

## The Media of Washatiyah Dakwah in Quranic Exegesis Study

Julius M. Huho<sup>1</sup>, Rose C. Kosonei<sup>2</sup>, Peter, K. Musyimi<sup>2</sup>

<sup>1</sup>School of Arts and Social Sciences Garissa University, Kenya

<sup>2</sup>School of Education and Social Sciences, Karatina University, Kenya

[jmhuho@gmail.com](mailto:jmhuho@gmail.com)

### Abstract

*Food waste occurs when food is ready for consumption but not consumed. Food waste has considerable social, economic and environmental impacts. Even though it has become a global concern, no comprehensive studies on food waste in Kenya is available. This study sought to establish the sociodemographic determinants of households' food waste in Garissa sub-county, in Garissa County, Kenya. A total of 165 consumers were involved in the study. Bakery products were the most wasted. The per capita food wasted was 6.1 kg/person/year or approximately 5.1 tonnes (equivalent to 39,352,110 Kcal) for Garissa County. At a per capita consumption of 2360 Kcal/ person/day, the food wasted was enough to feed 16,674 people for one day. Males were more wasteful than females. Food waste was higher in households: headed by people aged 25 – 34 years; with higher income; with urban residency and with large sizes. Annually, Kshs 9600 (US\$96) per household was lost from the wasted food translating to a loss of Kshs 1.4 billion (US\$ 13.6 million) from the 141,353 households in Garissa County. With guidance and good policies, food waste can be managed since the majority of the consumers were concerned about food waste and had intentions to reduce it.*

### Keywords

sociodemographic; food security; food waste; garissa sub-county



### I. Introduction

Approximately 1.3 billion tonnes of edible food or about 30% of all global food is lost or wasted per year (Rutten, et al, 2015). Food loss occurs in early and middle stages of the food supply chains (upstream) during food production, post-harvest handling and storage while food waste occurs at retail and consumer levels (downstream) during processing, distribution and consumption phases (Huho, 2020). HLPE (2014) defines food waste as any food suitable for human consumption being discarded or left to spoil at the consumer level. Thus, food waste occurs when it is ready for consumption but not consumed (Bhandari, 2018). According to FAO (2018), about US\$940 billion globally is lost through Food Loss and Waste (FLW) every year and approximately US\$4 billion in sub-Saharan Africa. It is estimated that about 37% or 120–170 kg/year per capita of all food is lost or wasted in sub-Saharan Africa (SSA) (Sheahan, & Barrett 2017) and 280–300 kg/year per capita in North America and Europe (HLPE, 2014). Hitherto, more than 805 million people were chronically hungry with 23.8% of the total population in SSA being undernourishment between 2012 and 2014 (Rutten, et al, 2015). According to FAOSTAT estimates, approximately 9.5 million people suffered from severe food insecurity for the period 2016-2018 in Kenya (FAO, 2019).

Food loss and waste (FLW) has, therefore, become a global concern and is now being presented as crucial not only in improving food security but also reducing greenhouse emission of food systems (HLPE, 2014). According to FAO (2018), reducing

food waste would enhance food security, lessen the negative impact on climate and at the same time alleviate poverty. In middle and high-income countries, households (consumers) are responsible for more than half of total food wasted (Akerle, et al., 2017). Globally, consumers account for 30.9% of all the food wasted (Srinivas & Dongre, 2018). Segrè et al. (2014) acknowledge that retailers and consumers' behaviour is crucial in influencing the amount of food wasted. Also, Akerle, et al., (2017) notes that the characteristics of the consumers must be put into consideration for any meaningful strategy to mitigate food waste. Although only 5% of the total food wasted is ascribed to consumers in Sub-Saharan Africa (Defata, 2018), their role cannot be ignored in FLW along the food supply chain. In Kenya, postharvest loss (food waste included) accounts for 20-30% of all harvested crops. A report by The Standard Media Group on 1st May 2018 indicated that in 2017 farmers lost over 1.9 million tonnes of food worth Ksh150 billion (US\$ 1.5billion) (Omondi, 2018). However, studies on food waste at household (consumer) levels have not been undertaken to establish the magnitude of the waste and its associated social, economic and environmental impacts. The current study sought to establish the sociodemographic determinants of food waste at household level in Garissa sub-county, in Garissa County, Kenya.

### **1.1 Objectives of the Study**

- a. To find out the causes and types of household food waste in Garissa sub-county, Garissa County, Kenya.
- b. To examine the relationship between households' characteristics and food waste in Garissa sub-county, Garissa County, Kenya.
- c. To establish the social, economic and environmental impact of food waste in Garissa sub-county, Garissa County, Kenya.
- d. To identify suitable remedies for food waste reduction.

