

# **AN INVESTIGATION INTO THE CATEGORY OF FOODS WASTED WITHIN THE HOSPITALITY INDUSTRY IN THE UPPER WEST REGION**

**Emelia karbo<sup>1</sup>, Jemima Evelyn Nartey<sup>2</sup>, Christina AbiAtingah**

<sup>1</sup>Nusrat JahanAhmadiyya College of Education, Wa, Ghana  
[emeliakarbo@gmail.com](mailto:emeliakarbo@gmail.com)

<sup>2</sup>Department of Hotel, Catering and Institutional Management,  
Accra Technical University, Ghana  
[jemimanartey369@gmail.com](mailto:jemimanartey369@gmail.com)

<sup>2</sup>Department of Hotel, Catering and Institutional Management,  
P. O. Box 767, Bolgatanga Technical University, Ghana  
[abiatingah@gmail.com](mailto:abiatingah@gmail.com)

## **Abstract**

The study investigated the category of foods wasted in the hospitality industry in the Upper West Region of Ghana. The study population came from food vendors, chop bar operators, accommodation facilities, and food hawkers within the Upper West Region of Ghana. A stratified sampling approach was used in the selection of the study sample. Subsequently, the Krejcie and Morgan sampling table was used to determine the sample size for the different segments of the population. The study used a survey research design where questionnaire instruments based on a five-point Likert scale were used for the study data collection. Data from this study was an analysis based on descriptive statistics (i.e. frequency and percentage) and inferential statistics such as principal component analysis and multiple regression analysis. Results from the study suggest that the category of foods that often go waste in the understudied hospitality firms in the Upper West Region did not take a singular form but came from several food types. Also, it was established that restaurants' operating procedures and policies as well as chefs'/cooks' lack of ideas on how to use left-over food items for other dishes accounted for most of the food wastage in the hospitality sector.

**Keywords:** Food wastage, Hospitality industry, Food categories, Beverages, Chefs, Cooks

## **Introduction**

Food waste remains an important topical issue for both global food security and good environmental governance. Its occurrence happens to have a direct consequence on all the facets of sustainability that is, on the environment (e.g. energy, climate change, availability of resources), economic (e.g. resource efficiency, price volatility, increasing costs, consumption, waste management, commodity markets) and ethical and related social issues (e.g. health, equality) (FAO, 2016). Per the United Nations Universal Declaration on Human Rights, every individual be it poor or rich, male or female has a right to a standard of living adequate for the health and well-being of himself/herself and that of his family, including food. Despite every

individual right to food, it is estimated that 821 million people across the world over do not get sufficient food to eat. This means that one in every nine people is suffering from hunger (FAO, 2015). The bizarre part of this revelation is that people are not mainly hungry because of a shortage in food supply but rather because of excessive food wastage (Racz, Marchesi, & Crnković, 2018). For instance, an estimate provided by FAO suggests that close to one-third of all foods produced globally for human consumption go waste. In volume terms, it corresponds to 1.3 billion tons per year (FAO, 2011).

Food waste does not only threaten global food security (Godfray, et al., 2010), but it comes with its own economic and environmental challenges (Hall, 2009). Estimates available suggest close to 40% of Ghana's food which in monetary terms is about 8 billion dollars of food a year is discarded from fields, commercial kitchens, manufacturing plants, markets, schools, and restaurants (Future of Ghana, 2016). Even though, not all of these excesses of foods are eatable nevertheless, a significant part of it can still go to the most vulnerable in society who may need it most. For instance, it is estimated that nearly 95 percent of vulnerable communities within the country are not getting adequate food to eat (Wanjiku, 2017). Also, 1 out of 4 children in many parts of the country goes to bed hungry without taking in any food at all (Future of Ghana, 2016). Again, it has also been established that one in every five new births in Ghana is born stunted, which in monetary terms has been estimated to cost the economy \$2.6 billion a year, which is about 6.4 percent of the country's real GDP (Wanjiku, 2017).

Even though the underlying consequences associated with food wastage happen to be quite dire and substantial both at the micro and macro level (Al-Buainain, 2015) yet there seems to be no single accepted definition of the concept in the literature (Racz et al., 2018). For instance, in certain instances, the concept of food loss and food waste have been used interchangeably in the literature to refer to or depict the same concept. However, it has to be stated that these two concepts are not the same and each tends to denote different things altogether. For instance, Gustavsson et al. (2011) assert that food losses constitute the decrease in eatable food mass throughout the part of the supply chain that specifically leads to a reduction in the edible food for human consumption. According to them, food losses often take place during the production, post-harvest, or at the processing stage in the food supply chain (Gustavsson et al, 2011).

However, food waste constitutes foods that are often of good quality and fit for human consumption yet they are still not eaten because it is thrown away either before or after it spoils (Brian et al., 2013). The EU Fusion (2016) on their part defined food wastage as any food lost by deterioration or waste and may usually take the form of composted foods, crops ploughed in/not harvested, anaerobic digestion, bioenergy production, co-generation, incineration, disposal to sewer, landfill or discarded to the sea. From the perspective of Lipinski, Hanson, Lomax, Kitinoja, and Waite (2013), food waste constitutes all forms of food that are of high quality and wholesome yet get not to be eaten, because it is thrown away either before or after it spoils.

Food wastage may usually take the form of unconsumed food items, the half-eaten meal left on the plate, food preparation leftovers, and scraps coming from residences or households, commercial establishments like restaurants, schools, institutions, and cafeterias, (Aziz, 2012; United States Department of Agriculture, 2015). According to Baig et al. (2019), food wastage may usually occur as a result of a person's negligence or the decision to throw food away. For instance, it has been established that people may discard leftover food for the fear that it is no longer safe to eat (Baig et al., 2019). Also, an individual's economic affluence or societal welfare policies through subsidized prices of foods have all been identified as part of the factors that increase individual access to food supply which in effect result in excessive food wastage (Baiget

al., 2019). According to the High-Level Panel of Experts on Food Security and Nutrition (HLPE) (2014), the distinction between food wastage and food losses emanates from their time of occurrence within the food supply chain. Per their perspective, food losses often occur before the consumption level regardless of the cause whereas food waste occurs at the consumption level regardless of the cause. The study, therefore, seeks to investigate the category of foods wasted within the hospitality industry in the upper west region.

