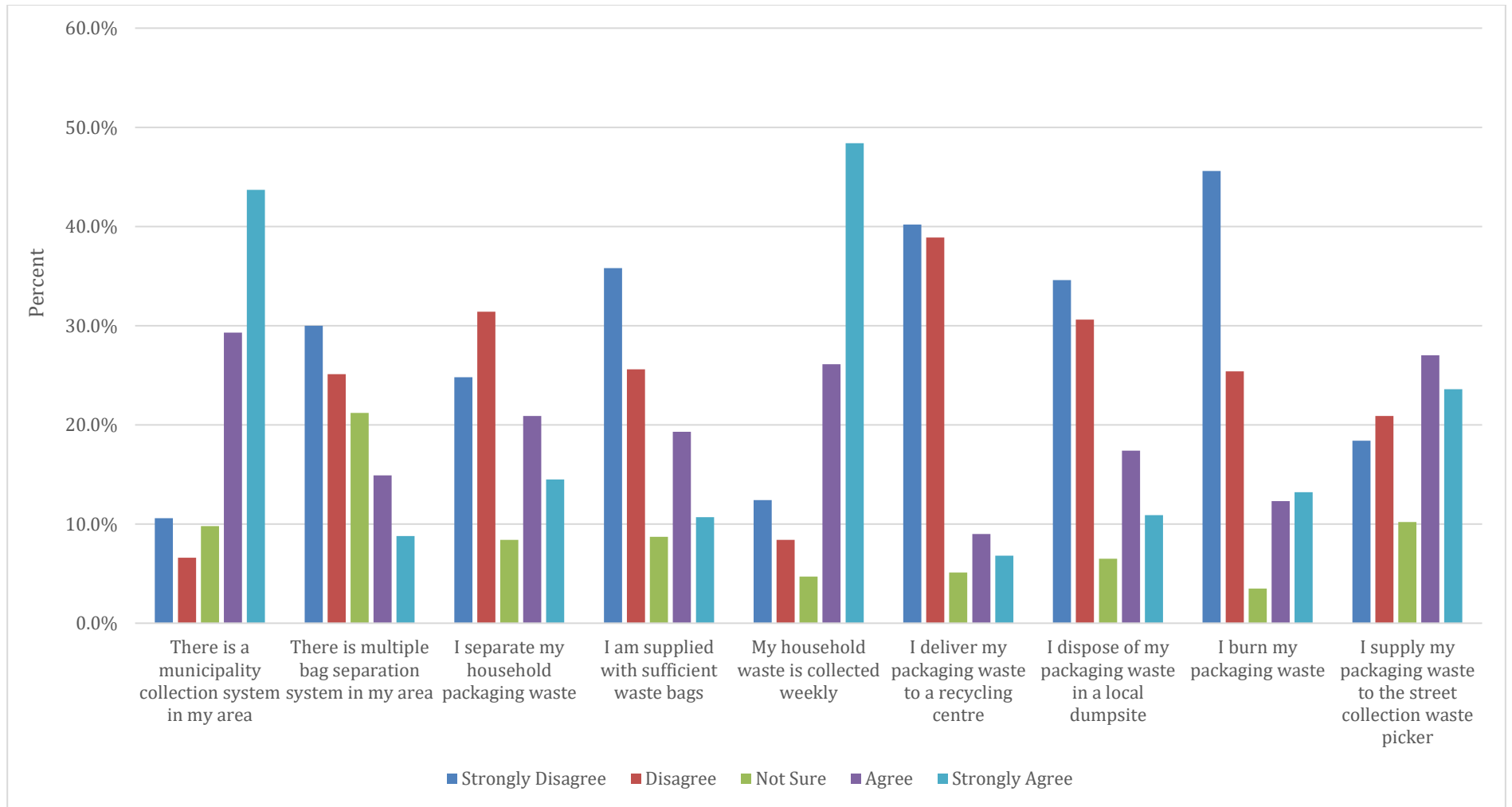
## Combined Responses to Waste Management
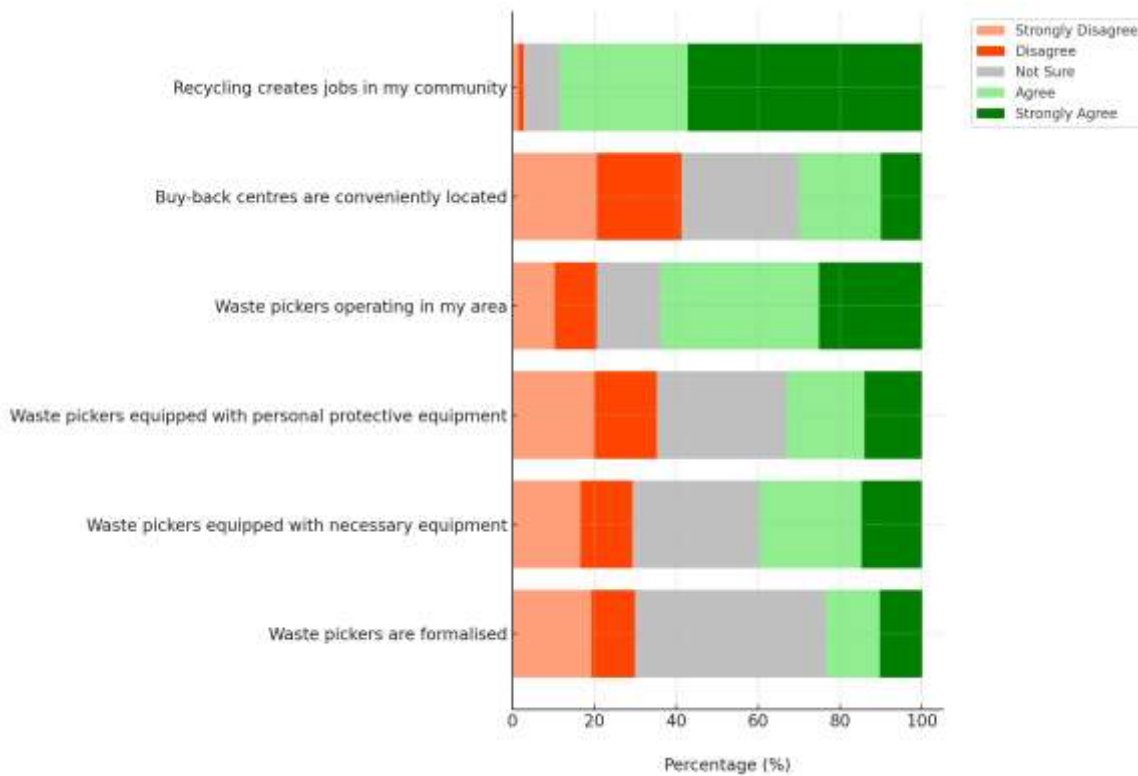


|  |  | Strongly Disagree | Disagree | Not Sure | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| I believe that metal packaging recycling can help create jobs in my community | E1 | 1.6% | 1.2% | 8.7% | 31.4% | 57.2% |
| Packaging buy back centre / recyclers are conveniently located in my area | E2 | 20.7% | 20.6% | 28.6% | 20.0% | 10.0% |
| There are waste pickers operating in my area | E3 | 10.4% | 10.3% | 15.5% | 38.7% | 25.1% |
| Waste pickers are equipped with necessary personal protective equipment | E4 | 20.0% | 15.2% | 31.8% | 19.0% | 14.0% |
| Waste pickers are equipped with necessary equipment (Carts, bags,) | E5 | 16.7% | 12.6% | 31.1% | 24.8% | 14.8% |
| Waste pickers are formalised (registered with waste picker organisation eg. ARO and SAWPA) | E6 | 19.3% | 10.7% | 46.5% | 13.2% | 10.4% |
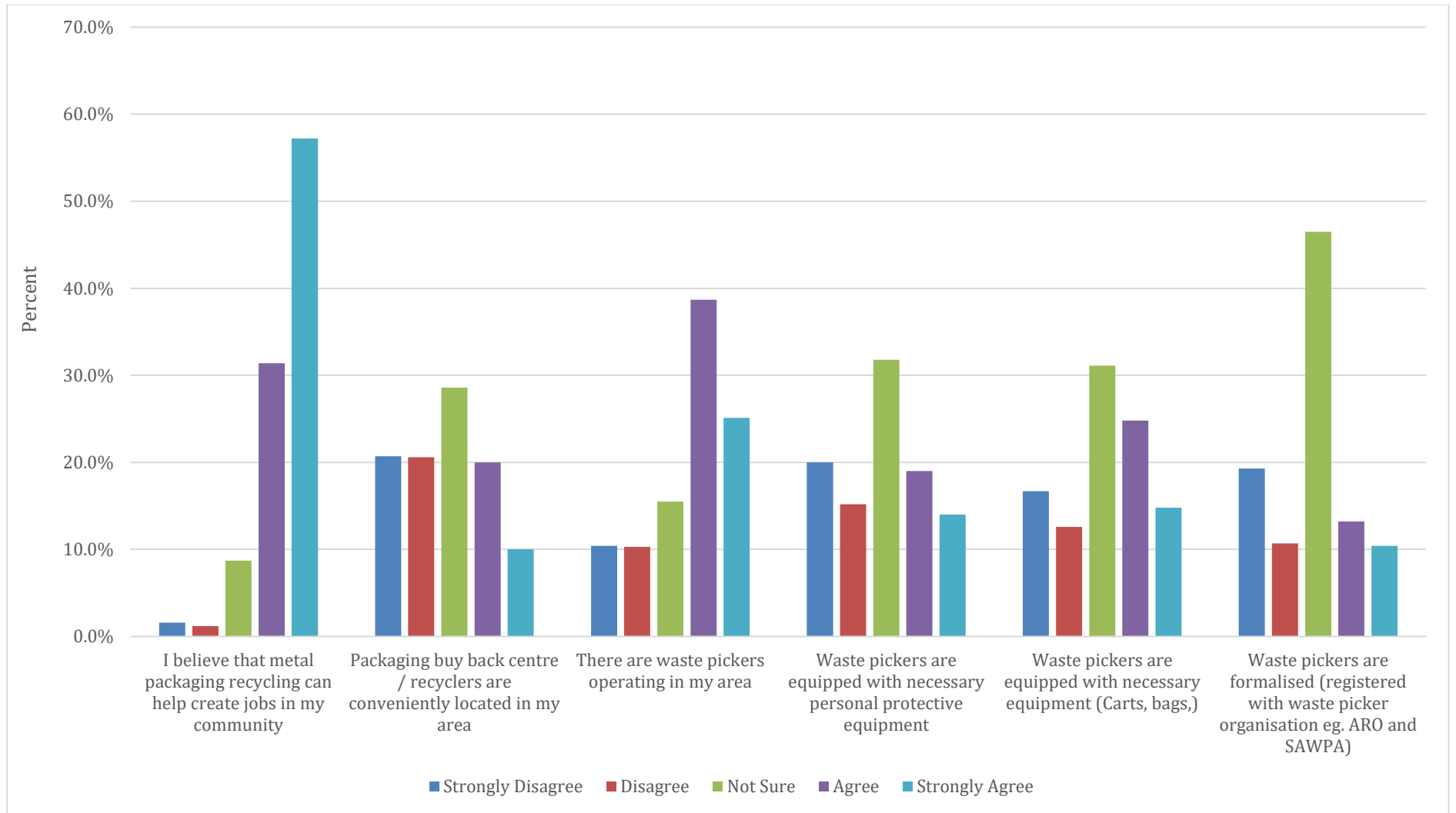
# Mean Disposal by Biographical Factors

| | | Aerosol cans | | | | | Food Cans | | | | | Paint Cans | | | | | Polish Cans | | | | | Soft Drink Cans | | | | | Beer Cans | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Standard Deviation | Median | Minimum | Maximum | Mean | Standard Deviation | Median | Minimum | Maximum | Mean | Standard Deviation | Median | Minimum | Maximum | Mean | Standard Deviation | Median | Minimum | Maximum | Mean | Standard Deviation | Median | Minimum | Maximum | Mean | Standard Deviation | Median | Minimum | Maximum |
| Gender | Female | 3.41 | 4.62 | 2.00 | 1.00 | 50.00 | 10.08 | 19.73 | 6.00 | 1.00 | 268.00 | 3.18 | 8.23 | 1.00 | 1.00 | 60.00 | 2.43 | 5.21 | 1.00 | 1.00 | 55.00 | 11.62 | 26.21 | 6.00 | 1.00 | 400.00 | 14.88 | 18.62 | 10.00 | 1.00 | 124.00 |
| | Male | 3.50 | 4.44 | 2.00 | 1.00 | 50.00 | 10.81 | 19.78 | 6.00 | 1.00 | 300.00 | 2.69 | 8.50 | 1.00 | 1.00 | 80.00 | 2.55 | 4.35 | 1.00 | 1.00 | 34.00 | 13.60 | 26.36 | 6.00 | 1.00 | 300.00 | 19.12 | 25.55 | 12.00 | 1.00 | 150.00 |
| Age (years) | 15 - 19 | 2.74 | 1.91 | 2.00 | 1.00 | 13.00 | 10.14 | 14.69 | 6.00 | 1.00 | 100.00 | 1.67 | 1.41 | 1.00 | 1.00 | 5.00 | 2.22 | 2.49 | 1.00 | 1.00 | 10.00 | 14.09 | 48.26 | 6.00 | 1.00 | 400.00 | 15.49 | 21.66 | 6.00 | 1.00 | 100.00 |
| | 20 - 29 | 3.57 | 4.80 | 2.00 | 1.00 | 50.00 | 9.22 | 12.16 | 6.00 | 1.00 | 150.00 | 4.16 | 12.37 | 1.00 | 1.00 | 80.00 | 2.52 | 4.85 | 1.00 | 1.00 | 50.00 | 11.63 | 18.84 | 8.00 | 1.00 | 230.00 | 15.30 | 20.96 | 10.00 | 1.00 | 150.00 |
