UNVEILING FOOD WASTE HABITS: A PATHWAY TOWARDS SUSTAINABLE DEVELOPMENT IN RAWALPINDI AND ISLAMABAD

[1]Dr. Firdous Ahmed Shehri

[2]Dr. Sadaf Alam

[3]Qurat Ul Ain Waqar

[4]Dr. Raj Maham

[1]*Business School, Senior Assistant Professor, Bahria University, Islamabad Campus, Pakistan*
https://orcid.org/0009-0008-5115-6597

[2]*Business School, Senior Assistant Professor, Bahria University, Islamabad Campus, Pakistan*

[3]*Business School, Senior Lecturer, Bahria University, Islamabad Campus, Pakistan*

[4]*Beaconhouse International College, Islamabad, Pakistan*

[1]*fahmed.buic@bahria.edu.pk,* [2]*salam.buic@bahria.edu.pk,* [3]*Qwaqar.buic@bahria.edu.pk*
[4]*raj.maham@bic.edu.pk*

Abstract

Purpose: The current paper focuses on the food waste pattern in three distinct patterns, including birthday parties, marquees, and domestic consumption. Methodology: A predetermined questionnaire was used to collect data from the twin cities of Rawalpindi and Islamabad. A sample size was set to be 551 respondents from three distinct settings. To find the primary data, Google Forms were used for the survey method. To gain enriched data, the researcher has also conducted observational studies to analyze food consumption patterns and carried out in-depth interviews with selected respondents. Findings: The findings of the study have provided valuable insights into how food waste patterns vary across distinct social contexts. In particular, there was higher food waste at birthday parties and marquees than at home. Further research could also be conducted to identify additional factors affecting food weight distribution and its implications for distinct settings to minimize food waste. Implications for theory and practice: The current study makes a significant contribution to food waste management theory and the circular economy by identifying distinctive waste patterns across different social situations, providing a basis for developing effective waste reduction strategies. The study also made practical contributions, including optimizing food procurement, quantity control, and event planning to mitigate food waste in birthday parties, marquees, and domestic consumption, resulting in economic and environmental benefits. Originality and value: It presents a strong research question, a transparent methodology, and a clear emphasis on real-world inferences, making it a valuable contribution to the field of food waste management in three distinct social contexts.

Key Words: Food Waste, Birthdays, Marquees, Domestic Food Consumption

1. INTRODUCTION

Food wastage has emerged as a critical global concern, with profound ethical, environmental, and economic implications. It has become a norm for people to waste food during various events, such as weddings, birthdays, or New Year celebrations (Ahmadzadeh, Ajmal, Ramanathan, & Duan, 2023). Studies showed that kids also waste food as they are immature and have no understanding of the intensity of food waste. Moreover, kids' parents were even more accountable for food waste as they filled their plates to the brim, believing that their children would enjoy their meal in full, but they left half of the plate full of food (Ahmadzadeh et al., 2023).

Much has already been studied about the food wastage around the globe, and scholars have provided different ways to address this issue (Mou et al., 2023). In the context of Pakistan, specifically in Rawalpindi and Islamabad, the twin cities where social gatherings such as marquees events, birthday parties, and daily domestic consumption are prevalent, understanding the dynamics of food wastage becomes imperative (Mou et al., 2023), as evident in the statistical data.

Statistics revealed compelling insights into the scale of this issue. A study conducted among 551 participants in the region illustrated significant disparities in food wastage across different settings. On average, marquee events were found to generate approximately 15.3 kilograms of wasted food, followed by birthday parties with 12.8 kilograms, and domestic settings with 9.5 kilograms. These statistics underscore the urgency of investigating the factors contributing to food wastage within each setting to formulate effective mitigation strategies (Zheng, Chen, & Ma, 2023).

Although descriptive statistics revealed the extent of food wastage, further analysis using methods such as Analysis of Variance (ANOVA) explained the subtle variations between event contexts (Pandey, Budhathoki, Perez-Cueto, & Thomsen, 2023). ANOVA findings revealed a highly significant difference in the mean level of wastage of food between marquees events, birthday parties, and households ($F_{(2, 97)} = 18.72$, $p < 0.001$). This statistical finding highlights the necessity for targeted interventions based on the specific dynamics of each environment to effectively reduce food wastage (Amaral & Orsato, 2023).

In light of this context, this study aimed to delve deeper into the determinants and trends of food wastage in marquees, birthday parties, and home settings in Rawalpindi and Islamabad. By shedding light on the underlying determinants of food wastage and suggesting context-specific interventions, this study aims to support current initiatives towards sustainable and responsible food consumption patterns in the region (Khalid et al., 2024).

