Household Maize Consumption Behavior and Food Loss in Gucha Sub-County, Kisii County, Kenya

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Abstract
Despite growing research, academic investment and intervention programming on food security at national and household level, countries are still facing enormous challenges in attaining food security. In Kenya, albeit plenty food produced at household level, it is paradoxical that most of these households persistently experience food insecurity. This is partly blamed on household food-resource handling procedures at consumption stage that leads to food loss and waste. One of the major perceived reasons for this is the socio-cultural situation which influences food handling processes at consumption level leading to direct food loss and waste. This paper interrogates the relationship between household food consumption patterns and food loss and waste in Gucha Sub-County, Kisii County, Kenya. The paper is an extract from the study that focused on household food-resource handling procedures and food security in Gucha Sub-County. Mixed research technique was utilized in collecting data on food beliefs, and its effect on food loss, waste and eventual food security/insecurity. The study found that different households adopt different food distribution mechanisms, food preferences, dietary patterns, household food allocation. Understanding household arrangements, social behavior, and cultural contexts which influence decision making processes in relation to food consumption behaviour are important in effective food-resource handling processes. It is the recommendation of the study that consumer education campaigns should be increased to provide knowledge and awareness on appropriate food types, food preparation skills, meal planning, using leftovers and food discard behaviour. The study provides evidence that once people are aware of the value of their losses, then there is commitment to handle food-resources better.

Keywords: Household maize consumption behavior, Food loss

1.0 Introduction

Although household food security, particularly consumption patterns has not been a common component of social science research. These discipline has been common in agriculture and economics fields but in recent years, anthropologists have turned their attention to examining determinants of food consumption patterns at the household level and community at large (Crooks, 1996). The primary focus of anthropology is on human belief, perception, and behaviour at the community, household, and individual levels. Household food consumption is one of the major components in the food production chain, and where a lot of food loss and waste take place (Aulakh et al. 2013). One of the major cereals that is used for consumption purposes is maize which remains staple food for any communities in sub-Saharan Africa.

Worldwide Maize contributes one-third of the world's cereal output. Maize consumption accounts for 31% of the total food production and constitutes more than 75% of the cereal consumption. In recent times, maize production globally has increased by nearly 50% due to expansion in Africa, Asia and introduction of high-yielding varieties such as genetically modified corn-BT-corn (Jones & Sheats, 2016). In 2013/14 maize consumption was around 950 million metric tons with Africa consuming over 30% and SSA around 21% (FAOSTAT, 2014). Eastern and Southern Africa use larger portions approximately 85% of its production as food (IITA, 2009). Unlike other cereal crops that are consumed mainly by human as food (wheat and rice), maize is a multi-purpose crop used as food, feed, fuel, and as raw materials for industry (Morris, 2002).

In Kenya, data on maize consumption is thin and not clear, and the actual food consumption per person is less understood, with most estimates assuming 90 kilogram which is one bag per year. In Kisii County and in particular Gucha Sub-County, maize production accounts for 55% of total food production (KCIDP, 2014). In this study, household food consumption is one of the stages that food loss and waste occur. Maize crop has faced the greatest loss and waste during handling procedures. The food loss and waste is categorized as weight loss due to spoilage, quality loss, nutritional loss, seed viability loss, and commercial loss (Boxall, 2001). The magnitude of the losses and waste at consumption stage vary greatly among different regions and economies (Kumar & Kalita, 2017). Due to such losses, recently, there has been renewed emphasis on efficiency and food safety at the consumption stage. This has stimulated a major paradigm shift in the way postharvest food losses and waste is conceived from a series of individual components to an integrated value chain linking producers and consumers (Hodge et al. 2010).

Studies have found that most consumers in developed countries have weak financial incentives to minimize food loss and food waste because they have access to an abundance of inexpensive, readily available food. In the USA, over a period of about 80 years (1929–2008), food expenditure by families and individuals as a share of disposable personal income decreased from 23·4% to 9·6% (USDA/ ERS, 2010). In Europe for instance, research exploring the households' food and food waste behaviour or practices in the UK has shown a more in-depth picture of consumer perceptions and thoughts, both with regard to motives governing these, as well as behaviours as such (Evans, 2011).