## **II. Research Methods**

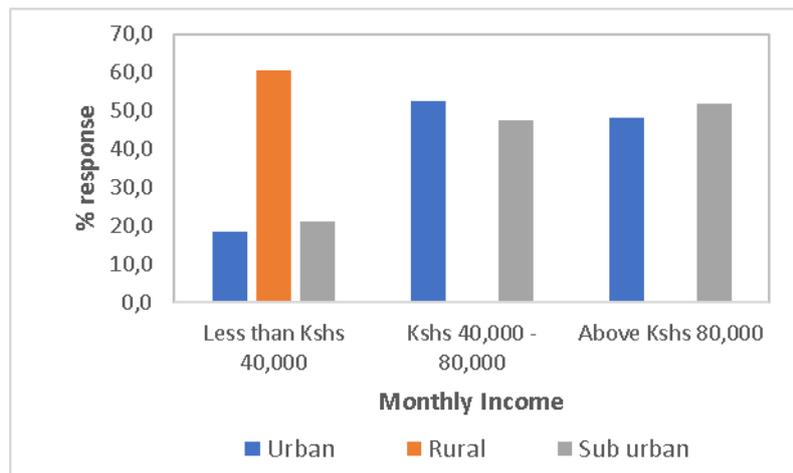
Data for this study was collected in Garissa sub-county that is characterized by three types of residency: urban, suburban and rural. Save for the few inhabitants who practice irrigation agriculture along River Tana, the main economic activity is pastoralism. Food is largely obtained from the market. Households' survey through the use of questionnaires was used in data collection. Consumers themselves reported food wastage. A total of 165 households were involved in the survey.

SPSS Vs 25 was used to compute the descriptive statistics which were used to summarize the results of the measurements. To quantify the amount of food wasted and the associated socio-economic costs, the waste was categorized according to the type of food as proposed by Garcia-Garcia et al. (2016). The categories were: tea/ coffee, bakery products, grains/cereals, fruits, vegetables, meat and meat products, fish products and milk and dairy products. The amount of food thrown away per week per household was collected in ranges of less than 250g, 250-500g, 500-1kg, and 1kg-2kgs. To calculate per capita food wasted, the number of household members was multiplied by the mid-point of the amount of food waste range. The totals were subsequently converted into annual food waste. For households with more than four members, the figure of 5 was used in the analysis. In estimating the economic value of the food wasted, the mid-point value of each of the following given ranges was used: Up to Kshs 500 (US\$5), Kshs 600 – 2000 (UD\$20), Kshs 2100 – 5000 (US\$50) and more than Kshs 5100 (UD\$51). The sum economic value was calculated by multiplying the number of households in each of the range and the mid-point value of the same range and summing up the values obtained.

### III. Discussion

#### 3.1 Socio-Demographic Characteristics

A large proportion of the respondents were males (57.8%) since they were the heads of the family. The cultural (Somali) and religious (Islam) inclinations revered the role of men in the family. Female respondents accounted for 42.2%. About 46.9% of the respondents were aged between 25 and 34 years. Only 7.8% and 6.3% were aged between 18-24 and 55 – 64 years respectively. Those aged between 35 – 44 years accounted for 21.9% while those aged 45 – 54 years were 17.2%. Over half (56.3%) of the households had an urban residency; 12.5% lived in rural areas and 31.3% lived in suburban areas. Monthly incomes varied from one household to the other. The majority (46.9%) had monthly incomes ranging between Kshs 40,000 and 80,000 (US\$400 – 800). A few (12.5%) had monthly incomes of above Kshs 80,000 (US\$ 800) and 40.6% of the households had monthly incomes of less than Kshs 40,000 (US\$400). There was a relationship between monthly incomes and the place of residence. The rural residency had the majority (60.4%) of the households with the lowest monthly incomes of less than Kshs 40,000 (US\$400). Households with monthly incomes of more than Kshs 40,000 (US\$400) lived either in urban or suburban areas (Figure 1).

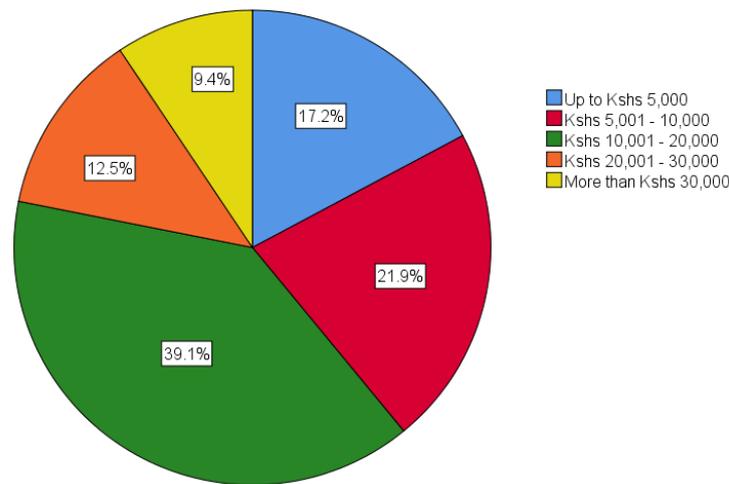


*Figure 1. Proportions of households' monthly incomes in urban, rural and suburban residency*

Households in Garissa sub-county are large. In 68.8% of the total households, the number of households' members were more than four; 14.1% had 3 members; 10.9% had 2 members and 6.3% had one member.