1.1 Objectives

1. To assess the extent of food wastage in marquees events, birthday parties, and domestic settings in Rawalpindi and Islamabad.
2. To identify the primary categories of wasted foods within these contexts.
3. To understand the factors contributing to food wastage in each setting.
4. To propose ways for reducing food wastage in these contexts.

1.2 Research Questions

1. What is the magnitude of food wastage in marquees events, birthday parties, and domestic settings in Rawalpindi and Islamabad?
2. What are the main categories of foods wasted in these settings?

3. What are the socio-cultural, economic, and behavioral factors influencing food wastage?
4. What interventions can be implemented to minimize food wastage in these contexts?

2. LITERATURE REVIEW

Food waste was taken as a dependent variable, whereas types of events were independent variables. These further include events in three different contexts: birthdays, celebrations in marquees, and domestic food consumption.

2.1 Dependent Variable

Food wastage (quantified by weight or volume). Quantifying food waste was challenging due to the lack of a unified definition of food waste. Some studies used weight, while others used volume (Attiq, Habib, Kaur, Hasni, & Dhir, 2021).

2.2 Independent Variables

- Type of event (marquees, birthday parties, domestic).
- In most large gatherings in marquees, such as weddings and New Year celebrations, which often feature buffets with a large variety of food, people tend to take more food than they can consume (Zhu et al., 2023).
- In birthday parties, especially for children, excess food was prepared due to fear of under-catering. Not only did this result in leftover food that was never consumed, but it also made it customary to put a cake on the birthday child (Bilska, Tomaszewska, & Kołożyn-Krajewska, 2022).
- Food waste has also become a serious problem in households. The primary reasons were overbuying, impulse buying, and improper storage. Children usually like to have fast food meals such as burgers, fries, and fizzy drinks. This further leads to waste of food in home-cooked meals (González-Santana, Blesa, Frígola, & Esteve, 2022).
- Socio-economic status (SES) of participants. In birthday mania, people with high (SEC) ordered more food to show their influence and wealth to their guests, leading to a high volume of food waste. Similarly, in large gatherings at marquees, they have a similar pattern. In domestic settings, they usually bought in bulk and also bought food they did not really need. On the other hand, people with comparatively low (SEC) have less food waste on birthdays, marquees, and domestic consumption due to a limited budget and inviting a limited number of guests (Haldar et al., 2022).
- Cultural practices and norms. On birthdays, it has become a cultural practice to make lavish arrangements and order excess food. In subcontinental regions such as Pakistan, India, and Bangladesh, where the dowry was required of the parents, families were frequently under pressure to throw extravagant weddings and provide an abundance of food so their daughter could live in harmony with her in-laws (Principato, Mattia, Di Leo, & Pratesi, 2021).
- Generosity and food waste: In Pakistan, hospitality (mehman nawazi) is a profound cultural pillar, a source of family pride, and a core element of national identity. However, this deeply ingrained value often results in significant food waste, particularly during urban celebrations. In cultures that practice "Mehman Nawazi," or sacred hospitality, guests are seen as divine blessings. Hosts feel a profound obligation to provide overwhelming generosity, especially with food, driven by the deep-seated fear of a guest leaving hungry or feeling unwelcome. This anxiety often results in over-catering to ensure this shame is avoided.
- Feast mentality: The ziyafat, or feast, is built on the principle of lavish excess. Tables are piled high with dishes, intentionally offering more than any guest could eat. This

overwhelming display is a powerful gesture of the host's generosity and a refusal to be seen as restrained or sparing. At a ziyafat (feast), the goal is to overwhelm the table with food. It is a standard practice that proves the host's generosity knows no limits.

- Food preparation and storage practices. Poor food preparation and improper storage practices were common causes of food waste. For example, under- or over-cooked food did not suit the people's taste. Similarly, dairy products spoil quickly if not stored properly. Preparing food more than required leads to leftovers that may not get eaten (Al-Obadi, Ayad, Pokharel, & Ayari, 2022).
- Awareness of food waste issues. Labels on food items that describe "use by" or "best before" dates often create confusion among people, leading to the discarding of food that is still safe to consume. The best remedy for this problem was to have awareness of food waste issues. When people understood that food waste was not only a bad practice but also had a significant impact on the environment, it required resources like land, water, and a variety of crops. Throwing leftovers on the land damages the environment and can create a pungent smell, troubling the people living in the nearby areas (Szakos, Szabó-Bódi, & Kasza, 2021).
- Responsible consumption and production: The pervasive cultural practices contributing to consumer-level food waste present a significant impediment to Pakistan's realization of Sustainable Development Goal Target 12.3. Addressing these socio-cultural drivers is a prerequisite for attaining the target of halving per capita food waste by 2030. Culture-driven food waste in Pakistan cripples progress on multiple SDGs. It represents a catastrophic loss of resources, economic capital, and environmental integrity, far beyond the mere loss of food itself.
- Access to recycling or composting facilities. People were more likely to compost or recycle food if it was convenient for them. Appropriate infrastructure, including more bins for food leftovers or drop-off locations, can facilitate increased composting and recycling. Local or municipal organizations can play a significant role in raising awareness by posting "don't waste food" posters in prominent locations (Bigdeloo, Teymourian, Kowsari, Ramakrishna, & Ehsani, 2021).