Both in developed and developing countries however, ethnographic studies indicate that consumers do not carelessly waste food (Evans, 2012) rather, it is the socially-determined practices in food and eating and the contextual factors in which food habits are embedded that crucially impact consumer's wastage of food. Watson and Meah (2013), observed that consumers seem to explicitly articulate rare environmental concerns, but are strongly driven by an innate ethical motivation to do the 'right thing' yet consumers also express motives that counteract food waste avoidance behaviours (Graham-Rowe et al. 2014). Indonesia studies on household food consumption behavior found that 80% of rural women took a smaller number of meals during periods of food shortage, while the percentages of husbands, other family members and children were 6%, 11% and 3% respectively. Eight seven percent women studied mentioned that the daily meal is first served to the husband or senior male member of the family and that they have the best share of the food. After that, the children and other family members get the second priority in meal distribution. Women take the meal at the end and usually eat a smaller amount of food in case of shortage (Zhou, 2013).
In Tanzania, Nyoro et al. (2004) and Peter et al. (2013) found that nearly 400 grams of maize

are consumed per day per person. The average national consumption is estimated to be over three million metric tons per year (FAOSTAT, 2014). Given these conditions, geographic isolation of rural communities, income seasonality and its implications are important policy issues in the country. This implies that intra-household food distribution may change in the face of shocks to entitlements. In South India, food price rise results in a greater fall in calorie intake for female members of the household. In South Africa, food consumption patterns are determined by food eating habits and food preferences by citizens (Viljoen, 1996). In Kenya, where this study was conducted, adult male's consumption of food is greater relative to needs where the household faces chronic food insecurity. The decision to distribute food in favor of the adult male may be a conscious survival strategy, adopted by the family as a whole to enhance the income he brings in as principal bread-winner.

As Kearny (2010) observes, household food consumption depends on a large and complex set of social factors related to food availability, accessibility and choice. Further to this, Guyamord et al. (2010) notes that food behaviour is under the complex influence of a large range of short to long-term regulation policies that involve food-resource handling processes. In this study we believe that anthropologists are in a good position to uncover the subtle dynamics that mark household-level decision making in food consumption patterns to understand this behaviour to a certain degree from the point of view of the people themselves. In their study on Anthropology of eating, Mintz & Du Bois (2002) noted that culture is the pervasive foundation that underlies the food value chain. In socio-cultural sense, people use culture to frame what they consider to be acceptable and preferable for production, consumption and exchange. The study holds that this is a major determinant on how food-resources are handled and used within and outside the household. The study further observes that yet this is important in addressing food loss and waste and eventual food security, in most studies on food security it is given less focus.

This paper draws evidences from a study conducted in Gucha Sub-County which has 19,645 households. Kisii County is situated in Western Kenya. As per the 2009 census, Gucha sub county has a population of 1.5 million with, 245,029 households occupying 1,317.4 sq. km (KNBS, 2010). The study used a survey research design to give descriptive accounts of the various situations observed on household food-resource handling in Gucha Sub-county. The researcher employed interview schedule, key informant interview, focus group discussions and direct observation as the main methods of data collection. Purposive sampling was used to select participants in the in-depth interview methods. Data was analyzed using both qualitative and quantitative techniques.

The findings presented here attempts to interrogate food consumption and exchange procedures and their implications on food loss and waste, and eventual food (in) security in Gucha Sub-County. The researchers argue that consuming food represents a basic locus of identity, conformity and resistance. Even those who appear otherwise powerless, exercise choices in food preparation and consumption. The researchers begin with interrogation of food consumption variables in Gucha Sub-County.

1.2 Maize Consumption Procedures among Smallholder Farmers

This study adopted FAO (2008)'s definition of food consumption, which refers to the amount of food available for human consumption. However, the actual food consumption may be lower than the quantity shown as food availability depending on the magnitude of losses and wastage in the household especially during storage, in preparation and cooking, as food

thrown and/or given away. Household food consumption is one of the major components of food-resource handling procedures in the food production chain. An important observation from literature documents in Kisii County is that, for the past two and half decades despite a repeated history of maize production, maize consumption in the County is unreliable, with a steadily increasing consumer base. Unreliable maize supply has not only caused immediate food security problems, but also reinforced poverty cycles. The main question here then is why does the food loss and wastage trend continue among households?