| | 30 - 39 | 3.70 | 5.61 | 2.00 | 1.00 | 50.00 | 10.06 | 14.28 | 6.00 | 1.00 | 155.00 | 1.84 | 1.89 | 1.00 | 1.00 | 10.00 | 2.43 | 4.38 | 1.00 | 1.00 | 34.00 | 11.54 | 15.72 | 7.00 | 1.00 | 100.00 | 19.75 | 22.90 | 15.00 | 1.00 | 150.00 |
| | 40 - 49 | 3.56 | 3.81 | 2.50 | 1.00 | 25.00 | 13.19 | 33.12 | 8.00 | 1.00 | 300.00 | 1.71 | 1.69 | 1.00 | 1.00 | 10.00 | 2.89 | 6.68 | 1.00 | 1.00 | 55.00 | 16.50 | 40.08 | 6.00 | 1.00 | 300.00 | 20.07 | 27.78 | 11.00 | 1.00 | 150.00 |
| | ≥ 50 | 3.03 | 3.57 | 1.00 | 1.00 | 20.00 | 11.28 | 25.41 | 6.00 | 1.00 | 250.00 | 3.30 | 8.09 | 1.00 | 1.00 | 50.00 | 2.21 | 4.06 | 1.00 | 1.00 | 35.00 | 11.86 | 21.83 | 5.00 | 1.00 | 150.00 | 15.39 | 21.08 | 6.00 | 1.00 | 124.00 |
| Race | African | 3.50 | 5.15 | 2.00 | 1.00 | 50.00 | 11.05 | 23.00 | 6.00 | 1.00 | 300.00 | 2.80 | 7.34 | 1.00 | 1.00 | 60.00 | 2.68 | 5.43 | 1.00 | 1.00 | 55.00 | 13.17 | 30.04 | 6.00 | 1.00 | 400.00 | 17.93 | 25.43 | 10.00 | 1.00 | 150.00 |
| | Coloured | 3.20 | 3.03 | 2.00 | 1.00 | 20.00 | 8.46 | 7.91 | 6.00 | 1.00 | 45.00 | 2.24 | 2.21 | 1.00 | 1.00 | 10.00 | 1.89 | 1.83 | 1.00 | 1.00 | 10.00 | 10.62 | 10.51 | 6.00 | 1.00 | 50.00 | 13.05 | 11.66 | 8.00 | 1.00 | 60.00 |
| | Indian | 3.74 | 3.94 | 2.00 | 1.00 | 23.00 | 7.49 | 5.28 | 6.00 | 1.00 | 24.00 | 6.13 | 19.71 | 1.00 | 1.00 | 80.00 | 1.70 | 1.75 | 1.00 | 1.00 | 10.00 | 9.91 | 9.77 | 6.50 | 1.00 | 50.00 | 21.39 | 18.95 | 18.00 | 1.00 | 60.00 |