#### 3.2 Households' Food Purchasing Behaviour

The main source of food for 64.1% of the households was open-air markets situated in Garissa Town. This was attributable to the urban and suburban residency of 87.6% of the households. The rest of the households obtained food from small markets such as bakeries, butcheries and dairies (21.9%), supermarkets (9.4%) and 4.7% from farms. Most of the rural households accessed food directly from irrigated farms along River Tana. Dependence on markets as a source of food coupled with large household sizes led to huge expenditures on food. Nearly 40% of the households spent between Kshs 10,000 (US\$100) and 20,000 (US\$ 200) on food every month. Some 9.4% of the households spent over Kshs 30,000 (US\$ 300) per month on food (Figure 2).

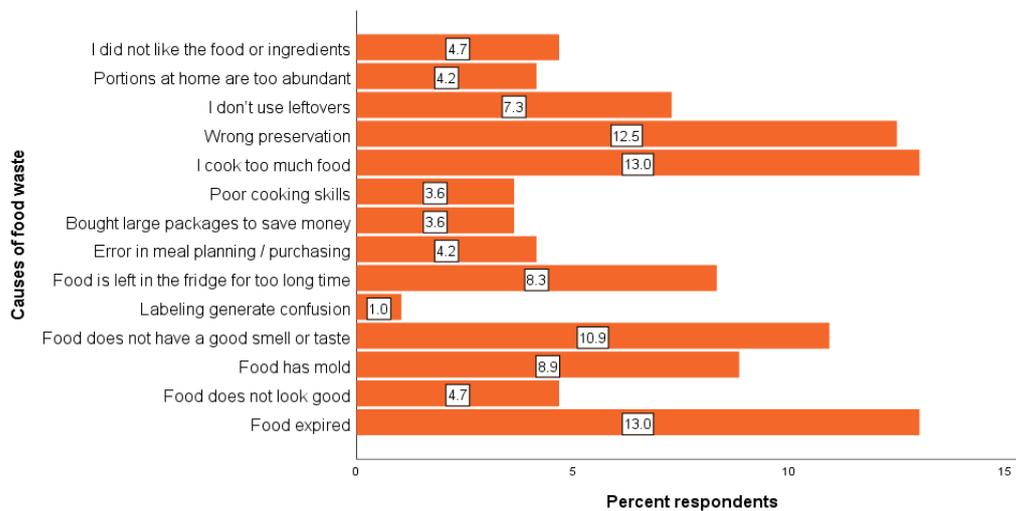


**Figure 2.** Monthly households' food expenditure

With the majority of the households depending on markets as their source of food, 57.8% bought food once or more than once a week. About 28.1% bought food either daily or once in every 2 days while 26.6% bought food once every month. The majority (57.8%) of the households used food list when doing the shopping; 20.3% occasionally used and 21.9% did not use. During purchasing, special offers on food items attracted 60.9% of the households; 7.8% were occasionally attracted while 31.3% were not attracted. To a large extent, the special offers did not influence the amount of food required to be purchased. Only 26.6% of the households bought food in excess. Stockpiling to save on time, frequent movement to the markets and to cater for visitors were given as reasons for buying excess food. Others households either bought the required amount (45.3%) or occasionally bought in excess (28.1%).

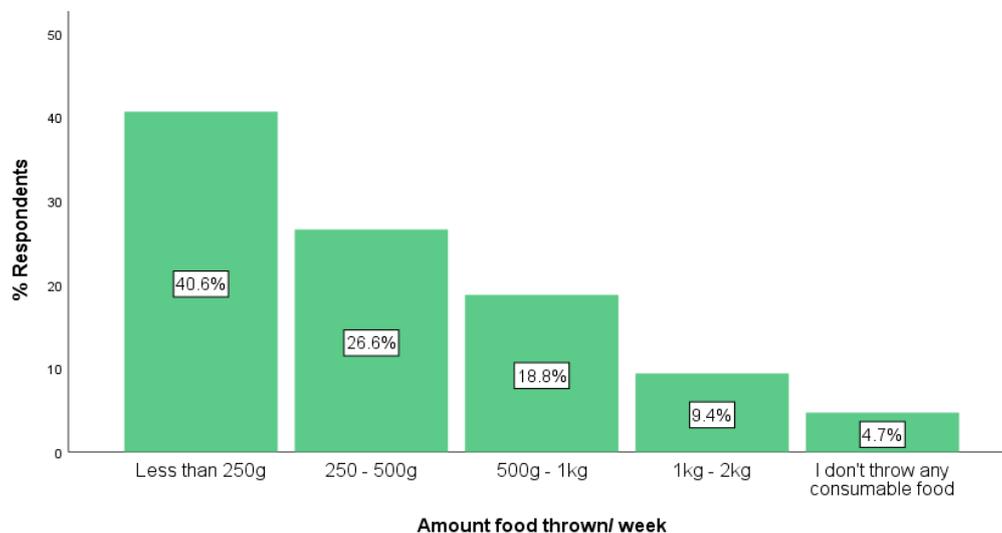
### 3.3 Households' Food Waste

Food waste is common in almost all households. Food expiration and cooking more than required for a meal were the main causes of food waste each accounting for 13% of the causes. Food expiration was associated with little attention given by respondents on the expiry date of packaged food; occasional stockpiling of food the very high temperature in the region. Thus, poor preservation methods which accounted for 12.5% of the causes of food waste, quickly led to food spoilage. Food labels were indicated as the least cause of food waste at 1% as most of the respondent did not know much about it. Figure 3 shows the causes of food waste in households.