The study began with an interest to understand the kind of maize products consumed by respondents in the study area. When respondents were asked what their main maize product for consumption was, an equal proportion of men and women (that is 50%) indicated *ugali* (prepared from maize flour) as their main food. During a focus group discussion, participants shared that members in the household are socialized into *'ugali'* (maize flour mixed together with hot water). This was mostly consumed during lunch and supper with vegetables or meat (roast or stew). It was shared that at the beginning of maize harvest season, every household that has maize no matter the amount, the consumption is high. However, its consumption declines as the season edges to the next harvest.

During the study, the researcher found that once maize has been harvested dried and shelled, 53% of the respondents stored the maize grains in the household granary, whereas 35% of the households sold much of it and stored little maize grains for household consumption later, it was only 12% of the respondents who sold everything to the village traders or neighbors after harvest. Village traders are business brokers and usually move around the villages sourcing grain from smallholder farmers. It was also shared during focus group discussions that smallholder farmers sold some maize grains to non-farming households who needed it for domestic consumption. The researchers asked respondents to mention what they ate within the last seven days. The results are shown in Table 1.1 below.

Table 1.1 Foods Taken Within the Last Seven Days

Type of food	Frequency	Percentage
Porridge(maize/sorghum)	355	96.1
Maize (ugali/chiyoyo)	377	100.0
Rice	234	62.1
Lemons /Mangoes/Pineapple	13	6.5
Bananas	200	53.1
Bread	1	0.3
Meat (beef/mutton/pork/fish)	94	24.9
Sweet potatoes(irish/nduma)	102	27.1
Groundnuts dried	49	13.0
Vegetables	377	100.0
Milk products	158	41.9
Beans	41	10.9

Analysis in Table 1.1 above indicates that all (377, 100%) respondents took maize in form of ugali or chiyoyo (boiled maize grains) within the last seven days, 234 (62.2%) took rice, 200(53.1%) took bananas, 155(41.9%) took milk products, 155(41.1%) took sorghum/porridge, 377(100%) took vegetables, 102(27.1%) took sweet potatoes (irish/nduma), 49(13.0%) took dried groundnuts, 45(11.9) took meat (beef/mutton/pork/fish), 41(10.9%) took beans, From the above analysis maize/ugali was a dominant meal among

households in the study area. As a coping strategy employed by households in the pursuit of food security, households reduced the quality and quantity of meals they consumed as well as purchase of less preferred food such as sweet potatoes and bananas.

Other households reduced the number of people eating in the house. For example, a key informant said that they reduced the number of relatives in the household, as well as selling livestock to meet food needs. Towards harvesting period, most households are maize grains deficient. They increased consumption of cassava and other roots and tubers. This is a time when rural households change the tradition of maize consumption and compensate with other food items such as rice for maize. Other foods consumed in the study area included; bananas, legumes, tubers, milk, eggs, beans and other cereals.

Despite Gucha sub-county being among the rich banana producing sub-counties in Kisii County, and banana being the fourth most widely consumed crop after maize, rice, and wheat (Rarieya and Schmidt, 2009), its uptake as food was a bit low compared to maize (ugali). In a focus group discussion, the researcher wanted to know the reason for this low uptake. One participant said that: " we consume bananas as snack, even after eating bananas, one expects to eat ugali every time in the evenings, members of the household will always demand ugali in the evening before they sleep, even if there is cooked bananas" (Male respondent, 46 years).

From the researcher's observation, such habits lead to food loss and waste, especially in cases where both maize and bananas are cooked at the same time, remnants or inedible food is disposed. It was also discussed that at the start of the season, there is plenty of maize harvested and members of the household are not keen to reduce food portions. Therefore, a lot of ugali is cooked and eaten, thus, overconsumption and the end result is food wastage. However, one participant said that: "leftover ugali is used by household members in the morning as a snack with tea or porridge" (Female participant, 36 years). The hard outer covers of leftovers are peeled and household members consume the soft part.