FIGURE 1 RESEARCH FRAMEWORK
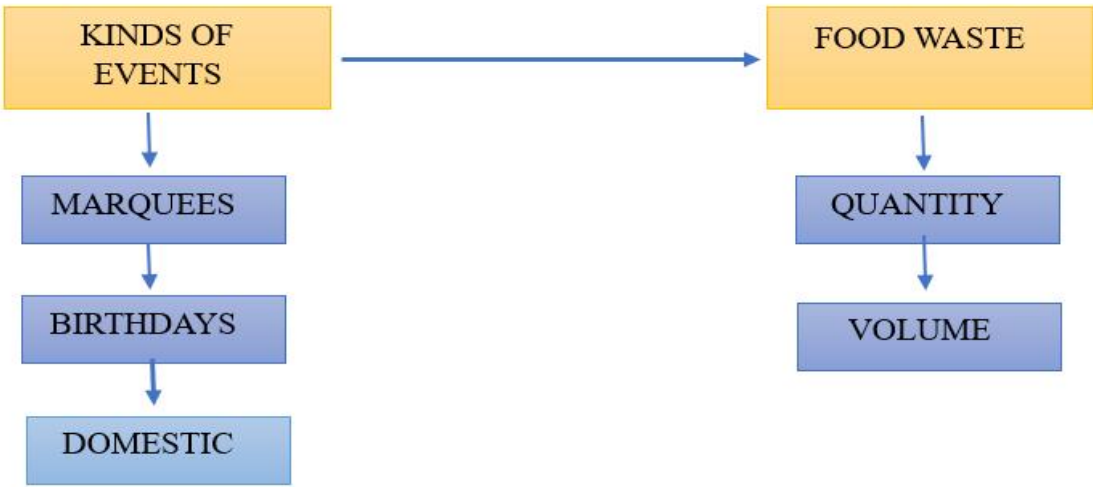
Based on the literature, the following hypotheses are developed.

2.3 Hypotheses

H_1: The amount of food wastage will be significantly higher in marquees events compared to birthday parties and domestic settings.

H_2: Perishable food items such as fruits, vegetables, and prepared dishes will constitute the majority of wasted food.

H_3: Socio-economic status will correlate positively with the amount of food wastage, with higher-income households wasting more food.

H_4: Increased awareness of food waste issues will be associated with reduced wastage.

3. RESEARCH METHODOLOGY

This study employed a mixed-methods approach to investigate food waste within households, weddings, and birthday parties in the twin cities of Rawalpindi and Islamabad. Households are where daily food consumption consistently occurs. By first understanding the waste habits in this setting, we can accurately measure how much additional waste is created by extraordinary events. This insight into everyday practices is the essential foundation for developing effective public campaigns that promote better food management. In Pakistani culture, weddings are the most significant social and financial event for families, who often invest a lifetime's savings. The centerpiece of this expenditure is the food service. Driven by a powerful cultural pressure for abundance, there is an unspoken rule that requires not only high-quality food but also a massive surplus. To avoid the profound social disgrace of running out, caterers typically prepare 20-30% more food than the estimated number of guests.

Although often home-based, birthday parties' function under a separate set of rules from daily household consumption. They are planned events with catered food and a defined guest list, mirroring the wasteful patterns of larger galas on a smaller scale. This trend is fueled by evolving social norms, particularly in urban areas, where elaborate, commercialized celebrations with professional catering and excessive trimmings are becoming commonplace. This makes them a distinct and growing stream of waste, separate from routine household waste.

Therefore, to effectively evaluate food waste in three settings, data were collected through predetermined questionnaires, surveys, observational studies, and interviews. Stratified random sampling was utilized to ensure representativeness across three strata, which included households, weddings and birthday parties. It was a valuable technique for guaranteeing accurate and representative samples. It reduced bias in the research process and further enhanced the quality of research findings (Song & Kawai, 2023). To obtain genuine and legitimate data, information was gathered from 500 participants. The distribution of these respondents is shown in Table 3.1 below.

Table 3.1: Distribution of Targeted Respondents

Events	Number of respondents
Households	200
Weddings	150
Birthdays	150
Total	500

As shown in Table 3.1 above, the total number of respondents was 500, of which 200 were from households, 150 from weddings, and 150 from birthday parties.

