

**FOOD INSECURITY, A PERCEIVED BARRIER TO HEALTHY EATING
IN THE LAKE VICTORIA REGION, KENYA:
FINDINGS FROM A QUALITATIVE STUDY**

Korir EC^{1*}, Tuitoek PJ² and D Marais³



Emily Cherotich Korir

*Corresponding author email: korirem@yahoo.com

¹Department of Human Nutrition, Faculty of Health Sciences, Egerton University, Njoro, Kenya

²Murang'a University of Technology, Murang'a, Kenya

³Warwick Medical School, University of Warwick, United Kingdom



ABSTRACT

Consumption of poor-quality diets was noted as prevalent in the Lake Victoria Region, Kenya. As a strategy to communicate desirable change and promote healthy eating in the region, a 30-member panel of policymakers and implementers developed and proposed 12 food-based dietary guidelines (FBDGs) in 2017-2018. The objective of this study was to assess barriers in adopting the proposed FBDGs amongst community members in the lowlands of Kisumu and Homa Bay counties. Qualitative, descriptive cross-sectional design was used to collect data from 72 focus-group discussions (FGD). The FGD was conducted among 216 school going children (10-13y), 216 high school students (15-18y), 207 adult males (26-74y) and 211 females (18-71y). The participants were asked to state whether the proposed FBDGs reflected their daily dietary practices? If the answer was no, the FGD participants were asked to elaborate on the perceived barriers. Each FGD consisted of 8-12 participants. The demographics of FGD participants were collected before the start of FGD sessions. All FGD proceedings were audio-recorded and transcribed verbatim. Demographic information of participants was analyzed and presented using descriptive statistics. The FGD responses were coded and analyzed based on the main code, the barriers. Barriers to healthy eating in the study area were mainly linked to low production of food, food unavailability and inaccessibility. Specific factors which contributed to the food insecurity situation included; dry and sunny weather, seasonality in food availability, limited resources to secure potential farmland with fences, gender influence on land use, high cost of food, lack of money to purchase food, low income, sale of farm produce with resultant inadequate quantities of food consumed and inappropriate meal composition. Food insecurity was a perceived barrier to healthy eating in the lowlands of the Lake Victoria region. This research suggests the need to address food systems and economic structures to improve food production, distribution, accessibility and consumption in the region. Coding was done with the aid of NVivo8 (QSR International Pty Ltd Version 8, 2008). This study was registered with the Kenyan National Commission for Science Technology and Innovation (NACOSTI/P/18/12634/22291).

Key words: Healthy eating, Lake Victoria, barriers, food insecurity, food unavailability, food inaccessibility



INTRODUCTION

Globally, there is increased awareness on the need to consume healthy diets for optimal human health and environmental sustainability [1, 2, 3]. Therefore, food security becomes a concern to any community as the foundation for healthy eating [4]. Food is however not equitably distributed. The European countries are consuming approximately 600 g/day more food (1,800 g/day) than African countries (1,200 g/day) [5]. Under the shadow of the COVID-19 pandemic, prevalence of undernutrition in the year 2020 in sub-Saharan Africa was 24.1 percent and 28.1 percent in eastern Africa [6]. Besides low total dietary intake, diets in low- and middle-income countries including those in Sub-Saharan Africa have been described as having, high proportions of starchy foods, with less access to animal proteins, fruits and vegetables [7, 8]. Therefore, macronutrient deficiency is frequently compounded by micronutrient deficiencies, particularly iodine, iron, vitamin A and zinc [9]. A further compounding factor to undernutrition problems in low- and middle-income countries, is the nutrition transition from undernutrition to obesity and the resultant coexistence of overnutrition and undernutrition within the same community or household [10, 11].