1.3 Household Consumption Patterns or Behavior

Despite the above assertion, the researcher observed that in times of plenty, household members receive excessive food ratio for consumption hence, food waste. Additionally, the peeled parts of food remnants are not eaten, thus, food loss and wastage. With regard to this, respondents were asked to indicate the number of meals they took on daily basis. This is summarized in Table 1.2 below.

Table 1.2 Number of Meals Taken on Daily basis by a Household

Category	Frequency	Percentage
One	30	8.0
Two	271	71.9
Three	74	19.6
More than three	2	0.5

Analysis in Table 6.2 above found that, majority (271, 71.9%) of the respondents indicated that they took two meals a day, 74 (19.6%) took three meals a day, 30 (8.0%) took one meal a day while 2 (0.5%) took more than three meals a day. To cushion hunger in the study area, most respondents reduced the number of meals they took in a day (maintained at two meals a day). In the study area, the day typically starts with porridge or tea and a baked sweet potato or *ugali* leftovers, eaten either at home or in the field during work. The researcher was interested to know what influenced household food consumption behavior. Forty eight

percent 181(48%) of the respondents said that food availability was the main factor. Thirty four percent 128 (34%) mentioned food affordability as the main influence of what household consumed. Eighteen percent 68(18%) of the respondents said that their household food consumption behavior was determined by food tastes and preferences.
During key informant and focus group discussions, it was observed that higher income households have had a greater access to enough maize for consumption along with a greater purchasing power to access such foods than poorer households. From the above analysis, it is clear that 34% of the respondents mentioned food affordability as the main determinant of consumption behavior. However, it was noted in a focus group discussion by one participant that: "due to low income in most households here in Boochi sub-location, we have reduced the amount of food we exchange or share with neighbors and relatives" (Female participant, 64 years). This finding shows that in the contemporary, households are experiencing weakened communal ties, rendering people not to engage in food sharing practices. The researchers got similar responses from other sub-locations.

As highlighted above, only eighteen percent of the respondents were influenced by tastes and preferences on maize products to consume. According to the discussants, food tastes and preferences were largely determined by the kind of foods and accompaniments available for consumption and value attached to such food. The above findings are in concurrence with a study in South Africa by (Viljoen, 1996), which found out that food consumption patterns are determined by food eating habits and food preferences made by households. Additionally, Hoddinott (2012) shared that social norms regarding foods and who should consume them, and different levels of understanding of what foods to consume and in what quantities.

The research was interested in finding out how social factors influence food consumption patterns among respondents in the study area. Out of 377 respondents, 294 (78%) of them were influenced by household type, 266(69%) were influenced by family lifestyles, 211(56%) were influenced by individual behaviors and perceptions of and expectations towards foods, whereas 190 (48%) were influenced by smallholder farmers' lack of awareness on what to consume at particular times of the day.

On individual's behavior, it was shared that eating and the perceptions of respondents' consumption behavior were critical factors influencing food loss and waste in the study area. For instance, on household type, large households were forced to cook a lot of food in the house because all members must get satisfied and some food must remain on the plate. A key informant said that: "once the food cooked is eaten, it should remain as a sign of satisfaction, if it does not remain especially for the case of children it is believed that the children are not satisfied" (Male informant, 46 years). The above findings relates well with Albisu (2016) who found out that food waste results from consumer's social behavior. This include; cooking loss, plate waste and sharing of cooked food with friends and neighbors. Therefore, this study maintains that households' social behavior influences the amount of food lost or wasted. However, this aspect is widely ignored by most food security interventionists and studies.

Still on households' social behavior, the study further revealed that to some households, satisfaction among children was measured through observation of the stomach or belly of the child. A key informant shared that: "If the belly of a child protrudes to a certain level as per the observant's knowledge, then the child is satisfied" (Male informant, 54 years). This is one of the reasons children are encouraged to continue eating as much food as possible thus, food

wastage. As shared by a participant:

> Some children are tricky and they want to show you that they can finish eating all *ugali* in the plate. Once their stomachs are full and they want to continue with eating, some of them hide behind the houses to vomit, and then come back to continue with eating the remaining *ugali* (Female participant, 48 years).