Table 3.2: Response Rate

Questionnaires	No. of Respondents
Returned and completed questionnaires	511
Completed questionnaires but received too late, not included in analysis	24
Incomplete questionnaires received	46
Questionnaires not received	169
Total Questionnaires distributed	750

In Table 3.2, 750 questionnaires were distributed, and 511 were returned and considered valid for analysis, which corresponds to an approximate response rate of 68%. Two hundred thirty-nine questionnaires were not considered valid for analysis because they were not filled out, had wrong responses, were received too late, and 169 questionnaires were not received at all. The reason for distributing 750 questionnaires was to overcome the non-response error.

Table 3.3:   Sample Size

Questionnaires	No. of Respondents
Returned and completed questionnaires	511
Household observations	20
Observations at weddings	5
Observations at birthday parties	5
Interviews	10
Total	551

Although the required number of respondents was 500, the researcher selected 511 respondents from the survey, 20 observations from households, five from weddings and birthday parties each, and 10 from interviews. Therefore, the sample size was considered to be 551, as shown in Table 3.3 above.

3.1 Data Collection Method

Data were collected using three methods, including surveys, observations, and interviews. Structured questionnaires were administered to household members to gather data on demographics, which included size, income, and occupation. Other demographics included food purchasing, consumption patterns, food storage, and preparation practices. It also included an examination of food waste generation, focusing on its types, quantities, and attitudes toward food waste. Similarly, for weddings and birthday events, data were collected from event organizers, caterers, and a sample of guests at selected events. Closed-ended questions, which were having multiple-choice options and required respondents to select one or more options as an answer, were used for statistical analysis because this study was based on quantitative methods. These questions were specific and meticulously prepared in advance to elicit an increasing amount of information from respondents. Discreet observations were conducted at selected events to supplement survey data and provide insights into food consumption patterns, serving sizes, and wastage.

To collect data from households, apart from surveys, direct observation was done. A researcher has visited 20 households to do direct observation by getting prior permission. This involved discreetly noting food quantities, types of food wasted, and disposal methods. Structured and semi-structured interviews with household members (e.g., homemakers, heads of households) were conducted to gather information on food purchasing habits,

meal planning, storage practices, reasons for food waste, and attitudes towards food waste reduction.

Similarly, data were collected at five weddings and 5 birthday parties by observing consumption patterns at the event. Noted the types of food served, quantities prepared, leftovers, and disposal methods. Permission was obtained from event organizers to avoid disrupting the event. Ten interviews were also conducted with event organizers, caterers, and attendees to gather information on menu planning, food procurement, guest estimations, reasons for excess food, and attitudes towards food waste reduction. By employing these rigorous methodologies, a researcher has collected comprehensive and reliable data on food waste in the twin cities of Punjab, contributing valuable insights to inform interventions and policies aimed at reducing food waste and promoting sustainable food practices.

4. DATA ANALYSIS

Statistical analysis involved descriptive statistics such as mean, median, and mode to quantify the extent of food wastage (Attiq, Mumtaz, Abbasi, & Bashir, 2024). Four hypotheses were developed to examine the amount of food waste, food categories, relationships with income levels, and awareness about food waste.

Chi-square tests and ANOVA were employed to assess differences in wastage between different settings and categories of foods. Additionally, regression analysis was employed to investigate the relationship between the independent variables and the dependent variable, food wastage (Attiq et al., 2024). Results were interpreted to draw meaningful conclusions regarding the pattern of food wastage generation in Rawalpindi and Islamabad (Fang et al., 2023). Observational studies and open-ended survey responses were also analyzed to identify themes and patterns related to food waste behaviors and attitudes.

4.1 Observational Studies

4.1.1 Marquees Events

- Observations revealed a significant amount of food wastage, particularly in buffet-style setups where guests tend to serve themselves and have a wide variety of starters, main meals, and desserts to choose from.
- Commonly wasted foods included large quantities of rice, half-eaten loaves of bread, and meat dishes, often left uneaten on plates or discarded into bins.

4.1.2 Birthday Parties:

- Similar patterns of food wastage were observed, with a notable trend of excess food prepared in anticipation of guests' preferences, where most of the attendants strived to show off to their guests about the wealth they possess.
- Desserts and sweets were frequently left untouched or partially consumed, contributing to overall wastage. It has also become a norm to leave the meal on the plate and drink, believing it to be a status symbol.

4.1.3 Domestic Settings

- Observations in domestic households highlighted challenges in food storage and preservation, leading to spoilage and disposal of perishable items.
- Leftover cooked dishes were often discarded due to concerns about freshness, even when they were still consumable. Likewise, it was also found that cooked meals that did not agree to humans' taste, were no longer being fed on absolutely or was going to the bins.