**Figure 3. Causes of food waste in households**

Based on the amount of edible food thrown away in the week previous to data collection and the number of people per household, the amount thrown per capita per week averaged at 117.6g translating to 6.1 kg/year. This was within the observed values of 6-11 kg/year in sub-Saharan Africa and South/Southeast Asia (FAO, 2018). Most of the households (40.6%) threw away less than 250g of edible food per week; 9.4% threw up to 2kg and 4.7% did not throw any food (Figure 4).

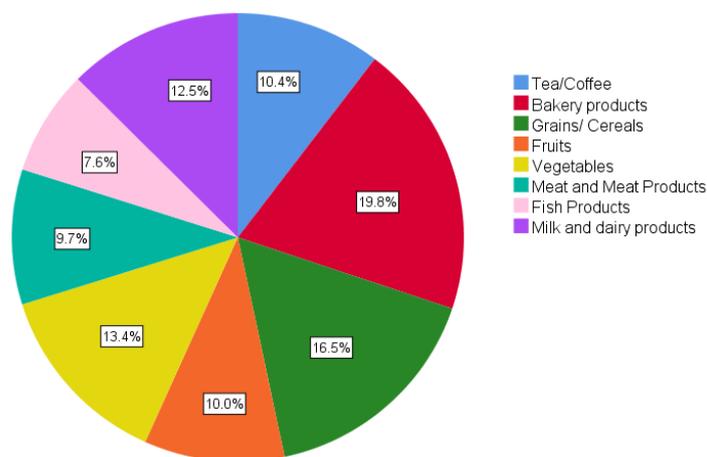


**Figure 4. Amount of food thrown in a week**

The weekly frequency of throwing away leftover and food that was considered not good for consumption was considerably low. In a week, 59.4% of the households threw away food not more than once. About 26.5% and 14.1% threw away food twice and more than twice per week respectively. As observed, households threw away small amounts of food leftovers. In every food groups, 54.1% of the households threw less than 2% in a week. Households that threw 3-5%, 6-10% and 11-20% of the food were 20.5%, 20% and 9.1% respectively. Only 4.4% threw up to 2kg of the food. The findings support FAO (2018) assertions that less food is wasted at the consumer level in low-income countries with much of the food wasted during the initial and intermediate stages of the food supply chain. HLPE

(2014) observes that only 1.3% of the initial production is wasted at the consumption (household) level in low-income countries and this varies between food groups and regions.

Bakery products were the most wasted accounting for 19.8% of all the food wasted (Figure 5). This is because the majority of the sampled population were of Somali descent whose meals largely comprised of wheat products such as pasta and bread. In addition, bakery products are cheap and readily available. More waste occurred in the food group that formed the staple food as impulse buying and stockpiling were very common. Grains/ cereals and vegetables were second and third most wasted food accounting for 16.5% and 13.4% respectively. Unlike bakery products, the majority of the sampled population (Somalis) were poor consumers of vegetables resulting in low purchases and subsequently low wastage. Although dairy products are highly perishable, the low wastage of 12.5% of the total food wasted was occasioned by the large use of powdered or long-life milk in almost all of the households. Due to the high cost of meat and fish products, less wastage occurred with meat and fish accounting for 9.7% and 7.6% respectively.