From the above finding, smallholder farmers neglect such a behavior, but it leads incidences of food loss and wastage. Resonating on similar sentiments, Lipinski (2013) recognized that food loss and waste is generally associated with behavior such as negligence and unconscious decisions, which eventually affect household food handling and management decisions.
Discussants also shared that culture dictates that bulky food should be cooked since at any given point in time, a visitor will arrive. Giving food to a visitor is a source of blessing to the household, a way of creating more friends and expanding social networks. Guansheng (2015) confirms the above findings by reporting that in Chinese society, households/people usually treat visitors with meals in order to make new friends and enhance established social relationships. One participant said that: *"*even if a visitor tells you that I am satisfied, he/she must be served with some meal*"* (Participant, male 39 years). To some households again, a visitor is given some food to take to his/her children, thus, reducing the amount of food remaining in the household. Additionally, a man in the household should not complain about the amount of food prepared in the household, this implicates him as lazy or selfish. This is the reason why rationing the amount of food to be cooked in the study area is not taken into consideration especially when there is plenty of maize. This has a direct impact to food loss and waste within the household.

From the above findings, it is the observation of the study therefore, that smallholder farmers are not willing to lose or waste food-resources, but are rather influenced by accultured social behavior from senior members of the household. This is supported by findings of Evans (2012) in his ethnographic studies in the U.K that consumers do not carelessly loose or waste food, but rather, it is the socially-determined practices in food choices, eating habits and eating patterns in which food consumption is embedded. Similarly, in the USA, Neff et al. (2015) found out that food loss and wastes of 31% to 40% of its post-harvest food supply is highly experienced at consumer level. This is based on consumers' social behavior in food-resource handling processes. Overall, this momentously impacts consumers' loss and wastage of food-resources in the household.

One of the important aspects observed in the study area was meal serving procedures. For instance, members of the household do not serve themselves, but rather the wife or the mother of the household knows how much food to serve to each member including visitors. It was pointed out that every time, the wife or mother assumes that a member of the household consumes the same amount of food holding all factors constant. However, this is not the case because the amount of food consumed by a member of the household may differ at different times.

The above situation is attributed to factors such as type of work engaged in a day, health conditions of an individual and type of meal cooked and with which accompaniment, for example, what is accompanying *ugali* during supper time. As shared by one participant: "during ceremonies in the neighborhood, members of the household usually feed in those ceremonies, and when they come back home, they are required to feed again" (Male participant, 45 years). This is a clear manifestation of food waste, since junks of food in the

household will remain unconsumed, hence thrown away when not used.

One of the aspects that led to food loss and waste in the study area is when porridge (erongori) is cooked for all, but it is rarely introduced as a 'desirable' food for adults, but only to the young. *Erongori* is prepared from fermented maize flour as a beverage for human consumption mostly for breakfast. It was cheap and easier to prepare for a bigger group. According to one respondent: "*erongori* is easy to make and takes just about 10-15 minutes to cook and serve" for young children, adolescent, nursing mother and those who are sick and *erongori* was preferred because of its high nutritional value. *Erongori* was also used especially during household communal labour activities.

One of the respondents confirmed that: "whether we have enough porridge or not for all members of the household, *ugali* must be cooked for all" (Male respondent, 48 years). Therefore, a lot of food and porridge is cooked, but not all is consumed, thus, food wastage. It was shared by participants in the focus group discussions that there are times in the season when all household members are forced to drink porridge, even if *erongori* is usually prepared for children. This is the time when almost every household in the study area is faced with chronic maize shortage and households are forced to resort to preparing porridge out of maize for breakfast and lunch for all family members including adults who earlier on avoided it. This was aimed at minimizing cost of food purchase as maize porridge is cheap and easier to prepare.