### **Literature review**

A study was done by Hoover and Moreno (2017) on behalf of the Natural Resources Defense Council sought to characterize the amount of food that is wasted in three U.S. cities; Denver, Nashville, and New York City for both residential and non-residential sectors and again identify the main reasons that accounted for food waste in those listed cities. Results from the study showed that an average of 68 per cent of all food thrown away within these three cities was deemed edible. Again, it was established that the average amount of total food wasted per capita across all three cities was 3.5 pounds per person per week. Also, the average amount of edible food wasted per capita across all three cities was 2.5 pounds per person per week. Moreover, when it came to the category of food often discarded across the three cities, it was established that the largest two categories of food wasted by participants were inedible parts and edible fruits and vegetables. Again, the fourth-highest category of food wasted on average was liquids, oils, and grease, which includes beverages. Meat and fish, dairy and eggs, and baked goods were all wasted in similar proportions. However, in tracking the total food wasted (i.e. edible food and inedible parts), three items namely; coffee, banana, and chicken were found in the top five of the most wasted foods in all the three cities. Finally, food items appearing in the top ten of most wasted edible food items in all the three cities were coffee, milk, apples, bread, potatoes (peels), broccoli (stalks) and pasta.

Moreover, a study by van der Werf, Seabrook and Gilliland (2019) seek to examine the food-wasting behaviour of households in London and Ontario, Canada. The study relied on the theory of planned behaviour (TPB) where the scale of TPB was administered to the respondents in these two cities. Results from the study revealed that the studied households threw out avoidable food waste 4.77 times/week (SD=4.81) and 5.89 food portions/week (SD=5.66). However, with regards to the category of food often wasted or discarded by the respondents, it was revealed that fruits and vegetables were the most wasted food items followed by other food and bread and baked goods with dried food (i.e. cereal) as the least common forms of food often wasted. Specifically, 81.0% of the respondents held that they never threw away any kind of dried foods. Moreover, when it came to the reasons that accounted for the excess waste in this category of food, it was evident that buying too much was the primary factor for bread and baked goods, dairy, fruit and vegetables, and other food, whereas when it came to food such as meat and fish, reasons such as exceeding its expiry date and for dried food changed in taste and appearance constituted the prime reasons for their wastage. Finally, when it came to the three primary motivators that entice them to reduce food wasting behaviour, 58.9% of the respondents selected reducing monetary loss as their first choice and this was significantly ( $p < 0.001$ ) higher than both reducing environmental impact (23.9%) and reducing social impacts (17.2%).

Similarly, in the case of Malaysia, Papargyropoulou et al. (2019) work identified fruits and vegetables as the main food commodities that are often wasted in most buffet preparation in Malaysian restaurants. Interestingly, the reasons identified to have accounted for such high wastage of fruits and vegetables were that these food categories were quite heavy (for example

watermelon skins) and were often used in high quantities as they were quite cheaper to buy when compared to other food commodities such as meat, fish, and seafood.

Results reported in the study of Hoover and Moreno (2017) are consistent with the ones found in the studies of the Waste and Resources Action Programme (2013) in the United Kingdom. The most revealing part of their report is that 7.0 million tonnes of food waste discarded by households in 2012 is adequate to fill London's Wembley stadium nine times over, and constitutes 19%, by weight, of food brought into the home in London. Again, even out of the 7.0 million tonnes of food wasted, 4.2 million tonnes are avoidable and in monetary terms are worth £12.5 billion (US\$20 billion). In terms of the categorization of food wasted, it was established that waste from items such as tea, banana skins, poultry bones, onion skins and orange peel constituted 60 per cent of the entire waste. Again, it was observed that 40 per cent of all the food waste was linked with 'carbohydrate foods'; potato and potato products (21%); bread and bakery (12%); and pasta/rice (7%). However, items such as Fruit and vegetable food waste (15%) and Meat/fish (6%) accounted for a lower proportion of avoidable food waste. The results reported in the study of the Waste and Resources Action Programme (2013) are not very different from the ones found in the work of Gjerris and Gaiani (2013) as their work identified bread and cereal products as the food items that are often wasted by most UK households. For instance, Gjerris and Gaiani (2013) asserted that bread and other cereal products wasted by UK households alone would be adequate to prevent the malnourishment of about 30 million of the world's hungry population.

Nevertheless, when it came to the category of foods wasted, food items identified to be usually wasted in London and Ontario were found not to be very different from the ones identified in other developing economies such as India and sub-Saharan Africa. Explicitly, in a work done by the Institution of Mechanical Engineers (2014) on sub-Saharan Africa and India, it was observed a little over 50% of fruit and vegetables in these two regions end up being discarded. In the same report, it was established that in Tanzania, nearly 25% of all milk produced in the wet season go waste. However, the most intriguing part of their assessment is that nearly 25% of food waste in developing countries could be avoided or prevented with better storage facilities.

In the case of Ghana, a study by Rutten and Verma (2014) assessed the medium to long-term macroeconomic impacts of tackling food losses focusing on outcomes in terms of economic growth, changes in production and prices for relevant commodities, impacts on households' food consumption and nutrition, and economy-wide welfare. Results from the study suggest that across all the processes in the food supply chain that is, from agricultural production, post-harvest handling and storage, processing and packaging, distribution and consumption, fruits and vegetables had the highest rate of wastage among all the other food categories. Per their estimate, 66% of fruits and vegetables are discarded across the food supply chain. The highest rate of fruit and vegetable wastage occurs at the processing and packaging stage with 25% of them going to waste at this stage. The least rate of fruit and vegetable waste occurs at the consumption stage with only 5% of fruits and vegetables going spoilt at this stage. Findings from this study tend to affirm the works of the Institution of Mechanical Engineers (2014) and that of Werf et al. (2019) as fruit and vegetables were similarly identified in their study as the items with the highest rate of wastage.