| | White | 3.12 | 2.23 | 3.00 | 1.00 | 12.00 | 10.36 | 10.22 | 10.00 | 1.00 | 70.00 | 1.60 | 0.91 | 1.00 | 1.00 | 4.00 | 1.56 | 0.80 | 1.00 | 1.00 | 4.00 | 11.49 | 11.50 | 10.00 | 1.00 | 60.00 | 15.69 | 11.90 | 12.00 | 1.00 | 50.00 |
| | Other | 8.75 | 9.00 | 7.00 | 1.00 | 20.00 | 25.60 | 26.40 | 10.00 | 8.00 | 70.00 | 10.00 | | 10.00 | 10.00 | 10.00 | 5.40 | 5.77 | 4.00 | 1.00 | 15.00 | 21.55 | 22.75 | 15.00 | 3.00 | 69.00 | 31.07 | 11.97 | 28.50 | 20.00 | 47.00 |
| Province | Gauteng | 2.66 | 1.77 | 2.00 | 1.00 | 15.00 | 9.53 | 11.77 | 7.00 | 1.00 | 150.00 | 1.67 | 1.28 | 1.00 | 1.00 | 5.00 | 1.95 | 2.80 | 1.00 | 1.00 | 30.00 | 11.88 | 11.44 | 9.00 | 1.00 | 100.00 | 19.38 | 17.12 | 15.00 | 1.00 | 124.00 |
| | KwaZulu Natal | 3.31 | 4.17 | 2.00 | 1.00 | 30.00 | 10.99 | 26.79 | 5.00 | 1.00 | 300.00 | 3.06 | 9.04 | 1.00 | 1.00 | 80.00 | 3.05 | 6.05 | 1.00 | 1.00 | 55.00 | 14.30 | 37.03 | 5.00 | 1.00 | 400.00 | 19.12 | 29.00 | 7.50 | 1.00 | 150.00 |
| | Western Cape | 2.82 | 2.63 | 2.00 | 1.00 | 20.00 | 8.64 | 8.69 | 6.00 | 1.00 | 70.00 | 1.45 | 1.42 | 1.00 | 1.00 | 10.00 | 1.62 | 1.70 | 1.00 | 1.00 | 12.00 | 9.58 | 10.22 | 6.00 | 1.00 | 60.00 | 13.26 | 17.88 | 10.00 | 1.00 | 150.00 |