In Gucha Sub-County, availability of food-resources is challenged by household financial constraints, and this led to inability of smallholder farmers to procure adequate food for consumption. The researcher was interested in understanding respondents' social behavior in times of maize shortage. The study found that 72% of household women took fewer meals during periods of food shortage, whereas the percentage of husbands, other family members and children was 10%, 12% and 6%, respectively. The women interviewed during the study lamented that the husband other senior male members of the family were given first priority, while the children and other family members were given second priority in meal distribution. The above findings compares well with studies conducted in India and Indonesia on household food consumption behavior during shortage of food, which found out that 80% of rural women took a smaller number of meals during periods of food shortage, whereas the percentage of husbands, other family members and children was 6%, 11% and 3%, respectively (Zhou, 2013).
Food borrowing was also allowed among households. In times of maize shortage, some members of the household depended on borrowing and/or sharing the little maize they have. As confirmed by one of the key informants:

> "Some of us do not harvest enough for our families and therefore, depend on our friends and neighbors in sharing food items, whatever little we get is utilized by all members of the household, however it is a belief that a man should consume a bigger share of food than the rest of the members" (Male informant, 54 years).

The finding above indicates that smallholder farmers in the study area managed their lives by adopting various communal strategies such as food sharing ('egieseri') as a social safety net. In this study, a social safety net refers to the collective intra and inter-household assistance or support members of the households receive to address their food needs. The general consensus among participants in different interview discussions was that consumption trends

change once people harvest their maize grains. Some respondents also said that they were forced to sell assets in the house to meet their consumption needs. The researcher observed that household assets are measures of household resilience, which cushions the effect of adverse circumstances, such as crop failure or on household food insecurity. Household assets include livestock, machineries and land which could be sold, if need be, so as to purchase food used in feeding the households in times of adversity. As Kang'ara et al. (2001) noted livestock are considered a means of security and means of coping during crop failure and other calamities.

Despite the existence of food sharing practice for decades, it is not rampant today because of increased individualism and scarcity of resources among households. As such, farming households are forced to make decisions on how to mitigate the problem of little food harvested and dietary needs by practicing reciprocity. These findings are confirmed by Morton et al. (2008) who observed that reciprocal non-market exchanges of food as will be extrapolated later in the paper, occur frequently among smallholder farmers and influences how households access food for consumption. However, the practice has deteriorated over time.

As mentioned earlier in the study, reciprocity is one of the main strategies employed by rural farming households to ensure food availability. In this study, reciprocity is a non-economic mechanism that is used to provide food-resources to those who are unable to fully participate in their food needs at a given time. As asserted by Lomnitz (2002), households create adaptive mechanisms to counter food harvesting deficits and the shortcomings of market systems, and the farming households in Gucha sub-county are no exception. The researcher observed that smallholder farming households in the study area, sharing of food-resources are done at household level rather than communally.
The informal systems used by households in accessing food are currently fading away because of economic challenges experienced by majority of households in the study area. This has forced many smallholder farmers to work independently thus, moving away from collectivity. One participant narrated that: "Nowadays it is not easier to share food like before (old times), because people are faced with many economic challenges such as scarcity of land for farming and inadequate income" (Male participant, 45 years). Additionally, some households have taken advantage of intimate bonds and reciprocity and do not work hard in their own farms, hoping that they will be considered by those who have plenty. This has reduced the willingness of people to help in times of need.

1.4 Levels of Awareness and Knowledge about Food Loss and Waste

The levels of awareness and knowledge about food loss and waste are two important aspects important in addressing food security among smallholder farmers in Gucha Sub-County. When respondents were asked whether they know that food loss and waste occurred in the households during consumption, all respondents unanimously agreed that sometimes in the process of handling maize grains, some loss or waste is experienced. Respondents acknowledged having the knowledge on how to reduce food loss and waste during consumption in the household. In describing their knowledge about how to reduce the amount of food they lost or wasted, 51% described themselves as very knowledgeable and 49% described themselves as fairly knowledgeable.
Eight six percent (86%) of the respondents indicated they had received or heard information about food lost or wasted from various sources of agronomic information, while 14% sought information on food loss and waste. On whether respondents used this information in

reducing food loss and waste within their households, majority (70%) of the respondents did not use the information they have. For example, it was shared that in most cases when there is plenty of food particularly during harvesting season, respondents are not keen to avoid food loss and waste until they become food deficient.