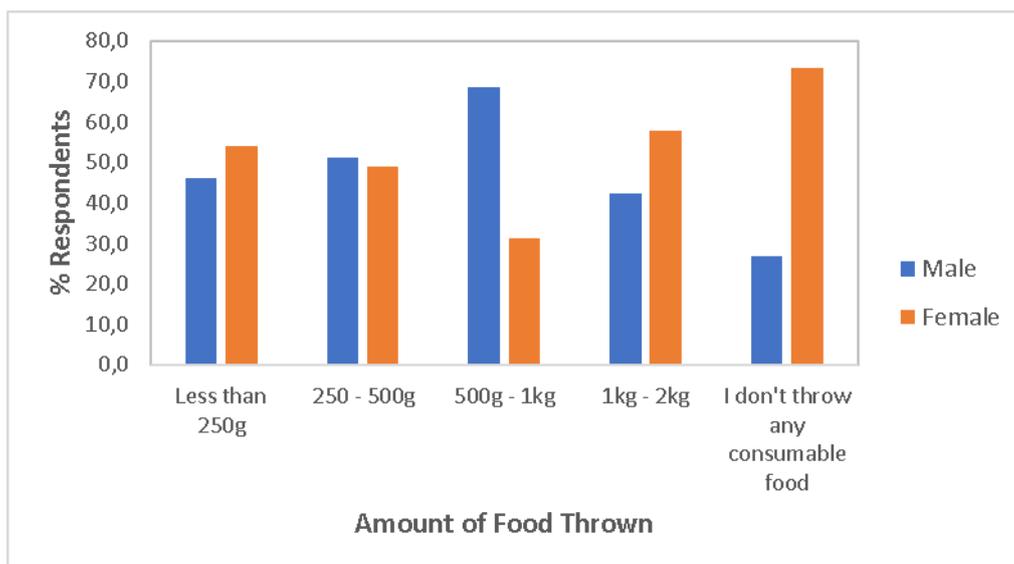


*Figure 5. Most wasted food group*

### 3.4 Household Characteristic and Food Wastage

#### a. Gender, Age and Food Waste

Cantaragiu (2019) asserts that there is no consensus on the impact of gender on food wastage with some studies showing more wastage among males and other females. Other studies show a similar amount of wastage. This study established that males (52%) than females (48%) wasted more food. Males (68.6%) wasted between 500g - 1kg of food compared to 31.4% females. Besides, males accounted for 26.7% of the respondents who never threw any consumable food against 73.3% of females. Like observed by Cantaragiu (2019), the persons who buy food have lesser waste. In the study area, purchasing of food was primarily females' role, hence less wastage among them. Also, the lack of enthusiasm to cook among men often resulted in frequent changes of planned meals from which the food items had been bought to quick-fix ones or eating from hotels. However, more females (57.8%) wasted between 1kg - 2kg of food compared to males (42.2%) as indicated in Figure 6.



**Figure 6.** Relationship between gender and food wastage

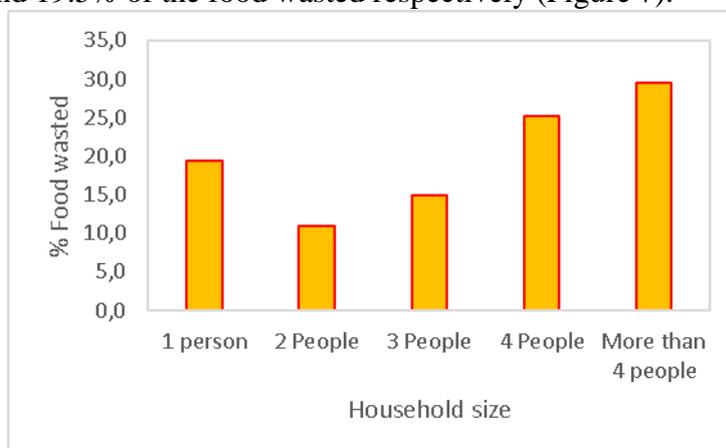
Respondents aged between 25-34 years reported the highest wastage accounting for 41.3% of the total food wasted. The waste was associated with the attitude towards certain food by consumers of this age group and the large number of household members. They accounted for 75% of all the households with one person; 57.1% with 2 people; 88.9% with 3 people; 36.8% with 4 people and 32% with more than 4 people. In all the cases, they had the highest members in a household. Also, they had the highest shopping frequency accounting for 66.7% and 53.8% of the households where shopping was done twice per week or weekly respectively. Stancu & Lähteenmäki (2018) observe that households with a higher frequency of shopping have higher risks of more food waste. Respondents aged from 35 - 44 years accounted for 24.3%; 55 - 64 years accounted for 14% while 45 - 54 years accounted for 13.8% of the total food waste. Least food wastage was common amongst respondents aged between 18 and 24 years which accounted for 6.6% of the total. A crosstabulation between age and the amount of food thrown away revealed that 53.8% and 52.9% of the respondents that threw less than 250g and between 250 - 500g of food respectively were aged 25 -34 years. About 50% of the respondents who threw between 1 and 2kgs of food were aged between 55 - 64 years. On the other hand, respondents aged between 18 -24 years who recorded the least amount of food thrown also had the highest population (66.7%) who did not throw any edible food (Table 1).

**Table 1.** Relationship between age and amount of food thrown in a week

Age (Years)	% respondents				
	< 250g	250 - 500g	500g - 1kg	1kg - 2kg	I don't throw any consumable food
18 - 24	3.8	5.9	0.0	16.7	66.7
25 -34	53.8	52.9	41.7	16.7	33.3
35 - 44	15.4	23.5	41.7	16.7	0.0
45 - 54	26.9	11.8	16.7	0.0	0.0
55 - 64	0.0	5.9	0.0	50.0	0.0

## b. Household Size and Food Waste

Food waste increased with increase in the size of the household. Households with more than 4 people had the highest waste accounting for 29.5% of the total food wasted. Those with four people accounted for 25.2% while households with 3, 2, and 1 person(s) accounted for 14.9%, 11% and 19.5% of the food wasted respectively (Figure 7).



**Figure 7.** Household size and percentage of the total food wasted

Households with more household members experience challenges in managing food-related needs and activities resulting in higher waste (Stancu & Lähteenmäki, 2018). The higher the number of children the higher the amount of food waste produced (Martindale & Schiebel, 2017). The small but numerous quantities of food leftovers by members in large households resulted in a considerable huge amount of food wasted in the study area. About 60.3% of the households with more than 4 people wasted between 1 - 2kg of food every week while 14.1% wasted less than 250g. Similarly, 39.7% of the households with four people threw away 1kg - 2kg of food while 13.9% threw away less than 250g every week (Table 2).