Similar to other low- and middle-income countries, diets in Kenya are inadequate in both quantity and quality [12]. A survey in Kenya noted that around 12% of households had unacceptable consumption of diets which consisted chiefly of staples, flavoured with green vegetables and oil [13]. Although there was prevalence of macro and micronutrient inadequacy in Kisumu, there was also an emergence of overweight and obesity [14]. Consuming a healthy diet throughout the life course helps to prevent malnutrition in all its forms as well as a range of nutrition-related non-communicable conditions [15]. The need to improve diet quality, particularly among populations most vulnerable to malnutrition, is a current global concern [16]. Promotion of appropriate diets and healthy lifestyles by the use of FBDGs was a goal, given priority consideration in the first International Conference on Nutrition [17]. Dietary guidelines are the basis for developing policies intended to shift consumption patterns to achieve sustainable diets by addressing dietary composition and energy intake [1]. As a strategy to communicate desirable change and promote healthy eating in the Lake Victoria, this study developed and proposed 12 FBDGs in the region. This paper presents explanatory barriers to adopting the proposed FBDGs in the region.

MATERIALS AND METHODS

A 30-member panel of policy makers and implementers in nutrition, health and agriculture departments engaged in a series of two workshops to develop and propose 12 FBDGs based on nutrition and nutrition related-health concerns in the region (Box 1).



Box 1: The proposed food-based dietary guidelines for the Lake Victoria Region-Kenya

Eat lunch, supper and 2 healthy snacks every day.
Eat well-balanced breakfast every morning.
Eat diverse energy giving foods to include; non-processed locally milled maize, sorghum, millet and wheat products cassava, arrow roots, yams, sweet potatoes, green bananas, rice, interchangeably.
Eat legumes, nuts, fish, poultry, insects, meats, or eggs interchangeably every mealtime.
Eat plenty of diverse vegetables every mealtime.
Eat variety of fruits every day.
Eat foods prepared with small amounts of cooking oil always.
Drink at least one cup of boiled fresh or locally fermented milk or yoghurt every day.
Drink plenty of clean and safe water throughout the day.
Use clean and safe water to wash your hands and to prepare food every time.
Eat less fatty, salty, sugar-sweetened foods.
Engage in physical activities every day.

This study conducted in 2017-218 was designed to consumer-test perceived feasibility of the proposed FBDGs using focus group discussions (FGD). Using an open-ended FGD guide to elicit response, a total of 72 FGD were conducted among primary school pupils (18), high school students (18) and adult males (18) and females participants (18). All FGD proceedings were audio recorded. A trained moderator who had first degree in nutrition facilitated the FGD sessions.

Study design and setting

Qualitative, descriptive cross-sectional design was used in this study. The counties of Kisumu and Homa Bay were purposively selected. Research findings and reports in the region showed prevalence of undernutrition as well as emerging overnutrition [13, 14]. Although community members engaged in fishing and subsistence farming with the potential to be self-sufficient in food production, agricultural produce varies with agro-ecological zones (AEZs) and thus food availability and accessibility [18, 19]. The study site was stratified based on AEZs. The AEZs in Kisumu and Homa Bay counties are classified into Upper Midlands (UM) and Lower Midlands (LM) [20, 21]. The LM zone is the nearest to the Lake. The zone is further categorized into LM2, LM3, LM4 and LM5 with agricultural potentials decreasing from LM2 to much lower productivity in LM5. The predominant LM3 and LM4 zones were selected for this study. The purposively selected study sites within these zones were Kisumu town (Ksm_Urb), South-West Seme (Ksm-LM3), Nyando (Ksm_LM4), Homa Bay municipality (HmB_Urb), Ndhiwa (HmB_LM3), and Mbita (HmB_LM4) (Figure 1). In each site, six villages were selected using a computer random number generator. Three focus group discussions (FGD) were conducted among primary school pupils (10-13y), High school students (15-18y), adult males (26-74 y) and females (18-71y).

Study procedures

This study was conducted in two phases. In phase one, the 30-member panel developed and proposed FBDGs for the region (Box 1). In the second phase, FGD was conducted among community members to test feasibility of the proposed FBDGs. This paper seeks to present qualitative findings of the perceived barriers to adapting the proposed FBDG in the region.