As well, household and individual social behavior and perception of expectations towards food affect the food-resource handling processes at the household level. For example, when food is plenty, households do not exercise meal planning activities, but rather become reactional on food consumption. It was shared by discussants in a focus group discussion that, a household can cook food at anytime and any amount without considering the number of people in the household at a given time and their food needs. The eventual result is more food is cooked and ends up being lost or wasted. More often than not, households base their justification on the social norms, beliefs and customs on food consumption, which affect meal planning processes. Respondents were asked how much it bothered them to throw out food because it was not eaten, Eight two percent (82%) reported that food loss and waste bothered them a lot; while18% reported that they were not bothered at all.

From the above analysis, majority were really bothered on food loss and waste, however, some of them were not in control because of culture demands cooking a lot of food, which will go to loss or waste. Additionally, it was shared in the focus group discussion that sometimes food is lost or wasted based on how it is handled over the season from the storage facility to consumption. This study observes that maize loss and waste while handling it from store over the season are not always accounted, but assumed as minimal. During a key informant interview, it was shared some households tend to underestimate food loss and waste at consumption level. This is the reason why not much is done to reduce the loss and waste. As construed by Lebersoger and Schneider (2011), this is true whether in a developed or developing country, since consumers generally underestimate their own food loss or waste and eventually turns to be a chronic problem.

As shared by participants in the study, cooking a lot of food and ensuring that there are remnants for a visitor who may arrive at anytime or for later use, is a culturally recognized behavior in Gusii community. This is confirmed by Barr, (2007) that social norms people are accultured to play a paramount role in shaping attitudes towards household food-resource handling and management. Besides, due to the complexity of social behavior that may affect the amount and likelihood of food loss and waste in the household, the anticipation of food loss and waste does not constitute an easy task (Quested et al. 2013). As pointed out by Graham-Rowe et al. (2015) actions aimed at reducing food waste at household are characterized by low efficiency, if they do not concern key psychological and social mechanisms, constituting the basis for motivation to reducing food waste in the household.
In the forgoing discussion, overall food loss and waste at consumption stage in the household is mainly driven by social factors, including habits of food preparation, serving and consumption. Additionally, household food consumption habits and perceptions are largely shaped by household members' upbringing, social and cultural background. All these factors are moderated by the social environment created by households themselves. The study observed that understanding the extent to which smallholder farmers are actually knowledgeable can help to inform whether interventions ought to be implemented in reducing more food losses and waste. The paper concludes with conceptual framework, which illustrates interactions of main variables influencing household food consumption behavior in the study area. This is illustrated in Figure 1.1 below.