**Table 2.** Household size and the amount of food wasted per week

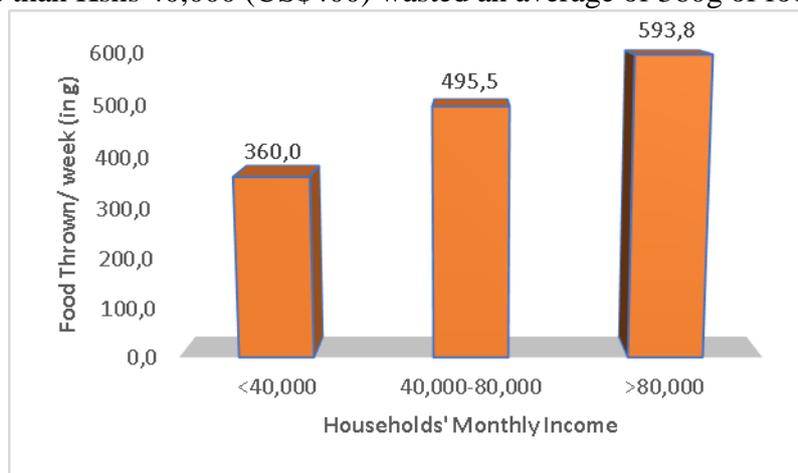
Household size	% Respondents per amount of food waste per week					% Mean food wasted
	< 250g	250 - 500g	500g - 1kg	1kg - 2kg	I don't throw any consumable food	
1 person	11.0	22.8	44.0	0.0	0.0	19.5
2 People	31.5	0.0	12.6	0.0	60.7	11.0
3 People	29.4	20.3	9.8	0.0	0.0	14.9
4 People	13.9	24.0	23.1	39.7	22.3	25.2
More than 4 people	14.1	32.9	10.6	60.3	17.0	29.5
Total (%)	100	100	100	100	100	100

Households with 2 people wasted the least accounting for 11% of the wasted food. This is because the two members in the household would easily motivate each other to eat leftovers. As such, 60.7% of the 2-people households would not throw any consumable food. Comparatively, households with one person wasted more food than those with 2 – 3 people. One-person households' food waste accounted for 19.5% of the total wasted food with 44% and 22.8% of the households throwing away 500g - 1kg and 250g - 500g of food per week respectively. All one-person households reported throwing away some consumable food. Eating similar food consecutively was considered boring hence deterred people from eating

leftovers. The observation was consistent with the European Communities (2011) who notes that lack of opportunity for sharing food makes one-person households wasteful.

### c. Income and Food Wastage

The amount of edible food thrown away per household averaged at 452.9g per week. Households with higher income wasted more food than the ones with lower income. On average, each household with monthly incomes of above Kshs 80,000 (US\$800) wasted 593.9g of food per week. Households with monthly income ranging between Kshs 40,000 (US\$400) and Kshs 80,000 (US\$800) wasted an average of 495.5g while those with monthly incomes of less than Kshs 40,000 (US\$400) wasted an average of 360g of food (Figure 8).



*Figure 8. Relationship between households; monthly income and amount of food thrown*

Among the households with monthly incomes of above Kshs 80,000 (US\$800), 50% wasted over 500g of food per week. None of the households indicated that “they don’t waste consumable food.” The majority (62.5%) of these households lived in urban areas and suburban areas (37.5%) where the amount of food waste is high (see Table 3). high income was associated with impulse buying and stockpiling. Only 19.2% of the households with monthly incomes of less than Kshs 40,000 (US\$400) had over 500g of food waste per week with 4% indicating that “they don’t waste consumable food.” About 31% of these households lived in rural areas that are characterized by low food wastage. One-third of the households with monthly income between Kshs 40,000 (US\$400) and Kshs 80,000 (US\$800) wasted over 500g of food per week with 6.6% with no food wastage. Further, a Chi-Square analysis showed a strong positive relationship of 0.779 between Household income and the amount of food waste.

### d. Households’ Residency and Food Waste

More food waste occurred in urban compared to rural and suburban residency. Urban dwellers accounted for 39.2% of the total food wasted while suburban and rural households accounted for 32.7% and 28.1% of the total food wasted respectively. Of the households that indicated “we don’t throw any consumable food,” 61.6% lived in rural areas, 24.7% in suburban and 13.7% in urban (Table 3). Just like Segrè et al. (2014) observes in emerging economies, the diversification of diet and change towards more perishable products in urban residency coupled with substantial income resulted in increased food waste in the study area.

**Table 3.** Relationship between residency and amount of food wasted in a week

Residence	% Respondents per amount of food waste per week					% Mean of food wasted
	< 250g	250 - 500g	500g - 1kg	1kg - 2kg	I don't throw any consumable food	
Urban	24.7	33.5	62.0	36.9	13.7	39.2
Suburban	27.9	47.9	38.0	17.0	24.7	32.7
Rural	47.4	18.6	0.0	46.1	61.6	28.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

#### e. Shopping Frequency and Food Waste

No significant difference was observed between the shopping frequency and food waste. Although most (19.5%) of the food wasted accrued from households who purchased food every day, it was least (13%) in households where food was bought once per week.

### 3.5 Social, Economic and Environmental Impact of Households' Food Waste

Garissa County has a total population of 841,353 (KNBS, 2020) availability of food, in addition to its nutritional value, has an important role in economic, socio-cultural and environmental aspects of a population. This section looks at the implication of food waste on the economy, social and environmental aspects.