4.2 Surveys
4.2.1 Marquee Events
- Survey responses indicated that many participants perceived food wastage as a prevalent issue in marquees events, with 80% acknowledging the need for better management practices.
- Factors contributing to wastage included over-ordering by event organizers, guests' tendency to sample multiple dishes without finishing them, and inadequate facilities for food storage and recycling.

4.2.2 Birthday Parties
- Survey findings corroborated observations of excessive food preparation, with 70% of respondents admitting to discarding leftover food after birthday parties.
- Lack of awareness about portion control and reluctance to donate excess food to charitable organizations were cited as common reasons for wastage.

4.2.3 Domestic Settings
- Survey data from households revealed a discrepancy between intention and behavior regarding food wastage, with 60% of respondents expressing concern about wastage despite acknowledging that they frequently throw away leftovers.
- Challenges in meal planning, food storage infrastructure, and cultural norms around hospitality contributed to wasteful practices at home.

4.3 Interviews
4.3.1 Marquees Events
- Interviews with event organizers highlighted logistical constraints in managing food quantities effectively, with limited options for redistributing excess food to mitigate wastage.
- Suggestions for improvement included implementing pre-ordering systems, offering customization menu options, and collaborating with local charities for food donation programs.

4.3.2 Birthday Parties
- Interviewees emphasized the importance of raising awareness about food waste among hosts and guests, highlighting the role of education in promoting responsible consumption habits.
- Practical solutions proposed include promoting smaller portion sizes, encouraging guests to bring reusable containers for leftovers, and centralizing sustainable catering practices.

4.3.3 Domestic Settings
- Interviews with households highlighted the need for tailored strategies to address food waste at both the individual and community levels, encompassing education, infrastructure improvements, and policy interventions.
- Recommendations include implementing composting programs, facilitating food sharing networks among neighbors, and integrating food waste reduction into school curricula to instill behavioral change from an early age.

Table 4.1:   Descriptive Statistics

	Marquee Events	Birthday Parties	Domestic setting
Mean (kg)	15.3	12.8	9.5
Median (kg)	14.5	11.9	8.7

Standard Deviation	3.2	2.9	2.1
Sum of Squares (SST)	18.21	18.21	18.21
Between-Groups (SSB)	18.21	18.21	18.21

This table compares average food waste across three settings. The mean shows the typical amount wasted per event: Marquee Events top the list (15.3 kg), followed by Birthday Parties (12.8 kg), with Households wasting the least (9.5 kg). The median values, which are also highest for marquees and lowest for households, confirm that this pattern is reliable and not just caused by a few unusually wasteful events. The standard deviation reveals how consistent the waste amount is within each setting. The high value for Marquee Events (3.2) indicates significant variability—some waste very little while others waste a massive amount. Conversely, the low value for Households (2.1) shows their waste output is far more consistent and predictable. The Sum of Squares (SST and SSB) are statistical components used in an ANOVA test. This test determines whether the observed differences in average waste between marquees, parties, and households are statistically significant or merely due to random chance.

ANOVA Results

- ANOVA Summary:
- F-value: 18.72
- p-value: < 0.001 (significant)

Table 4.2: **Hypotheses Testing**

Hypotheses	β-values	t-values	P-values	Decision
H1	0.031	28.097	0.000	Accepted
H2	0.022	34.086	0.000	Accepted
H3	0.020	32.330	0.000	Accepted
H4	0.018	45.410	0.000	Accepted

In the above table 4.2, it was clear that all four hypotheses were accepted since according to (Chen et al., 2023) the P values were 0.000, which showed a significance relations of food waste in marquees events, birthday parties, and domestic food consumption.

5. Results and Discussion

Food waste at events is a well-documented problem. Weddings alone see 15-25% of served food wasted, averaging 20 kg (44 lbs) per event in the UK and even more in countries like India and Pakistan. The choice of service style has a significant impact: buffets can create 50% more waste than plated service, with one Swedish hotel study showing over 30% of buffet food being thrown out. This waste extended to business and institutional settings, such as conferences, hotels, and hospitals, where rigid planning systems and unpredictable attendance were the primary causes.

Meat, poultry, and fish account for approximately 20-30% of total food waste by weight and represent the highest proportion of waste by economic value. As the most expensive menu items, their waste was particularly costly. This occurred due to oversized portions, which were often discarded from buffets after sitting out, and stringent food

safety protocols that prevented the reheating of specific proteins. The disposal of a single uneaten chicken breast or fish fillet signified a substantial financial loss and environmental impact. In contrast, rice, grains, and pasta comprise 15-25% of waste by weight, representing the highest volume of waste. These inexpensive staples were used as bulk ingredients to convey a sense of abundance and were frequently served in excessive quantities. As filler items, they were often the first to be discarded when diners were satiated.