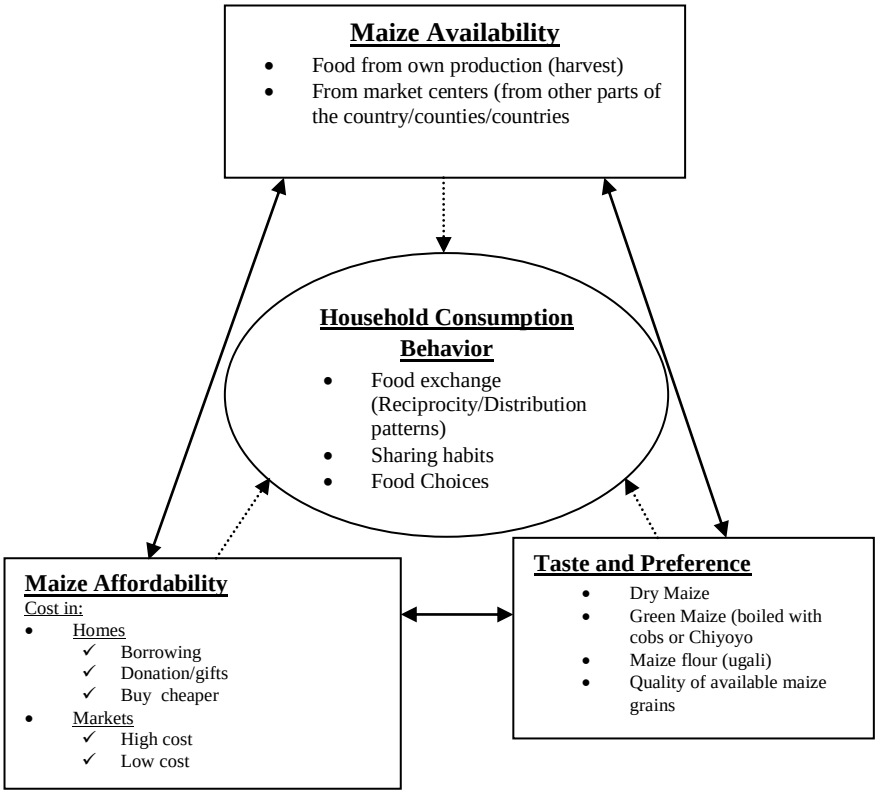

Figure 1.1: Food Consumption among Smallholder Farmers

Figure 1.1 above indicates that food consumption behavior among smallholder farmers is an outcome of many variables including; food availability/access, food affordability and food tastes and preference. These variables are influenced by household's social behavior. Food availability/access, affordability and taste and preference are moderated by the household consumption behavior. Food availability or accessibility in this study means the amount of food produced by smallholder farmers, whereas, food affordability means the capacity of the household to access enough food either through purchase or exchange for its members for consumption. As shown in Figure 1.1 above, maize Affordability is determined by cost in homes through borrowing, donation or gifts, buying at cheaper prices at home or buying at high or low cost in the market.

Taste and preference refer to the household food choices people make. Some smallholder farmers prefer dry maize, which they can grind and cook *ugali* or prepare porridge, others preferred green maize for boiling with cobs or as chiyoyo. Above all, quality of maize grains was a major determinant for taste and preference in the study area. The study shared that because of low income among smallholder farmers in the study area, they experience minimal food exchanges because of loose communal ties in recent times. This is because of reduced bonded social relationships and food prices playing a significant role in determining the amount of food purchased, shared and eaten in the households. Food tastes and preference are determined by the kind of foods available for consumption.

The above framework observes that household food consumption behavior is important in determining food availability/access, affordability and tastes and preferences in the study area. As discussed in this paper, food availability or affordability significantly influence the general food exchange processes in the study area. This consists of the amount of food

harvested, processing and distribution. A smallholder farmer's access to capital, marketing opportunities and production choices will influence food availability, affordability, tastes and preferences.

The household consumption environment also determines what household consumes in terms of quality and quantity. In this context, consumption environment is the physical and social context in which households and individuals decisions on food consumption processes are made. Therefore, the household food consumption factors bear significant influence on food availability, affordability, taste and preferences. For instance, the food, which households consume in quantity and quality, the location of eating, the number of eating events, and even the composition of the persons at each eating event have changed. This is attributed to food production, processing and distribution systems including reciprocity and eating preferences. Understanding social behavior on food-resource handling within households is an important scientific and policy issue for interventionists addressing household food security.

2.0 Conclusion and Recommendations

Understanding household arrangements, social behavior, and cultural contexts which influence decision making processes in relation to food consumption behaviour are important in effective food-resource handling processes within the household. Therefore, the researchers argue that there is need for a clear understanding of inter-household and intra-household dynamics in the food-resource handling processes. This understanding needs to capture the influence of social and cultural context of smallholder farmers consumption patterns. Data obtained can be translated into effective policies and interventions that promote sustainable household food security. It is the recommendation of the study that consumer education campaigns should be increased to provide knowledge and awareness on appropriate food types, food preparation skills, meal planning, using leftovers and food disposal behaviour. The literature provides evidence that once people are aware of the value of their losses, then there is commitment to handle food-resources better.

Acknowledgement

The authors would like to acknowledge the support of the Kenya National Commission of Science Technology and Innovation (NACOSTI) for funding the entire research project.

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