#### a. Economic Loss

Knoema (2020) observes that food expenditure in Kenya has remained high at 52.85 % in 2018 and with an average annual growth rate of 3.12%. This implies that in any household, more than 50% of the income is spent on food. Unfortunately, money losses are still experienced through wastage of purchased food. The economic loss, which was calculated based on the money lost through wasted food, varied among households. The calculated loss in this study included the purchase value of the food wasted only excluding indirect losses such as costs incurred during cooking, purchasing and disposal of waste food. In 62.5% of the households, the money lost ranged up to Kshs 500 (US\$ 5); between Kshs 600 - 2000 (US\$ 6 - 20) in 31.3% and between Kshs 2100 - 5000 (US\$ 21 – 50) in 6.2%. On average, the direct monetary loss emanating from the wasted food among the sampled population was approximately Kshs 800 (US\$8) per month or Kshs 9600 (US\$96) annually per household. This translates to an estimated annual loss of Kshs 1.4 billion (US\$ 13.6 million) from the 141,353 households (KNBS, 2019) in Garissa County.

#### b. Social Implication

Food consumption per capita is an important parameter for measuring food situation in a country or a region and is expressed in kilocalories (kcal) per capita per day. Estimates by Alexandratos & Bruinsma (2012) showed that food consumption per capita in sub-Saharan Africa was 2360 Kcal/ person/day against the global value of 2860 Kcal/ person/day in 2015. Although there was an increase from 2238 Kcal/ person/day in 2007, the per capita consumption remained low compared to the global value. Food insecurity was thus a challenge in SSA. In Kenya, data in FAOSTAT indicate that approximately 9.5 million (19.1% of the total population) suffered from severe food insecurity for the period 2016-2018 (FAO, 2019). Ironically, estimates show that Garissa County wastes approximately 5.1 tonnes (equivalent to 39,352,110 Kcal) of food annually. With a per capita consumption of 2360 Kcal/ person/day, the food wasted in the County was enough to feed 16,674 people for one day or 46 people for a whole year.

### **c. Environmental Impacts**

Although environmental impacts associated with food waste were never quantified in this study, 36.1% of the consumers showed concerns about the negative impacts that food waste has on the environment. Hanson, et al. (2015) notes that, if FLW is a country, it will be the third-largest emitter of greenhouse gas (GHG) emitting 4.4 Gt CO<sub>2</sub> eq per year (8% of anthropogenic GHG emissions) after China and USA. Besides, the decomposing wasted food in landfills produces methane, a potent GHG thus contributing to climate change. Depta (2018) notes that it is not only food that is wasted but also all the resources used to bring food to the table. This includes water and energy for production right from the farm, distribution and processing. For instance, about 250 km<sup>3</sup> of water is lost globally with annual food lost or wasted. According to HLPE (2014), food waste costs about 500kg of CO<sub>2</sub> and it is equivalent to 28% of arable land globally. As the world population grows there will be added pressure on the declining resources to feed the rising population (Segrè et al, 2014) if food waste is not managed.

### **3.6 Food Waste Reduction**

Developing suitable and sustainable remedies for reducing food waste requires understanding consumers' socio-demographic factors and their perception of food waste. It was, therefore, important to establish whether the consumer found it necessary to control food waste. The question "in your opinion, how necessary is controlling food wastage?" was asked. About 79.7% of the consumers indicated that food waste should be resolved urgently. From the 20.3% who reported no urgency in resolving the problem of food waste, 17.2% stated that other issues needed to be resolved first while 3.1% indicated that there was no need to resolve the problem. Overall, women (53%) were more concerned about food waste and urgent measures taken to control it than men (47%).

#### **a. Discarding Food Waste**

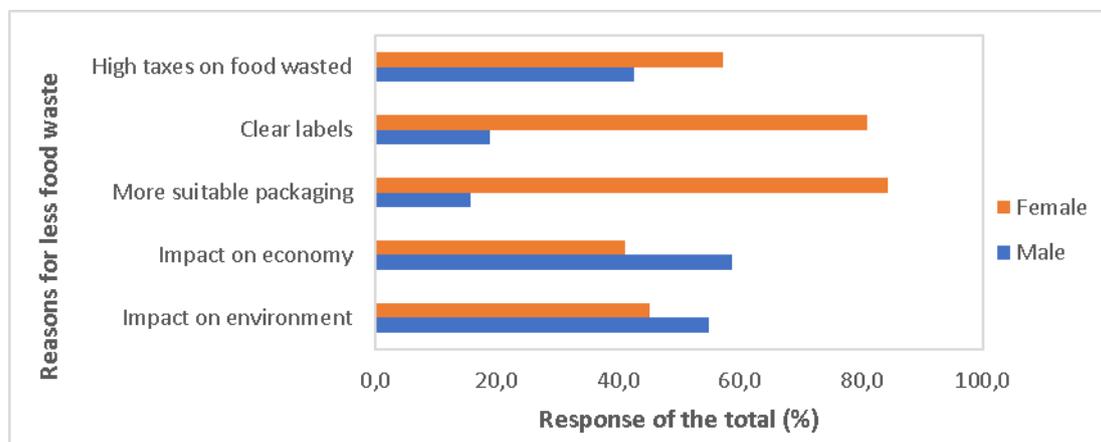
Most of the uneaten food was thrown in the garbage or fed to animals. The majority (34.9%) of the households threw uneaten food in the garbage while 30.1% fed animals. Although the study area is food insecure (GOK, 2014), very few households (16.9%) gave uneaten food as a donation. This was attributed to societal attitude on food donation from households as it was taken as belittling the receiver of the donation. There was a consensus that most of the uneaten food is wasted except where food was given as donations. As a result, food preservation was reported by 58% of the respondents as the most important information needed to reduce food waste. About 17.3%, 14.8% and 9.9% of the respondents indicated that information on organizations and initiatives that deal with food waste, recipes on leftover and freshness of the product respectively would help in reducing food waste.