| | Eastern Cape | 5.57 | 7.92 | 3.00 | 1.00 | 50.00 | 12.09 | 16.51 | 8.00 | 1.00 | 155.00 | 5.97 | 13.75 | 2.00 | 1.00 | 60.00 | 3.24 | 6.84 | 1.00 | 1.00 | 50.00 | 11.13 | 14.89 | 7.00 | 1.00 | 100.00 | 14.29 | 16.47 | 6.00 | 1.00 | 100.00 |
| | Limpopo | 3.00 | 1.41 | 3.00 | 2.00 | 4.00 | 15.00 | 5.00 | 15.00 | 10.00 | 20.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 3.50 | 2.12 | 3.50 | 2.00 | 5.00 | 15.00 | 13.23 | 10.00 | 5.00 | 30.00 | 12.50 | 3.54 | 12.50 | 10.00 | 15.00 |
| | Mpumalanga | 1.67 | 0.58 | 2.00 | 1.00 | 2.00 | 5.75 | 2.22 | 6.00 | 3.00 | 8.00 | | | | | | 7.00 | | 7.00 | 7.00 | 7.00 | 7.75 | 5.06 | 7.50 | 2.00 | 14.00 | 7.50 | 3.54 | 7.50 | 5.00 | 10.00 |
| | North West | 20.00 | | 20.00 | 20.00 | 20.00 | 47.00 | 18.38 | 47.00 | 34.00 | 60.00 | | | | | | | | | | | 82.50 | 31.82 | 82.50 | 60.00 | 105.00 | | | | | |
| | Free State | 3.67 | 2.08 | 3.00 | 2.00 | 6.00 | 8.67 | 7.09 | 10.00 | 1.00 | 15.00 | | | | | | 1.33 | 0.58 | 1.00 | 1.00 | 2.00 | 11.67 | 7.37 | 9.00 | 6.00 | 20.00 | 13.50 | 2.12 | 13.50 | 12.00 | 15.00 |
| | Northern Cape | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type of Dwelling | Informal Settlement | 5.44 | 7.29 | 3.00 | 1.00 | 35.00 | 14.55 | 25.88 | 6.00 | 1.00 | 150.00 | 3.63 | 8.86 | 2.00 | 1.00 | 50.00 | 3.25 | 5.36 | 1.00 | 1.00 | 25.00 | 13.47 | 24.65 | 5.00 | 1.00 | 150.00 | 17.63 | 22.71 | 6.00 | 1.00 | 98.00 |