Again, in the study of Rutten and Verma (2014), the food category with the second-highest rate of wastage was root and tubers with 54% of the foods under this category going to waste in Ghana. Specifically, most of the root and tubers' food waste and loss occurred at the post-handling and storage stage with 18% of the root and tubers' food items going to waste at the

stage of the supply chain. Likewise, in the food supply chain, the food item with the least form of wastage occurred at the consumption stage with only 2% of the foods going to waste. Moreover, among all the food categories, the food items with the least rate of wastage were cereals with their total rate of wastage standing at 20.5%. Again, cereals highest rate of wastage occurred during the post-harvest handling and storage. Additionally, when it comes to the category of food items often wasted, roots and tubers took the form of foods such as yam, cassava and groundnut with fruits taking the form of mango and orange and vegetables taking the form of okra and tomato and lastly cereals taking the form of maize, rice and cowpea. Hence, per their results, these were the cluster of foods often wasted in Ghana across the entire food value chain that is, from agricultural production, post-harvest handling and storage, processing and packaging, distribution and consumption.

Also, in an estimate done by the Food and Agriculture Organization of the United Nations (2019), it was opined that on average one third of the world's food is thrown away even though they were found to be edible and wholesome. This suggests that nearly 1.3 billion tonnes which in monetary terms is \$990 billion of food are discarded every year across the world. When it comes to the category of food often discarded fruits, vegetables, root and tuber fruits accounted for 45% of the wasted food with fish and seafood accounting for 35% and cereals accounting for 30% of the wasted foods. The categorization of foods often wasted or discarded in the reports of FAO tend not to be very different from the food items found in the studies of the Institution of Mechanical Engineers (2014), Rutten and Verma (2014), Hoover and Moreno (2017) and that of Werf et al. (2019). This presupposes that food items such as fruits and vegetables, bakery products, tubers and fish and seafood constitute the category of foods often wasted by both domestic and industrial consumers.

**Methodology**

The study adopted a cross-sectional research design. as rightly suggested by Saunders et al. (2009) that cross-sectional research design becomes the most suitable design to use when a study’s research questions begin with interrogative phrases such as, who, what, where, how much, and how. Hence, having all the study research questions commencing with the phrase ‘what’ affirms the suitability of the survey design under this context. According to the Ghana Tourist Board's recent report, the Upper West Region has a total of 36 registered accommodation facilities and 30 catering facilities made up of restaurants and other foodservice providers (Ghana Statistical Service, 2017). 166 entities made up of hotel facilities, catering facilities, food vendors and chop bars within the Upper West Region of Ghana formed the study population. The study used a stratified random sampling technique. According to Bryman (2012), stratified random sampling becomes ideal when a study population has a representation of different groups or units. However, to determine the sample size for each given stratum, the study used the Krejcie and Morgan (1970) sampling table to determine the sample size for all the four strata; hotel facilities, catering facilities, food vendors, and chop bars. The breakdown of the population size and sample size of the respective cluster has been presented in Table 1.

**Table 1: Description of Population Size and Sample Size**

<b>Stratums</b>	<b>Population size</b>	<b>Sample size</b>
Hotels	36	29
Restaurants	30	28
Food vendors	50	44
Chop bars	50	44

---

<b>Total</b>	<b>166</b>	<b>145</b>
--------------	------------	------------

---

Data collection instrument constitutes the tools used in collecting information from the study respondents (Bryman, 2012). It usually takes the form of tools such as questionnaire items, interviews, observations, or observation by participation. A questionnaire item was used to collect data from the respondents. Generally, questionnaire instrument mostly becomes much more dependable when a study seeks to use a standardized scale to obtain information from a large scale of respondents (Kumar, 2011). A familiarization visit was made to all the targeted institutions to discuss with them the purpose of the study and likewise seek their consent for their participation in the study. This familiarization visit will take one week to complete. However, institutions that agreed to participate were given an introductory letter obtained from the Graduate School of the University of Education, Winneba to confirm the study purpose as well as the researchers' identity. The data distribution and collection were the sole responsibility of the researchers and it took a period of three to four weeks to complete.

To confirm the suitability of the measuring scale to the study research questions, the supervisor together with other experts in the field of hospitality was asked to vet the questionnaire to confirm its suitability. Also, the instruments were pilot-tested in a similar setting to confirm the suitability of the scales for the targeted respondents. Finally, to confirm the internal reliability of the items, Cronbach's alpha was computed on each item to ascertain the reliability of each measuring time. A Cronbach's alpha value of 0.70 or more will be used as the measure to confirm the reliability of each given scale. The decision to use Cronbach's alpha value of 0.70 or more as the assessment criteria is based on the views of Nunnally and Bemstein's (1994) who assert that scales having reliability scores of 0.70 and above are often deemed highly reliable. Kline (2005) corroborated this same view when the author asserts that alpha values within the ranges of 0.7 and 0.8 are often the acceptable indicator that a scale is reliable.

In an attempt to address these concerns firstly, permission was sought from the district offices at the various divisions before the researcher distributed the questionnaires to the participants to fill out. Additionally, every questionnaire that was sent out was attached to a cover letter that espoused the purpose of the survey. The questionnaire did not require the names of the respondents; this was to protect their identity and remain anonymous. As a result, the personnel were aware from the beginning of what the researchers were doing, why and where the information was going, and why it was being gathered. To analyze the collected data, the researchers used Statistical Package for Social Scientists (SPSS) version 20 as the software package for both the descriptive and the inferential analysis. According to Bryman and Bell (2007), SPSS is one of the most widely used computer software packages for analysing quantitative data.

## **Results and Discussions**

### **Respondents Demographic**

The demographic profile of the respondents has been presented in Table 2. It provides detailed accounts of the respondents' age distribution, gender, academic qualification, job roles, number of employees, the average customers served per week, the number of years their organization has operated in the foodservice industry, and categorization of foodservice outlets surveyed.