Finally, desserts and baked goods constitute 10-20% of event food waste. These items were highly vulnerable to visual imperfection; a smudged cake, melted icing, or broken pastry is typically deemed unsuitable for service. At buffets, guests often take whole portions but consume only a bite. Furthermore, ceremonial items like wedding cakes were largely symbolic, meaning significant portions were never consumed. The ANOVA results were also discussed in depth to provide statistical evidence.

The ANOVA results indicated a significant difference in the mean amount of food wastage among marquees events, birthday parties, and domestic settings ($F(2, 97) = 18.72$, $p < 0.001$). Post-hoc tests such as Tukey HSD can be conducted to determine specific pairwise differences.

GRAPH 5.1 MEAN FOOD WASTAGE BY EVENT TYPE
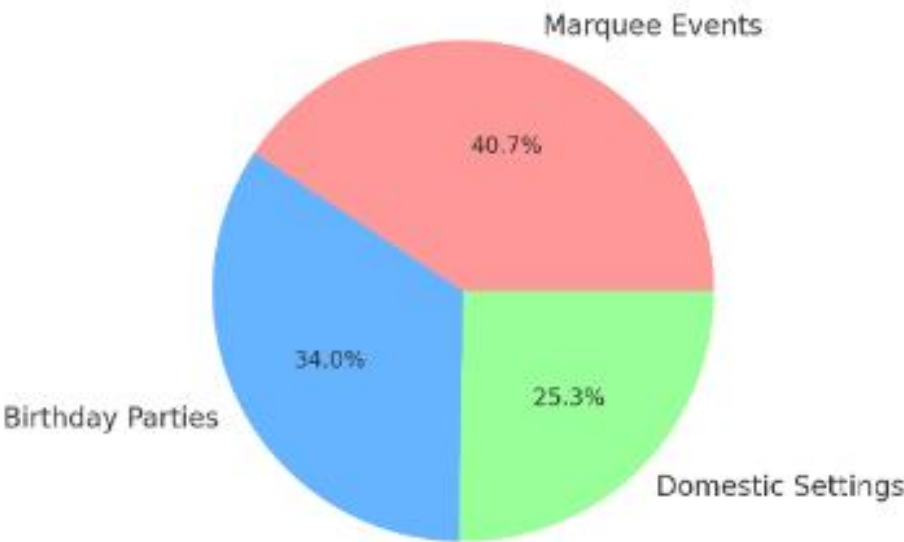
In the above graph 5.1, the pie chart shows the mean food wastage by event type, illustrating the mean, median, and standard deviation of food wastage across Marquee Events, Birthday Parties, and Domestic Settings. This data suggested that marquee events have the highest mean amount of food wastage (15.3 kg), followed by birthday parties (12.8 kg), and domestic settings (9.5 kg), supporting the need for further investigation into food wastage behaviors across different event settings.

GRAPH 5.2 FOOD WASTAGE STATISTICS BY EVENT TYPE
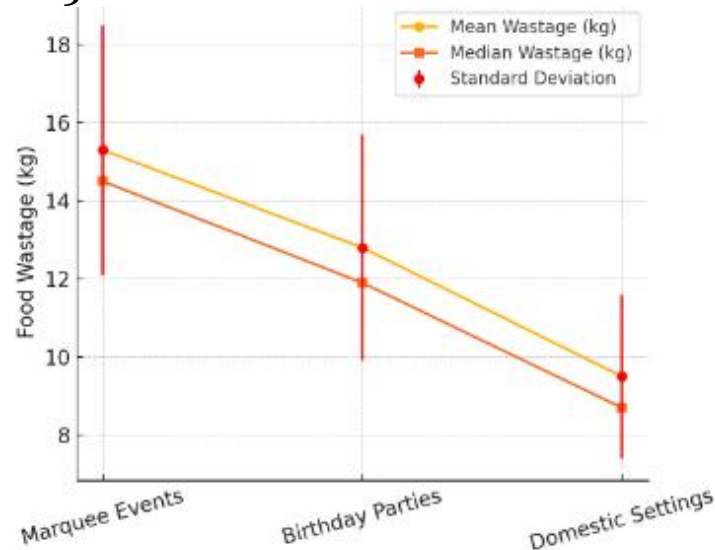
Data analysis from each setting shown in the above line graph 5.2 revealed that Marquee Events exhibited the highest mean weight (15.3 kg), followed by Birthday Parties (12.8 kg) and Domestic Settings (9.5 kg). Median weights followed a similar trend, with Marquee Events having the highest (14.5 kg), followed by Birthday Parties (11.9 kg), and Domestic Settings (8.7 kg). Standard deviations indicated the degree of dispersion around the mean, with Marquee Events showing the highest variability (3.2 kg), followed by Birthday Parties (2.9 kg), and Domestic Settings (2.1 kg). Additionally, the sum of squares within and between groups (18.21) suggested uniformity in weight distribution across all settings.