Selection of participants

The proposed FBDGs targeted all healthy individuals, above five years of age. The accessible population for consumer-testing were children and adolescents attending local schools, and adult males and females within the community. Class five and form two students were purposively selected based on the age group. Most of class five children attending school in Kenya are about 10 years, while form two students are between the ages of 16 and 17 years. For each FGD conducted in both primary and High schools, 12 participants who were able to engage in FGD in a meaningful way were selected with the help of the class teachers. The adult males and females participants were drawn from a list of village members with the assistance of the Village Elders and the Community Health Workers. Participating individuals had to be: married or living in own household; involved in food purchase and/or preparation; not coming from the same household; not relatives; and not immediate neighbours. In every strata, three FGD were conducted. A minimum of two FGD are recommended for saturation in every strata. A total of 72 FGD were conducted each consisting of 10-12 members.

Data collection

For the primary and high school learners, the first author and the moderator visited the schools a week before the date of the FGD to seek consent for their participation from the parents or guardians. For the adult participants, the moderator read the research protocol to the participants and allowed them to ask questions. Only those who signed the consent form participated in this research. The biodata of all the participants was taken before the commencement of the FGD sessions. The FBDGs message statements were printed and displayed on posters each one at a time in clear view to all participants. A volunteer research participant read the displayed FBDG out loud. The FGD participants, were asked to state whether the proposed FBDGs message statements reflected their daily dietary practices? If the answer was no, they were asked to elaborate on their present dietary practices and to explain the difficulty in adopting the proposed FBDGs? The FGD lasted for 45 minutes. All FGD proceedings were audio-recorded. In total 72 FGD were conducted (Kisumu County-36 and Homa-Bay County-36). This study was cleared by the Bioethical Committee in Kenya and registered with the Kenyan National Commission for Science Technology and Innovation (NACOSTI/P/18/12634/22291).

Data analysis

Descriptive statistics was used to present the biodata of the participants. The audio recorded proceedings were transcribed verbatim by the moderator. Inductive content analysis was done on transcribed audio-recorded proceedings. The emerging themes were coded based on words or terms used to express perceived barriers to adopting the proposed FBDGs. The first author with one other trained coder independently coded 10



transcripts. Any discrepancies on the key concepts were resolved. The inter-coder agreement was calculated and a weighted Kappa coefficient 0.93 was attained. Coding was done with the aid of NVivo8 (QSR International Pty Ltd Version 8, 2008).

RESULTS AND DISCUSSION

The FGD results are presented with verbatim expressions. The verbatim quotes are labeled in terms of study sites and the participant's stratum; Homa Bay urban (HmB_Urb), Ndhiwa (HmB_LM3), Mbita (HmB_LM4), Kisumu urban (Ksm_Urb), Nyando (Ksm_LM4) and Seme West (Ksm_LM3), primary school children(_Child), high school students (_Adol), male (_Men) and female (_Wom). The number at the end of each label (1, 2, 3) denotes the serialization of the FGD within the study site. An ellipsis (...) indicates omitted words or sentences.

Study population demographics

A total population of 216 class five (10-13y) pupils, 216 form two students (15-18y), 211 adult females (18-71y) and 207 adult males(26-74y) participated in the FGD sessions. Over 80% of the female (177) and male (165) participants attained primary school education. Only 15% (32) of male and 9% (19) of the female participants attained high school and tertiary education. Over 68% of the male (141) and over 62% female (132) were farmers and 37% of the males were fishermen.

Elements of food insecurity in the study area

Food security is entrenched in the Kenyan constitution as a human's right [22]. The present Kenyan government has therefore, set a policy objective to increase the quantity and quality of food available and accessible to ensure adequate, diverse and healthy diets [23]. Further, food security has been set as one of the pillars to deliver economic and social development in the Country [24]. Despite these efforts, this study found elements of food insecurity which included; limited food production; limited food accessibility; and inadequate amounts of food (Figure 1) as barriers to adapting healthy diets in the study area.