Results from the study show that the majority of the respondents thus, 60.6% were males, and the rest thus, 39.4% were females. Again, concerning the age distribution of the respondents, results from Table 2 show that a large section of the respondents' ages fell within the age bracket

of 21-30 years. Specifically, 51.8% of the respondents had their ages within this age bracket. Also, 24.1% of the respondents had their ages within the age bracket of 31-40 years, 21.9%, on the other hand, had their ages within the age bracket of 41-50 years and lastly, 2.2% of the respondents had their age above the age categorization of 50 years and above. Moreover, concerning the respondent’s academic qualifications, it was established that a small section of the respondents that is, 7.3% and 8.8% respectively had basic and secondary education as their academic qualifications. Again, it became evident that 37.2% of the respondents had either diploma/HND as their highest level of academic qualification whereas 46.7% of the respondents had a bachelor’s degree as their highest level of academic qualification.

Moreover, when it comes to the business profile of the respondent’s food outlet, results from Table 2 show that 24.1% of the understudied food outlets fall under the category of restaurants, 18.2% as bars with eating outlets, 22.6% hotels with restaurants, 8.8% as canteen, 13.1% as foodservice point and 13.1% as food vendors. Additionally, with regards to the number of years these firms have operated within the foodservice industry, it can be observed in Table 4.1 that 17.5% of the firms had operated for less than one year, 29.2% had been in existence for 1-2 years, 27.0% had been in operation for 3-5 years, 15.3%, on the other hand, have been in existence for 6-9 years and lastly, 10.9% of the food outlets have existed for more than 9 years.

Also, when it comes to the number of employees these food outlets engaged in their respective firms, it was established that a little over half of the respondents that is, 51.1% engaged close to 10 employees, 19.7%, on the other hand, engaged 11-20 workers, 22.6% of the firms worked with 21-50 employees, 4.4% employed 51-70 employees and 2.2% of the firms worked with more than 70 employees.

Lastly, concerning the position the respondents held or occupied in their respective firms, it can be observed in Table 2 that 17.5% respectively held the role of managers and chef within their respective firms, 19.7% were owners of their firms, 35.8% occupied the position of supervisors and 9.5% performed the role of a waiter in their firms. Results from the study suggest that the understudied firms were well spread across all the food outlets operating within the Upper West Region of Ghana that is, restaurant operators, food vendors, hotels with restaurants, canteens, and food service points. Again, it was revealed that a significant number of these food outlets have operated in the Upper West Region for more than a year. Also, results from the study showed that a greater number of the participants played or occupied a key role in their respective food outlets with some occupying the roles of owners, chefs, managers, supervisors, and waiters. This goes to suggest that most of the respondents play a key role in their firm's food value chain that is from procurement to storage to preparation to serving hence, will be well informed about the issue of food waste in their firm’s food value chain.

**Table 2: Demographic Profile of Survey Respondents**

<b>Demographic variable</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>	Male	54	39.4%
	Female	83	60.6%
<b>Age</b>	21-30 years	71	51.8%
	31-40 years	33	24.1%
	41-50 years	30	21.9%
	Above 50 years	3	2.2%

<b>Education</b>	Basic	10	7.3%
	Secondary	12	8.8%
	Diploma/HND	51	37.2%
	Bachelor's degree	64	46.7%
<b>Category of food outlet</b>	Restaurant	33	24.1%
	Bar with eating outlet	25	18.2%
	Hotel with restaurant	31	22.6%
	Canteen	12	8.8%
	Foodservice point	18	13.1%
	Food vendor	18	13.1%
<b>The number of Years a food outlet has been in operation</b>	<1 year	17	17.5%
	1-2 years	19	29.2%
	3-5 years	24	27.0%
	6-9 years	45	15.3%
	>9 years	10	10.9%
<b>Total number of employees</b>	Up to 10	70	51.1%
	11-20	27	19.7%
	21-50	31	22.6%
	51-70	6	4.4%
	More than 70	3	2.2%
<b>Average customers served in a week</b>	Up to 100	88	64.2%
	101-200	46	33.6%
	201-400	3	2.2%
<b>Position of Respondents</b>	Manager	24	17.5%
	Chef	24	17.5%
	Owner	27	19.7%
	Supervisor	49	35.8%
	Waiter/waitress	13	9.5%

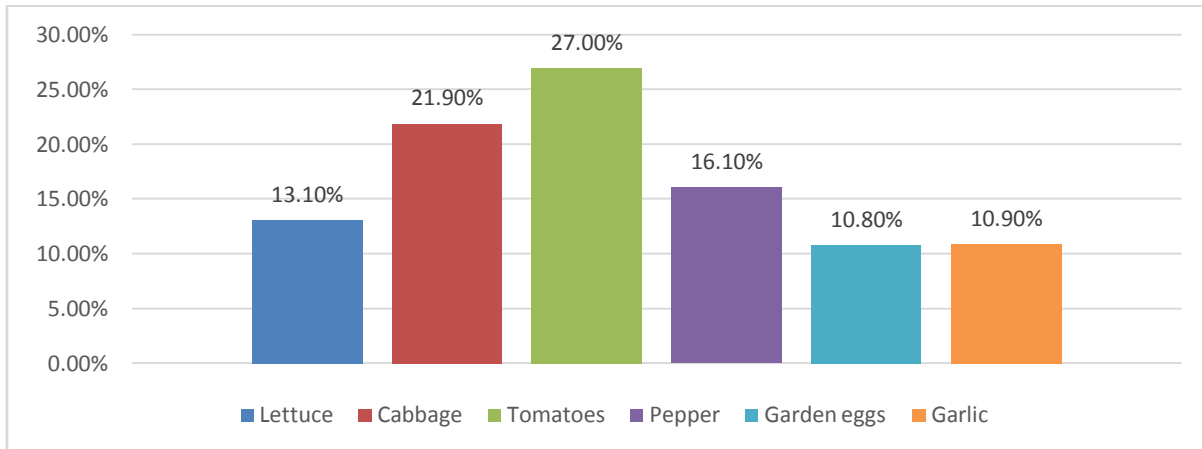
**Source: Author's fieldwork, 2020**

### **Category of Vegetables Often Wasted in the Hospitality Industry**

Results in Figure 1 suggest that the vegetables with the high spoilage rate in the understudied institutions were tomatoes and cabbage. Particularly, on tomatoes, 27.0% of the respondents identified it as the kind of vegetable that often gets wasted in their organization. With cabbage, 21.9% of the respondents listed it as the next highest vegetables that often get wasted in their organization. Again, the subsequent vegetable found to be often wasted in the understudied firms was pepper. With pepper, it was identified by 16.1% of the respondents as the third most wasted vegetable in their organization. Lettuce became the next vegetable identified to be mostly wasted by the respondent's firms. Particularly, on lettuce, 13.1% held the view that is the fourth highest wasted vegetable in their operation. However, among all the vegetables, garden eggs and garlic were found to be the least wasted vegetables across most of the firms' food value chains.