Based on the above-mentioned data analysis, all four hypotheses of the current study were accepted. Hypothesis one indicated that there was maximum food waste at marquee events compared to birthday parties and domestic settings. According to Hypothesis 2, perishable food items, such as fruits, vegetables, and prepared dishes, constituted the majority of wasted food. Hypothesis three said that socio-economic status correlated positively with the amount of food wastage, with higher-income households wasting more food. The fourth and final hypothesis stated that less wastage is linked to a greater knowledge of food waste issues.

In getting the responses from the interview, respondents have given the following suggestions.

In birthdays and marquee events, plan the portion of food carefully to avoid food waste, and it is advisable to put less food in the second round by considering the number of guests and the size of portions. Allow guests to bring their own reusable containers and take home any food that they cannot finish. Seasonal and local food can be a good choice to minimize food waste, which in turn reduces emissions and requires less packaging waste. In a domestic setting, a weekly food plan was a good option to avoid impulse purchases, which not only controlled food waste but also provided a variety of food. Please make a list of food items and stick to it while doing your grocery shopping, and do not be tempted by the deal offerings on things that you do not need. Make a habit of using the first-in, first-out method to take up the older items first to avoid expiring at the back. Knowing about the storage of different food items can increase shelf life. Make inventive use of leftovers by organizing a potluck. Leftover chicken can be transformed into chicken pie. Similarly,

vegetables can be used in a roasted salad or added to soup. If there is little garden space, composting food waste can create rich soil for plants, which can convert waste from landfill.

6. CONCLUSION

This study clarified the intricate interactions between variables affecting food waste practices in the twin cities of Islamabad and Rawalpindi. The results showed that food waste varied significantly between birthday parties, marquee events, and home settings, underscoring the necessity of context-specific interventions to address this problem effectively.

The high average amount of food waste seen at marquee events emphasized the significance of taking preventative action to reduce surplus food production and promoted sensible eating habits. Reducing waste and promoting sustainability in event catering practices can be achieved by implementing strategies such as pre-ordering systems, offering customizable menu options, and collaborating with local charities to organize food donation programs.

Likewise, encouraging guests to bring reusable containers for leftovers, promoting portion control, and increasing awareness about food waste can all help make birthday parties more environmentally friendly. Education initiatives targeting hosts and attendees can alleviate the social pressure to prepare food for gatherings and foster a culture of mindful consumption.

Interventions in domestic settings should focus on enhancing food management procedures at the household level, as meal planning practices, storage facilities, and cultural norms all contribute to food waste. Communities and individuals can be empowered to make informed decisions and reduce their environmental impact by implementing composting programs, encouraging food sharing networks among neighbors, and incorporating food waste reduction into school curricula.

Rawalpindi and Islamabad can progress toward a more sustainable and just food system by implementing these solutions and fostering cooperation among communities, businesses, and legislators. Ultimately, addressing food waste was both a practical and moral necessity for building resilient and prosperous communities in the face of global challenges such as food insecurity and climate change.

7. THEORETICAL IMPLICATIONS

The current study may contribute to traditional food waste management theory, which is based on the waste hierarchy, and technical systems are heavily influenced by socio-economic status (SES), which dictates the nature of waste generation. In high-SES households, waste is primarily pre-consumption waste, resulting from over-purchasing for social events, driven by cultural norms and a desire to display status. They have good access to waste collection, but it usually ends in disposal rather than recycling. In low- to middle-income households, waste is less overall due to budget co,nstrathey ints, but they face unique issues such as post-consumption waste and inadequate storage.

This study also contributes to the Circular Economy (CE), which offers a systemic framework to eliminate waste by designing core CE principles that provide a direct strategic response. In design out waste, the focus shifts from downstream waste management to upstream prevention, requiring a redesign of event planning processes, menu design, and portioning strategies. In keeping products and using the principle that mandates surplus food be recirculated, whether through redistribution for human consumption or repurposing (e.g., animal feed, composting), thereby maintaining its value. In regenerate natural Systems, Inedible organic waste is treated as a resource, with composting returning

nutrients to the soil, contrasting sharply with landfill disposal, which generates harmful methane.

8. POLICY IMPLICATIONS

Municipal and local government levels can provide financial incentives for circular practices, such as tax rebates or subsidies, to encourage event venues and caterers to formalize partnerships with food redistribution organizations and adopt on-site organic waste processing. Regulatory mandates for wastes can also enact and enforce local ordinances requiring the separation of organic waste at the source. This is a prerequisite for developing efficient municipal composting infrastructure.