 <p>Limited food production</p> <ul style="list-style-type: none"> Unfavourable weather High cost of farming Lack of fences on farms Gender influence on what to farm 	 <p>Limited food accessibility</p> <ul style="list-style-type: none"> High cost of food Low income No income No money Sale of family food produce 	 <p>Not enough food</p> <ul style="list-style-type: none"> Seasonal availability Inadequate quantity Skipping of meals Lack of variety
---	--	--

Figure 1: Barrier codes for food insecurity in the Lake Victoria region

Limited food production

Unfavourable environmental conditions, high cost of rearing livestock, lack of fences on farms were some of the factors which were indicated as limited production of food in the region.

Unfavourable climatic conditions

Despite the potential to irrigate the land near the freshwater Lake, food production in LM3 and LM4 zones of the Lake Victoria region was limited. The participant's described weather within zones described zones (especially LM4) as sunny, dry with only little rain. There was little production of maize, beans, fruits and sweet potatoes as the weather was indicated to favour growth of sorghum only; *"...the weather here is so sunny at times when foods like sorghum do well you might fail to get the maize, beans, fruits"* (HmB_LM4_Men_1). Further, drought limited accessibility to fodder feeds for the cows; *"...when there is drought, there is no grass for the cows"* (Ksm_LM3_child_1). *"...during drought the cows do not have milk"* (Ksm_LM3_Wom_2). Low precipitation, heat stress and dry spells are known hazards contributing to agricultural risk in the region [18, 19]. Besides drought, rearing of cows was stated as expensive due to zoonotic diseases; *"...to keep cows you need money because cows get sick, so you have to spend money every time treating them"* (HmB_LM3_Men_2). Further, milk production from the few cows was little; *"...from milking cows, I get, one Fanta (300mls) which is very little"* (Ksm_LM3_Adol_1). Other studies in the region indicated that livestock keeping in the region was not commercialized [25, 26].

Lack of fences on farmlands

Although there was the potential to grow cassava, sweet potatoes and maize in some parts of LM3 and LM4 zones, roaming cows and hippos destroyed crops on unfenced farms; *"cassava grows well. I once planted, but people just leave the animals to graze around, they destroy these crops, even the sweet potatoes, they do well but, because of roaming animals people do not plant them"* (HmB_Urb_Women_3). Apart from livestock, *"...the hippos are a problem, they destroy maize planted near the Lake"* (HmB_LM4_Wom_3). The land was, therefore, left fallow. Similarly, a study in Nyando and Muhoroni observed that some households left their land fallow while other households rented out their land [26]. This was attributed to several reasons including poverty, old age and the lack of labour and farm inputs. Low-income producers and consumers lack resources to invest in adaptation and diversification measures for better productivity of the land [27]. This suggests the need to reassess and prioritize the entry points to improve food production in the region.

Gender influence on what to farm

Men influenced decisions on the type of crops planted; *"Men prefer planting maize and sugar cane and if you plant, for example, sweet potatoes on the farm without his knowledge, he will come and uproot all of them"* (HmB_LM3_Wom_2). This finding concurs with an earlier study in Homa Bay which showed that men dominated decision-making for market-oriented crops such as beans, green grams, kales and maize, while women were more prominent in groundnuts and sweet potatoes farming [28]. Empowering women could improve food security situation in the region [29].



Limited accessibility to food

Limited accessibility to food was occasioned by sale of the little family food produce, high cost of food, lack of income and money.