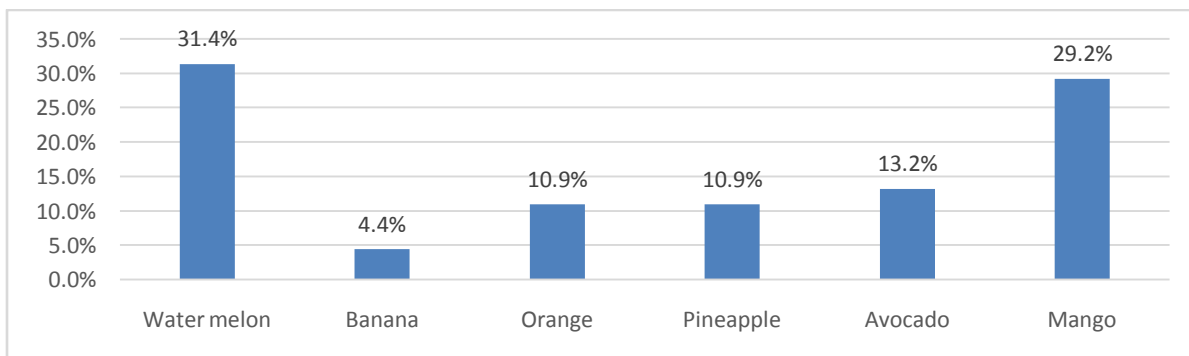
Specifically, 10.9% and 10.8% of the respondents respectively listed garden eggs and garlic as the least wasted vegetable in their operations



**Fig. 1: Category of Vegetables Often Wasted in the Hospitality Industry**  
**Source: Author’s fieldwork, 2020**

**Category of Fruits Often Wasted in the Hospitality Industry**

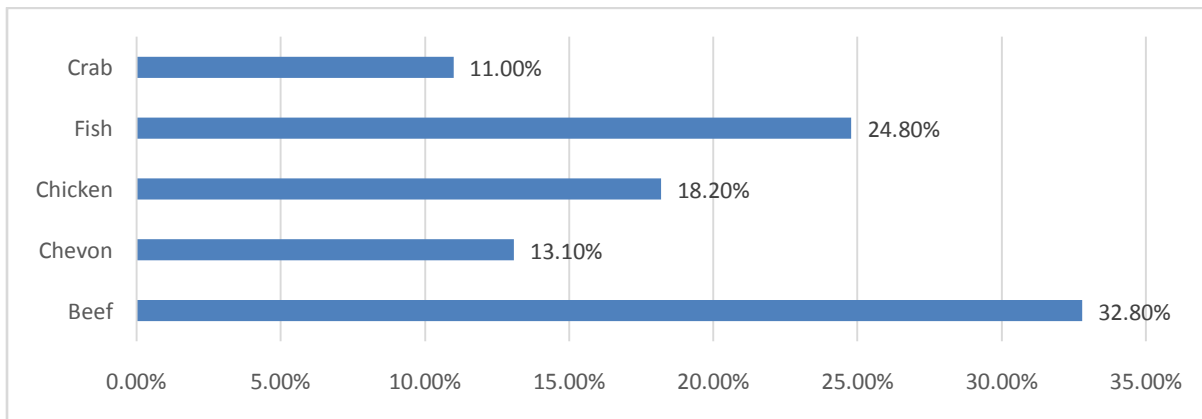
Under the category of fruits results from Figure 2 suggest that watermelon was identified as the most discarded fruit among all the listed fruits. Watermelon was identified by 31.4% of the respondents as the most wasted fruit within their food distribution chain. The second wasted fruit went to mango as 29.2% of the respondents listed it as the most discarded fruit in their organization. Again, the avocado was found as the third most wasted fruit in most of the firms’ food value chain. With avocado, 13.2% of the respondents identified it as the fruit that usually gets wasted in their organization’s production line. Also, 10.9% of the respondents respectively identified pineapple and orange as the most wasted fruits in their organization. Nevertheless, among all these fruits, the banana was found as the least wasted fruit in the organization’s food value chain. With bananas, only 4.4% of the respondents identified them as part of the fruits that were often discarded in their organization’s production line.



**Fig. 2: Category of Fruits Often Wasted in the Hospitality Industry**  
**Source: Author’s fieldwork, 2020**

**Category of Meat Often Wasted in the Hospitality Industry**

It can be observed in Figure 3 that the meat products that often get wasted in the understudied institution were beef followed by fish. 32.8% of the respondents listed beef as the meat that was often wasted in their organization. With fish, it was identified by 24.8% of the respondents as the most wasted meat in their organization. Aside from these meat products, the chicken was equally identified by 18.2% of the respondents as the most discarded meat product in their organization. Again, chevron was listed by 13.1% of the respondents as the type of meat that frequently get misused in their organization's food preparation. However, the crab was identified as the sea meat that was less discarded in the firm's food preparation. With crab, only 11.0% of the respondents identified it as the meat that was less wasted in their organization. As stated earlier, beef and fish meat recorded the highest rate of wastage in the firm's food preparation.



**Fig. 3: Category of Meat Often Wasted in the Hospitality Industry**  
 Source: Author's fieldwork, 2020

**Category of Baked Foods Often Wasted in the Hospitality Industry**

Results from Table 3 suggest that bread and cake constituted the baked products that were usually thrown away by most of the studied firms because of issues of spoilage or lack of freshness. Particularly, with bread 56.9% of the respondents identified it as the baked product with the highest rate of spoilage in their organization. Cake became the second most wasted baked product in the firm's food value chain. With cake, 23.4% of the respondents listed it as the baked product that often gets wasted in their organization. However, tarts and pie were the baked products that received the lowest rate of spoilage with their discarding rate standing at 4.4% and 2.2% respectively.