#### **b. The Motivation for Food Waste Reduction**

The majority (87.5%) of the consumers were concerned about food waste and they endeavoured to avoid it. Only 3.1% of the consumers showed no concern. Others (9.4%), showed concern about food wastage but had since become less worried about its reduction. Inability to control the feeding behaviour of the large number of children in a given household was reported as one of the reasons for reduced concern. When asked "the motivation for less food waste?", 39.8% of the consumers indicated the negative economic impact on households while 36.1% reported the negative environmental impacts. Other factors such as more suitable packaging, clear labels and high taxes on food wasted concerns for 24% of the consumers. Similar findings were observed in Denmark where the greatest

motivators to reducing food waste were the likelihood of saving money and environment concerns (Stancu & Lähteenmäki, 2018).

The motivation to reduce food waste varied between males and females. Males were largely motivated by environmental and economic concerns while females were motivated by suitable packaging and clarity of labels (Figure 9).



**Figure 9.** Reasons for reducing food waste

The disparity was as a result of differentiated gender roles in households. Financial losses associated with throwing away of edible food was a major concern among males since it is primarily their role to provide money to purchase food in most of the households. Suitable packaging and clear labels on food items were major concern among females since they did most of the buying of food from the markets. With high temperatures in the study area, appropriate packaging was a key concern for foods that were to be used more than once. Also, women were more concerned if a high tax was imposed on food wasted since they are directly involved in the purchase, preparation and preservation of food and ultimately wastage. Nevertheless, irrespective of the reason given, the concern on food waste among men and women resulted in its reduction where possible. Schanes et al. (2018) observe that concern about food waste is a significant indicator of the intention to reduce food waste.

### c. Understanding Food Labels

The use of date labels “use by” was clearer to the respondents than the “sell by”. About 71.9% of the consumers explained the “use by” date correctly compared to 25% of correctly explained “sell by” date. Comparatively, males (55.5%) described the “use by” date correctly compared to females at 44.5%. Although the most consumed food group (bakery products) carried the label “sell by” date, only 25% of the consumers could explain what the label means. Among the males, only 18.9% could correctly explain the “sell by” date and about 33.3% of the females. Overall, the “sell by” date was known to females (63.8%) than males (36.2%). Although there exists inconsistency in usage of these terms globally (European Communities, 2011), to most of the consumers the dates indicated on the labels meant that food was to be eaten or thrown away by this date. Thus, misunderstanding of date labels among the consumers led to increased food waste due to purported food expiration. In the EU for instance, 10% of the 88 million tonnes of food waste annually emanated from date labels (Depta, 2018).

## IV. Conclusion

Food waste is a reality in Garissa County. Per capital wastage of 6.1 kg/person/year fell within the 6-11 kg/person/year observed in many studies for SSA. The waste was significantly influenced by the socio-demographic characteristics of the households such as gender, age, income and residency. Males consumers were more wasteful as opposed to females. Higher-income that went along with urban and suburban residency resulted in more food waste compared to the low-income rural households. The most wasteful consumers were aged between 25 and 34 years due to attitude towards certain foods and the large number of family members. The aged, above the age of 55 years, were less wasteful. Consumers were aware of the benefits of the reduction of food waste. However, the motivation for waste reduction varied across gender based on their roles in households. Males consumers, who provided money to buy food, were motivated by economic and environmental factors while females, who did the actual buying, were motivated by packaging and food labels. Confusion on food labels was evident and led to throwing away edible food. It was apparent that food waste resulted in an annual financial loss of Kshs 9600 (US\$ 96) per household. Thus, reducing food waste would save approximately Kshs 1.4 billion (US\$13.6 million) from 141,353 households in Garissa County. In addition, the approximately 5.1 tonnes (equivalent to 39,352,110 Kcal) of wasted food annually is enough to feed 16,674 people in one day or 46 people for a whole year with a per capita consumption of 2360 Kcal/ person/day. With most of the consumers stating that the problem of food waste should be resolved urgently, it was clear, with proper guidance and policies, that chances of reducing food waste were high. The method of discarding food waste, feeding animal and/or throwing to the garbage, that was adopted by the majority of the consumers still led to huge negative economic, social and environmental costs. Consumers principally required information on food preservation, ways of making food waste useful and understanding of freshness of the product with regards to food labels. Understanding sociodemographic factors influencing households' food waste is significant in establishing measures to that controls and minimizes the wastage. Also, it will be vital components for enhancing consumers' awareness and cultivate behaviour change towards reducing food waste.

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