Sale of family food produce

Although over 60% of the participants were farmers, food production in the region did not necessarily translate to household food availability. Chicken was reared for what was described as "emergency cash", eggs were left for the hen to brood and hatch; "we keep the chicken majorly for emergencies, maybe you need some cash urgently the chicken is available (for sale)" (Ksm_LM3_Men_2); "we want the chicken to multiply in number, we cannot interfere with eggs" (Ksm_LM3_Men_2). Other farms produce sold in the region included legumes, referred to as "our bank", sorghum, rice, cassava, groundnuts, vegetables and milk; "...legumes are our bank, we do not eat them often, after harvest, you will not find them in our homes because we shall have sold all" (HmB_LM3_Wom_3); "...people will plant sorghum, then sell everything to the breweries" (HmB_LM3_Men_1); "some food like rice and cassava, we have mostly planted them just for cash not for food, it is planted and all are sold" (Ksm_LM4_Men_2). Selling of the family food produce meant that households sourced their foods from the market; "... when rice is ready for harvest, traders from Uganda come and take it all and we are left with nothing, so when we go back to buy it (from the market) the price is high" (Ksm_LM4_Men_2). This finding concurs with other studies in the region and Africa. A study in Kisumu found that subsistence food farmers depended on the market for household food supplies [30]. Similarly, a study in Ethiopia, found that rural markets and not subsistence agriculture played a much larger role in dietary diversity [31]. Also, a research in Northern Ghana observed that production of smallholder farming households was not related to children's dietary diversity and nutrient adequacy [32]. Low income obtained from the sales of family foods and the meagre wages obtained from menial jobs in the Lake Victoria region was often insufficient to buy food to add variety to the diet. The money was often spent on non-food items such as paying of school fees; "...most of the parents till other people's land, according to me the wages they are getting is less.... you find that there is no flour in the house there is no soap so to satisfy this it would be very hard they cannot afford the three meals a day plus the snacks" (Ksm_LM3_Adol_2); "Sometimes my children have been sent home for school fees, I will have to sell these green grams so that I can get the school fees" (HmB_LM3_Wom_2). This finding agrees with another study in Kenya where households with limited income were found to face unwelcomed trade-offs between food and other types of household necessities [29].

High cost of food

Except for small fish "omena", consumption of animal source food was low due to high cost. Most participants in the region rarely consumed large fish due to cost; "the type of fish we commonly use is the "omena" (Clarias) because the bigger fish like tilapia are expensive" (Ksm_LM4_Men_1). Although a study in Kisumu found an associated between meat with high socio-economic status in Kisumu urban [33], for most participants in this study, meat was inaccessible due to cost; "meat is very expensive, ... so instead of buying meat we buy the "omena" that is the "meat" we have"



(HmB_LM3_Men_2). Milk was preferably used to prepare tea to be served to everyone including children; *“I buy milk at Ksh. 50/= and sometimes that is the only money I have, so I will rather buy milk and prepare tea so that even the baby gets, rather than buy the milk and drink it alone”* (HmB_Urb_Wom_2). Low consumption of animal source food was not unique to the region. Similar findings were observed in Kakamega County [34]. Throughout sub-Saharan Africa, animal source foods have been noted as prohibitively expensive for the poor [8]. Besides animal source foods, fruits were also stated as costly in the region. Participants preferred to purchase vegetables rather than fruits: *“...you can even find that a month can go without eating fruits so long as I get what is needed like I get vegetables and flour that is all something like fruits is not of concern”* (Ksm_LM4_Men_2); *“Fruits are expensive, one mango can go for 30/= so instead of buying one fruit why don't I buy vegetables that will be eaten by everybody”* (HmB_LM4_Wom_1). A study done to inform policy in Nairobi reported similar findings. In the study, households could only afford the basic foods such as vegetables regarded as ‘necessity’ and devoted little to fruit consumption which the researcher referred to as luxury goods [35].

Further, use of oil rather than fat was indicated as more expensive. Therefore, the amount of cooking oil/fat had to be rationed to prolong use: *“this salad (oil) is expensive but the fat is affordable”* (HmB_Urb_Men_3); *“we use small amounts because it is expensive. I cannot imagine buying oil for every meal that needs to be prepared”* (HmB_LM3_Men_3); *“...for the oil, you just have to use it in small amounts because you want it to last longer”* (HmB_LM3_Men_2). For participants who depended on the sale of farm produce, the return was too little to afford purchase of other foods to ensure adequacy and dietary diversity: *“... the value of what we farm is so low, for example if I want to eat this good breakfast composed of milk, tea and eggs let us do an estimation of the amount of money required; I will need around Ksh.110/= because a packet of milk is Ksh.70/= then I will also buy 4 eggs that is Ksh.40/= . For me to have this money, I will have to sell my maize yet 1 ‘gorogoro’ (2kg) goes for Ksh.40/= i.e. I will sell 4 (2kg tins) because I will need tomatoes to make these eggs. This is the same maize I am to make ugali (thick porridge) from and eat with my family?”* (HmB_Urb_Men_1). This finding is in agreement with the global report where the cost of healthy diets have generally been indicated as above poverty line and unaffordable for the poor [4].