**Table 3: Category of Baked Foods Often Wasted in the Hospitality Industry**

Baked Foods	Frequency	Percent
Bread	78	56.9
Cake	32	23.4
Pie	18	13.1
Tarts	6	4.4
Pizza	3	2.2
<b>Total</b>	<b>137</b>	<b>100.0</b>

Source: Author's fieldwork, 2020

**Cereal Foods Often Wasted in the Hospitality Industry**

Results from Table 4 reveal that rice was identified as the cereal food with the highest spoilage rate in the firm’s food value chain. Specifically, 42.3% of the respondents listed rice as the cereal product that often gets wasted in their organization. Also, sorghum was found as the next cereal with the highest rate of wastage. It was listed by 15.3% of the respondents as the cereal product with the highest rate of wastage in their organization. Also, maize becomes the third cereal that was found to be frequently wasted in the firm’s food value chain. It was identified by 11.7% of the respondents as the most discarded cereal in their organization. However, among all these cereals oat was found as the product with the lowest discarding rate. Only 4.4% of the respondents identified the product that usually gets wasted in their food value chain.

**Table 4: Cereal Foods Often Wasted in the Hospitality Industry**

<b>Cereal</b>	<b>Frequency</b>	<b>Percent</b>
Rice	58	42.3
Wheat	9	6.6
Maize	16	11.7
Sorghum	21	15.3
Soya bean	6	4.4
Oat	15	10.9
Cowpea	12	8.8
<b>Total</b>	<b>137</b>	<b>100.0</b>

**Source: Author’s fieldwork, 2020**

**Tubers that often get wasted in the Hospitality Industry**

It can be observed in Table 5 that yam was the tuber product identified as the most wasted food within the studied organization. Specifically, 49.6% of the respondents listed it as the tuber product that was regularly wasted in their organization. Cassava became the second most wasted tuber product with 26.2% of the respondents listing it as the most wasted product in their organization's value chain. Plantain also recorded a high spoilage rate as 13.1% of the respondents listed it as one of the tubers that often get misused in their organization. Moreover, cocoyam became the tuber product with the least wastage as only 4.4% of the respondents identified as the food that often goes waste in their organization. Results from the study suggest that yam and cassava constituted the tuber products that were frequently wasted in the studied organizations.

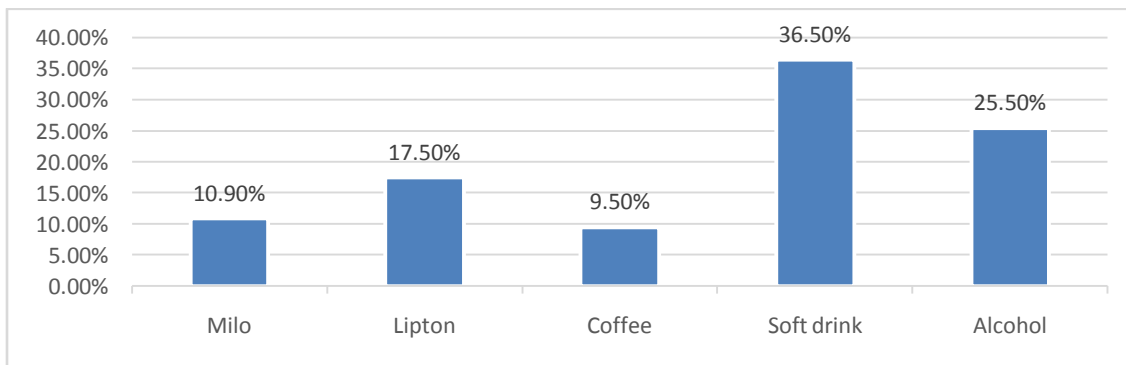
**Table 5: Tubers that often get wasted in the Hospitality Industry**

<b>Tubers</b>	<b>Frequency</b>	<b>Percent</b>
Cassava	36	26.2
Yam	68	49.6
Plantain	18	13.1
Sweet potato	9	6.6
Cocoyam	6	4.4
<b>Total</b>	<b>137</b>	<b>100.0</b>

**Source: Author’s fieldwork, 2020**

**Beverages that often get wasted in the Hospitality Industry**

Among all the beverages, soft drinks were listed by most of the respondents as the beverage that often goes waste in their institutions. It was identified by 36.5% of the respondents. Again, alcoholic drinks became the next beverage item with the second-highest rate of wastage. On alcohol, 25.5% of the respondents identified it as the beverage that often got wasted in their organization. Also, Lipton particularly was identified by 17.5% of the respondents as the beverage which got a significant section of its parts wasted. Nevertheless, coffee constituted the beverage item with the lowest rate of spoilage among the studied organizations. On coffee, only 9.5% of the respondents listed it as part of the beverage products that often go waste in their organization.

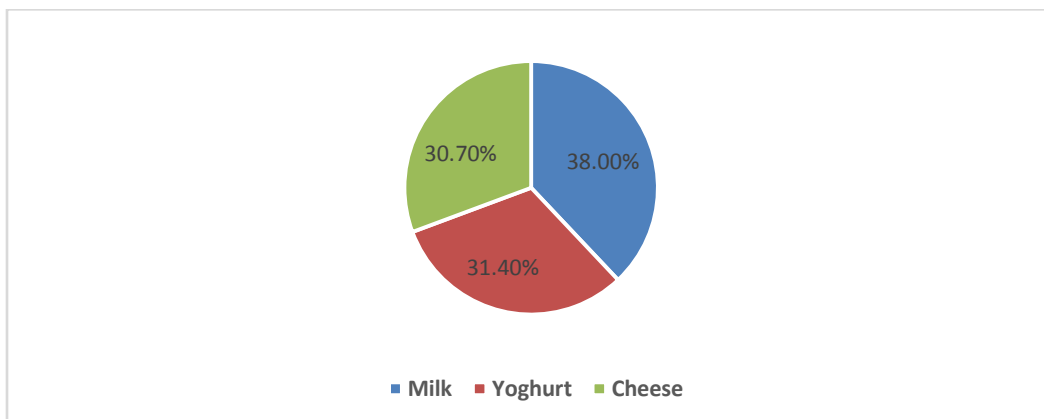


**Fig. 4: Beverages that often get wasted in the Hospitality Industry**

Source: Author’s fieldwork, 2020

**Category of Dairy Products that often get wasted in the Hospitality Industry**

Results from Figure 5 show that there is not much difference in the respondent’s ratings when it comes to the dairy products that often got wasted in their organization. For instance, whereas 38.0% of the respondents identified milk as the most wasted dairy product, 31.4% on the other hand identified yogurt as the most wasted dairy product in their organization. Also, 30.7% of the respondents listed cheese as one of the dairy products that usually get wasted in their organization. Results from the study suggest that milk, yogurt, and cheese constituted the dairy products that were mostly wasted in the understudied organization's food value chain.