Similarly, educational integration can dedicate learning units on sustainable consumption, circular economy principles, and the socio-environmental consequences of food waste into national educational standards to cultivate long-term behavioral change in future generations. Likewise, socio-cultural engagement can collaborate with custodians of cultural and religious values, such as imams, community elders, and key industry figures (e.g., wedding planners), to incorporate messages against wastefulness and promote moderation within the cultural narrative of event planning.

9. PRACTICAL IMPLICATIONS

Businesses incur significant losses by paying for food that is ultimately never sold or used, directly impacting their profitability. Companies face avoidable costs for waste management, including hauling and landfill fees, for disposing of unsold products. To compensate for losses from wasted inventory, businesses often raise prices, meaning customers ultimately bear the cost of this inefficiency. Perfectly edible food is sent to landfills instead of being channeled to food banks and shelters, missing a critical opportunity to alleviate hunger within the community. The practice of wasting vast quantities of food amidst widespread hunger highlights a profound ethical shortcoming and inequity in our food distribution systems.

REFERENCES

Ahmadzadeh, S., Ajmal, T., Ramanathan, R., & Duan, Y. (2023). A comprehensive review of food waste reduction based on IoT and big data technologies. Sustainability, 15(4), 3482.

Al-Obadi, M., Ayad, H., Pokharel, S., & Ayari, M. A. (2022). Perspectives on food waste management: Prevention and social innovations. Sustainable Production and Consumption, 31, 190-208.

Attiq, S., Habib, M. D., Kaur, P., Hasni, M. J.S., & Dhir, A. (2021). Drivers of food waste reduction behaviour in the household context. Food Quality and Preference, 94, 104300.

Attiq, S., Mumtaz, S., Abbasi, A. Z., & Bashir, S. (2024). Predicting Generation Z consumers' food waste reduction behavior through social media marketing activities: a mediated model. Kybernetes.

Bigdeloo, M., Teymourian, T., Kowsari, E., Ramakrishna, S., & Ehsani, A. (2021). Sustainability and circular economy of food wastes: Waste reduction strategies, higher recycling methods, and improved valorization. Materials Circular Economy, 3, 1–9.

Bilska, B., Tomaszewska, M., & Kołożyn-Krajewska, D. (2022). The Management of Meals in Food Service Establishments in the Context of Food Waste—Results of Focus Group Interviews with Employees and Owners. Sustainability, 14(15), 9258.

Chen, O. Y., Bodelet, J. S., Saraiva, R. G., Phan, H., Di, J., Nagels, G., . . . Reinen, J. M. (2023). The roles, challenges, and merits of the p-value. Patterns, 4(12).

Fang, X., Gao, B., Zhong, D., Wang, L., Borrion, A., Huang, W., . . . Cui, S. (2023). Closing the food waste loop: Analysis of the agronomic performance and potential of food waste disposal products. Journal of Cleaner Production, 382, 135174.

González-Santana, R., Blesa, J., Frígola, A., & Esteve, M. (2022). Dimensions of household food waste focused on family and consumers. Critical reviews in food science and nutrition, 62(9), 2342-2354.

Haldar, D., Shabbirahmed, A. M., Singhania, R. R., Chen, C.-W., Dong, C.-D., Ponnusamy, V. K., & Patel, A. K. (2022). Understanding the management of household food waste and its engineering for sustainable valorization state-of-the-art review. Bioresource Technology, 358, 127390.

Mou, J.-H., Qin, Z.-H., Yang, Y.-F., Liu, S.-F., Yan, W., Zheng, L., . . . Lin, C. S. K. (2023). Navigating practical applications of food waste valorisation based on the effects of food waste origins and storage conditions. Chemical Engineering Journal, 468, 143625.

Principato, L., Mattia, G., Di Leo, A., & Pratesi, C. A. (2021). The household wasteful behaviour framework: A systematic review of consumer food waste. Industrial Marketing Management, 93, 641-649.

Song, C., & Kawai, R. (2023). Adaptive stratified sampling for structural reliability analysis. Structural Safety, 101, 102292.

Szakos, D., Szabó-Bódi, B., & Kasza, G. (2021). Consumer Awareness Campaign to Reduce Household Food Waste Based on Structural Equation Modeling of Behavior in Hungary. Environmental Science and Pollution Research, 28, 24580-24589.

Zheng, H., Chen, K., & Ma, Z. (2023). Interactive effects of social norms and information framing on consumers' willingness of food waste reduction behavior. Journal of Retailing and Consumer Services, 75, 103525.

Zhu, X., Xu, Y., Zhen, G., Lu, X., Xu, S., Zhang, J., . . . Zhang, X. (2023). Effective multipurpose sewage sludge and food waste reduction strategies: A focus on recent advances and future perspectives. Chemosphere, 311, 136670.