No money to purchase food

Despite food availability in the market, most participants had no money to purchase food: *“Sometimes I do not have money ...for everything to be bought you have to have money”* (HmB_LM3_Wom_1); *“There are foods brought to the market here from Rift Valley, but if you do not have money you cannot buy”* (Ksm-LM4_Men_2); *“...Sometimes there is no money to buy milk, so we take strong tea (tea without milk)”* (HmB_LM3_Adol_1). Consumption of breakfast was perceived as only possible for individuals with regular income like “teachers; *“regular breakfast is possible maybe for teachers, those who are employed but for us it is not possible”* (Ksm_LM3_Wom_2); *“...parents till other people's land, ...with Ksh. 150 they earn you find that there is no flour in the house there is no soap, it is very hard to afford the three meals a day and snacks”* (Ksm_LM3_Adol_2). Adaption of strategies to support



the Kenyan government objective of "the big four" agenda (Food security, universal healthcare, manufacturing and affordable housing) as pillars to deliver economic and social development presents an opportunity to develop and implement programmes to promote food availability and accessibility in the region [36].

Lack of food

Lack of food resulted in skipping meals, consumption of inadequate quantities and inappropriate meal composition.

Skipping of meals

Although meal frequency is an important determinant of nutrient intake, diet quality and nutritional status breakfast and lunch meals were regularly skipped in the region. Supper seemed to be the only meal planned for the day by most families: *"...during the rainy seasons we can pretend to be eating twice, ...during the dry season, it is just the tea that you can talk about, then wait for supper, but again this supper you cannot count on it because sometimes it is also not there"* (Ksm_LM4_Men_1); *"...mostly we eat once in a day ...it is only the evening meal you are going to have"* (Ksm_LM3_Men_2); *"...at night I usually try to ensure that I make ugali with fish 'okoko' (small fish) with some kales on the side or, if I prepare githeri I must look for avocado for the children together with milk for tea so that they eat something heavy since they stayed hungry during the day"* (Ksm_LM4_Wom_1). Similarly, other finding on barriers to access healthy food was associated with less frequent consumption of breakfast and lunch [37]. However, between breakfast and lunch, breakfast was the most skipped, *"where will we get the time and money to prepare breakfast? When we wake up, everyone goes in search of food, by the time we are back, it is already lunchtime so we just take lunch and forget about breakfast"* (HmB_Urb_Men_1); *"...we wake up very early and go to the farm and the children also go to school, at lunchtime the children come back home and we also get from the farm and take lunch of which in most cases, it is tea and ugali from the previous night after that we just wait for supper"* (Ksm_LM4_Men_1). Family composition and size seemed to influence skipping of breakfast meals in the region. The women and elderly siblings often skipped meals in favour of the younger family members: *"sometimes the food that I have is so little, so I miss breakfast so that my children can have something to eat"* (HmB_LM3_Wom_1); *"At times there is food, but we are eight siblings and I am the eldest son, as the elder one I come to school without anything and leave the little food for younger siblings to eat"* (HmB_LM4_Adol_2). This finding concurs with another study in Kenya where the mothers or some older members often skipped breakfast to leave food for younger members of the family [38]. A study among Swedish adolescents (15–16y) found that meal patterns with omission of breakfast or breakfast and lunch were related to a clustering of less healthy lifestyle factors and food choice leading to a poorer nutrient intake [39].