**Fig. 5: Category of Dairy Products that often get wasted in the Hospitality Industry**

Source: Author’s fieldwork, 2020

**DISCUSSION**

This objective sought to identify the types or categories of food that were often wasted within the hospitality industry as a result of issues of defect or spoilage. With this objective, results from the study showed that the vegetable that often gets wasted in most of the understudied institutions were tomatoes, cabbage, and pepper. However, among all the vegetables, garden eggs and garlic were found to be the least wasted vegetables across most of the studied firm's value chains. For instance, only 10.9% and 10.8% of the respondents respectively listed garden eggs and garlic as the least wasted vegetable in their operations. Again, with fruits, it was established that watermelon, mango avocado, pineapple, and orange constituted the fruits that were frequently wasted in the firm's food distribution chain. However, bananas became the least wasted fruit in most of the firm's food value chain.

Additionally, when it comes to the category of meat that often gets wasted, results from the study suggest that beef, fish, and chicken were the most wasted meat in the firms' food value chain. However, crab became the least wasted sea meat among the studied firms. Also, when it comes to the category of baked products that often go waste, results from the study reveal that bread and cake remain the baked products that were usually thrown away in most of the studied firms because of issues of spoilage or product freshness. On the other hand, tarts and pies formed the least wasted baked products among the studied firm's value chain. Moreover, when it comes to cereal products, results from the study reveal that cereal foods such as rice, sorghum, and maize formed the most wasted cereal among the studied organization. Nonetheless, oat became the least wasted cereal product among the understudied firm's food value chains. Again, when it comes to the category of tubers that often get wasted, results from the study showed that tubers such as yam, cassava, and plantain became the most wasted tuber products with cocoyam being the least wasted tuber within their food value chain. Last but not the least, when it comes to beverages soft drinks, alcoholic drinks, and Lipton were listed as the most wasted beverages within the studied firm's food value chain. Nonetheless, coffee constituted the less wasted beverage product in the firm's food value chain. Finally, when it comes to dairy foods products milk, yogurt and cheese constituted the most wasted dairy products.

The results found in this study are not very different from the one reported in the work of Hoover and Moreno (2017) as their work found in three cities in the US that the most discarded food items in those cities took the form of meat, fish, dairy and baked products. For instance, in their tracking of the types of food often wasted it was revealed that food items such as coffee, milk, banana, and bread constituted the most wasted food items. Again, the food items found to be mostly discarded in this study happened to be very similar to those found in the study of van der Werf et al. (2019) as their work identified bread as one of the baked foods that often get wasted among their study respondents. Likewise, results from this study corroborate the claims of Papargyropoulou et al. (2019) as their work identified fruits and vegetables as the category of foods that often get wasted in most restaurants. Similarly, in this study vegetables such as tomatoes, cabbage, and pepper were found to be most wasted in the studied firm's food value chain. Again, the results found in this study are consistent with the observation made in the study of the Institution of Mechanical Engineers (2014) as their work identified fruits and vegetables as the most wasted food in most sub-Saharan Africa and India catering outlets.

**Conclusions**

Results from the study suggest that the category of foods that often go waste in the understudied hospitality firms in the Upper West Region did not take a singular form but came from several food types. For instance, the category of foods that often go waste in the understudied firms took

the form of vegetables, fruits, tubers, meat, baked products, cereal, and beverages. This revelation suggests that minimizing food waste within Ghanaian hospitality cannot take one approach as these foods' categories happen to have different life spans, handling, and storage processes and again come from different market centers across the country.

### **Recommendations**

By making reference to the study findings, the study suggests the following recommendations

1. When it comes to food preparation, results from the study suggest that issues such as restaurants' operating procedures and policies as well as chefs/cooks' lack of ideas on how to use left-over food items for other dishes accounted for most of the food waste in the hospitality sector. Since a restaurant's operating procedures details how a given food has to be prepared or served to a customer, it becomes proper for all restaurants, particularly those operating in the Upper West Region to relook at their operating procedures and see the things or approaches that increase the amount of food waste within their food value chain and replace them with procedures that can minimize the quantity of food waste within their food value chain.
2. Again, since the understudied firm's cooks had limited knowledge on how to use leftover foods in the preparation of other foods, it becomes important for the firms to build the knowledge base of their cooks on how best they can use left-over foods to make fresh and appealing meals. Aside from the training of cooks on new cooking methods, it may equally be prudent when the managers of these firms encourage their cooks to use leftover materials in the preparation of other meals since it can save the organization food cost and equally minimize their organization footprint on the environment.