| | House | 3.12 | 4.04 | 2.00 | 1.00 | 50.00 | 8.80 | 10.25 | 6.00 | 1.00 | 155.00 | 2.90 | 8.89 | 1.00 | 1.00 | 80.00 | 2.00 | 3.37 | 1.00 | 1.00 | 50.00 | 10.09 | 12.35 | 6.00 | 1.00 | 137.00 | 14.97 | 17.24 | 10.00 | 1.00 | 150.00 |
| | Flat | 3.35 | 3.01 | 2.00 | 1.00 | 20.00 | 8.67 | 10.16 | 6.00 | 1.00 | 70.00 | 1.73 | 1.19 | 1.00 | 1.00 | 4.00 | 2.37 | 3.24 | 1.00 | 1.00 | 20.00 | 12.79 | 40.58 | 6.00 | 1.00 | 400.00 | 21.93 | 28.16 | 12.00 | 1.00 | 150.00 |
| | Other | 6.36 | 7.38 | 2.50 | 1.00 | 25.00 | 39.72 | 78.06 | 10.00 | 1.00 | 300.00 | 2.60 | 2.80 | 1.50 | 1.00 | 10.00 | 9.60 | 14.64 | 3.00 | 1.00 | 55.00 | 45.60 | 73.62 | 11.00 | 1.00 | 300.00 | 49.41 | 59.77 | 20.00 | 1.00 | 150.00 |
| Type of | Informal | 5.44 | 7.29 | 3.00 | 1.00 | 35.00 | 14.55 | 25.88 | 6.00 | 1.00 | 150.00 | 3.63 | 8.86 | 2.00 | 1.00 | 50.00 | 3.25 | 5.36 | 1.00 | 1.00 | 25.00 | 13.47 | 24.65 | 5.00 | 1.00 | 150.00 | 17.63 | 22.71 | 6.00 | 1.00 | 98.00 |
| | Formal | 3.26 | 4.14 | 2.00 | 1.00 | 50.00 | 9.94 | 18.88 | 6.00 | 1.00 | 300.00 | 2.79 | 8.26 | 1.00 | 1.00 | 80.00 | 2.38 | 4.74 | 1.00 | 1.00 | 55.00 | 12.43 | 26.49 | 6.00 | 1.00 | 400.00 | 17.08 | 22.70 | 10.00 | 1.00 | 150.00 |