Consumption of inadequate quantity of food

During dry seasons, the amount of vegetables served was stated as very little or none; *"...when it is not raining there are no vegetables and the amount of vegetables served is very little just to support (escort) the ugali"* (HmB_LM4_Adol_1); *"Sometimes*



when vegetables are not in the market, we boil 'omena' and eat it without vegetables'' (Ksm_LM3_Aadol_3). If bought, fruits were shared out in small pieces; "sometimes when I buy fruits, we just have to share however little it is, as long as everyone gets a taste'' (HmB_LM4_Wom_3). To a child participant the choice to wash or not to wash hands before meal consumption, depended on the amount of food served and the number of persons set at the table to share the food: "when you are sent to the shop and there is already 'ugali' (thick porridge) served on the table and those who want to eat are also many, yet the 'ugali' is small, you just decide to start eating without washing your hands because they might finish for you food'' (HmB_Urb_Child_1). Similar findings were observed among residents in Nairobi slums where, little food, inadequate in quantity was eaten by food insecure households [40]. An increase of up to 20% of total daily food intake to meet dietary guidelines goals in Kenya has been recommended [5].

Consumption of limited variety of foods

Due to limited availability of food, only one kind of relish was served in a meal to 'conserve' any other relish for the next meal: "We will rather take the fish for lunch then take the vegetables for supper because eating the two at the same time is a waste of food'' (Hmb_LM3_Men_1). Foods eaten at lunch were mainly snacks which included, "...tea, porridge, roasted maize and water'' (HmB_LM3_Aadol_2). It is recommended that, a planetary health plate 'should consist by volume of approximately half a plate of vegetables and fruits and the other half, displayed by contribution to calories, which should consist of whole grains, plant protein sources, unsaturated plant oils, and (optionally) modest amounts of animal sources of protein' [2].

CONCLUSION

Food insecurity was a barrier to realization of healthy eating in LM3 and LM4 zones of the Lake Victoria Region, Kenya. Despite proximity to the largest fresh water Lake in Africa, and the potential to irrigate farms, food production depended on rain water. Other factors which limited food production in the region included; gender influence on what to farm; and deficient farming practices such as failure to secure crop farms from roaming animals. Apart from limited production of food, many participants depended on farm produce for income. The little income obtained from sale of family foods, faced unfair tradeoffs with other household needs given priority over purchase of foods to diversify family diets. High cost of food in the market, with little disposable income rendered food inaccessible to most research participants. Therefore, healthy eating was inconceivable to most research participants in the region. This research reiterates the need for the County Governments in the region to recommit to the existing policies to improve the food environment.



REFERENCES

1. **GBD 2017 Diet Collaborators.** “Health effects of dietary risks in 195 countries, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017.” *The Lancet*. 2019; 393 (10184): 1958-1972).
2. **FAO.** Plates, pyramids and planets Developments in national healthy and sustainable dietary guidelines: a state of play assessment Carlos Gonzalez Fischer & Tara Garnett. 2016.
3. **Willett W, Rockström J, Loken B, Springmann M, Lang T, Vermeulen S, Garnett T, Tilman D, DeClerck F, Wood A and MD Murray** Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *Lancet* 2019; 93(10170):447–92).
4. **FAO, IFAD, UNICEF, WFP and WHO.** The State of Food Security and Nutrition in the World 2020.
5. **World Wide Fund for Nature (WWF).** Bending the Curve: The Restorative Power of Planet-Based Diets. Loken, B. et al. WWF, Gland, Switzerland, 2020.
6. **US Department of Agriculture, Economic Research Service (USDA).** Definitions of food security 2019.
7. **Ruel MT, Harris J and K Cunningham** Diet quality in developing countries. In *Diet Quality: An Evidence Based Approach*. 2013; 2:239–261 [Preedy, VR, Hunter, LA & Patel, VB, editors]. New York: Springer.10.1007/978-1-4614-7315-2_18.
8. **Headey D and H Alderman** The Relative Caloric Prices of Healthy and Unhealthy Foods Differ Systematically across Income Levels and Continents. *The Journal of Nutrition*, 2019; **149(11)**:2020–2033.
9. **Harika R, Faber M, Samuel F, Kimiywe J, Mulugeta A and A Eilander** Micronutrient Status and Dietary Intake of Iron, Vitamin A, Iodine, Folate and Zinc in Women of Reproductive Age and Pregnant Women in Ethiopia, Kenya, Nigeria and South Africa: A Systematic Review of Data from 2005 to 2015. *Nutrients*. 2017; **9(10)**:1096.
10. **Ford ND, Patel SA and KMV Narayan** Obesity in Low- and Middle-Income Countries: Burden, Drivers, and Emerging Challenges. *The Annual Review of Public Health*. 2017; **38**:145-164.
11. **Hawkes C, Harris J and S Gillespie** Changing diets: urbanization and the nutrition transition. *Global Food Policy Report 2017*. Washington, DC: IFPRI, 2017.
12. **Kenya National Bureau of Statistics Economic Survey (KNBSES)**. 2016.