### **References**

1. Al-Buainain, F. (2015). *Need to reduce food waste: Experts. Published—Monday 23 March 2015*. Available at: <<http://www.arabnews.com/saudi-arabia/news/722026>>.
2. Aziz, 2012;
3. Baig, M., Al-Zahrani, K., Schneider, F., Straquadine, G., & Mourad, M. (2019). Food waste posing a serious threat to sustainability in the Kingdom of Saudi Arabia – A systematic review. *Saudi Journal of Biological Sciences*, 26 , 1743–1752.
4. Brian, L., Craig, H., James, L., Lisa, K., & Richard, W. (2013). *Reducing Food Loss and Waste. Working Paper*. Washington, DC.: World Resources Institute.
5. Bryman, A. ( 2012). *Social Research Method*. New York: Oxford University Press Inc.,.
6. Bryman, A., & Bell, E. (2007). *Business Research Methods Second edition*. New York: Oxford University Press.
7. EU Fusion. (2016). “*Food waste definition*”. EU FUSIONS, 2016, p.1. (Retrieved from: <https://www.eufusions.org/index.php/about-food-waste/280-food-waste-definition>).
8. FAO. ( 2015). “*The state of food insecurity in the world: meeting the 2015 international hunger targets: taking stock of uneven progress*”. Rome: Food and Agriculture Organization of the United Nations (Retrieved from: <http://www.fao.org/3/a-i4646e.pdf> ).
9. FAO. (2011). *Global food losses and food waste – Extent, causes and prevention*. Rome: FAO [www.fao.org/docrep/014/mb060e/mb060e.pdf](http://www.fao.org/docrep/014/mb060e/mb060e.pdf).
10. FAO. (2014). *Food wastage foot print: Full cost accounting report*. Rome: FAO.

11. FAO. (2016). *“Estimates of European food waste levels” Family Farming Knowledge Platform*. (Retrieved from: <http://www.fao.org/family-farming/detail/en/c/412647/>).
12. Food and Agriculture Organization of the United Nations. (2019). *Food Loss and Food Waste*. Available at <http://www.fao.org/food-loss-and-food-waste/en/> 2019 (Accessed 13.september 2019).
13. **Elijah A. A.** (2016). Future of Ghana: retrieved from <https://www.futureofghana.com/why-efficiency-within-ghanas-food-supply-chain-must-be-a-2016-election-issue/>
14. Ghana Statistical Service. (2017). *Tourism Market Trend in Ghana 2005-2014*. Accra: GSS.
15. Godfray, H.C.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F. and Toulmin, C. (2010), “Food security: the challenge of feeding 9 billion people”, *Science*, Vol. 327 No. 5967, pp. 812-818.
16. Gjerris, M., & Gaiani, S. (2013). “Household Food Waste in Nordic Countries: Estimations and Ethical Implications.” *Etikk i Praksis. Nordic Journal of Applied Ethics*, 3(7): doi:10.5324/eip.v7i1.1786, 6–23.
17. Gustavsson, J., Cederberg, C., & Sonesson, U. (2011). *“Global Food Losses and Food Waste: Extent, Causes and Prevention”*. International Congress FAO, doi:10.1098/rstb.2010.0126 (Retrieved from: <http://www.fao.org/docrep/014/mb060e/mb060e00.pdf>).
18. Hall, K. D., Guo, J., Dore, M., & Chow, C. C. (2009). The progressive increase of food waste in America and its environmental impact. *PLoS ONE*. <https://doi.org/10.1371/journal.pone.0007940>
19. HLPE. (2014). *Food losses and waste in the context of sustainable food system*. Rome : A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security.
20. Hoover, D., & Moreno, L. (2017 ). *Estimating Quantities and Types of Food Waste at The City Level*. New York: N.Y: Natural Resources Defense Council.
21. Institution of Mechanical Engineers. (2014). *A Tank of Cold: Cleantech Leapfrog to a more food secure world*. IMechE Available at: <http://www.imeche.org/docs/default-source/reports/a-tank-of-cold-cleantech-leapfrog-to-a-more-food-secure-world.pdf?sfvrsn=0>.
22. (Ismail, 2018).
23. Kline, R. B. (2005). *Principles and practice of structural equation modeling (2nd ed.)*. New York: The Guilford Press.
24. Krejcie, J., & Morgan, P. (1970). “Determining Sample Size for Research Activities”. *Educational and Psychological Measurement*, 30, 607-610.
25. Kumar, R. (2011). *Research Methodology: A step by step guide for beginners*. Los Angelos: SAGE Publications Ltd.
26. Lipinski, B., Hanson, C., Lomax, J., Kitinoja, L., & Waite, R. (2013). *Reducing Food Loss and Waste, Working Paper*. Washington, DC. : World Resources Institute.
27. Nunnally, J. C., & Bemstein, I. H. (1994). *Psychometric Theory (3rd ed.)*. New York: McGraw-Hill.
28. Papargyropoulou, E., Steinberger, J., Wright, N., Lozano, R., Padfield, R., & Ujang, Z. (2019). Patterns and Causes of Food Waste in the Hospitality and Food Service Sector:

- Food Waste Prevention Insights from Malaysia. *Sustainability*, 11(6016); doi:10.3390/, 1-22.
29. Racz, A., Marchesi, V., & Crnković, I. (2018). Economical, Environmental and Ethical Impact of Food Wastage in Hospitality and Other Global Industries. *JAHHR*, 9/1(17) , 25-42.
  30. Rutten, M., & Verma, M. (2014). *The Impacts of Reducing Food Loss in Ghana; A scenario study using the global economic simulation model MAGNET, LEI Report 2014-035*. Wageningen: LEI Wageningen UR (University & Research centre).
  31. Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students (5th ed.)*. Harlow: Pearson Education Limited.
  32. United Nation Education Scientific and Cultural Organization. (2019). *Education for Sustainable Development*. UNESCO Available at: <https://en.unesco.org/themes/education-sustainable-development/what-is-esd/sd> Accessed on 22/05/2019.
  33. van der Werf, P., Seabrook, J., & Gilliland, J. (2019). Food for naught: Using the theory of planned behaviour to better understand household food wasting behaviour. *The Canadian Geographer*, 2019, 63(3): DOI: 10.1111/cag.12519, 478–493.
  34. Wanjiku, F. (2017). Ghanaian Chef Works to End Hunger by Reducing Food Waste: A Virtual Student Foreign Service intern with USAID on the Young African Leaders Initiative team, Kenya. Retrieved from: <https://blog.usaid.gov/2017/11/ghanaian-chef-works-to-end-hunger-by-reducing-food-waste/>
  35. Waste and Resources Action Programme. (2013). *Household food and drink waste in the UK 2012*. London: WRAP <http://www.wrap.org.uk/content/household-food-and-drink-waste-uk-2012>.