13. **Comprehensive Food Security and Vulnerability Analysis.** (CFSVA) Kenya 2016.
14. **Cheserek MJ, Tuitoek PJ, Waudu JN and K Msuya** Anthropometric characteristics and nutritional status of older adults in the Lake Victoria Basin of East Africa: region, sex, and age difference. South African Journal Clinical Nutrition. 2012; **25(2)**:67-72.
15. **High Level Panel of Experts on Food Security and Nutrition (HLPE).** Nutrition and food systems. A Report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. Rome, Food and Agriculture Organization of the United Nations, 2017.
16. **IUNS.** From Sciences to Nutrition Security. The 21st International Congress of Nutrition. Buenos Aires, Argentina. Buenos Aires, Argentina. 2017.
17. **FAO.** Rome Declaration on World Food Security and World Food Summit Plan of Action. World Food Summit. Rome.1996: 13-17.
18. **Ministry of Agriculture, Livestock and Fisheries (MoALF).** Climate Risk Profile for Kisumu County. Kenya County Climate Risk Profile Series. Nairobi, Kenya. (2016).
19. **Ministry of Agriculture, Livestock and Fisheries (MoALF).** Climate Risk Profile for Homa Bay County. Kenya County Climate Risk Profile Series. Nairobi, Kenya. 2016.
20. **MoA/GTZ) (2010a).** Farm Management Handbook of Kenya Vol. II. Natural Conditions and Farm Management Information. Ecological Zones, Soils and Fertilising by Group of Districts – Subpart A2 Nyanza Province Kisumu County.
21. **MoA/GTZ, 2010b).** Farm Management Handbook of Kenya Vol. II – Natural Conditions and Farm Management Information – ANNEX: – Atlas of Agro-Ecological Zones, Soils and Fertilising by Group of Districts – Subpart A2 Nyanza Province Homa Bay and Migori County.
22. **Government of Kenya (GOK).** The Constitution of Kenya, 2010. National Council for Law Reporting, Milimani Commercial Courts, Nairobi, Kenya. 2010.22.
23. **Government of Kenya (GOK).** National Food and Nutrition Security Policy 2011.
24. **GOK/MOH.** Kenya National Nutrition Action Plan 2018-2022. 2018.



25. **Kandagor J and KO Nyandoro** Analysis of Livelihood Diversification to Food Security among Rural Households in Ndiwa Sub County, Homa Bay County, Kenya. *Journal of Food Security*. 2018;**6(2)**:90-98.
26. **Juma, N, Wegulo F and J Otieno** Linkages between Rural Poverty and Land Use in Nyando and Muhoroni Sub Counties Kenya. *Journal of Economics and Sustainable Development*. 2017; **89(10)**.
27. **United Nations Convention to Combat Desertification (UNCCD)**. 2017.
28. **GOK-ASDSP**. Household Baseline Survey Report – Homabay County, Government of Kenya Agricultural Sector Development Support Programme (ASDSP) Ministry of Agriculture, Livestock and Fisheries. Ministry of Agriculture, Livestock and fisheries. 2014. 1.
29. **Wambua BN, Omoke KJ and TM Mutua** Effects of Socio-Economic Factors on Food Security Situation in Kenyan Dry Land Ecosystem. *Asian Journal of Agriculture and Food Science*. 2014; **02(01)**:52-59.
30. **Hayombe PO, Owino FO and FA Otiende** Planning and Governance of Food Systems in Kisumu, Kenya, in Battersby, J. and Watson, V. (Eds.) *Urban Food Systems Governance and Poverty in African Cities*, Routledge, New York, 2019.
31. **Sibhatu KT and M Qaim** Rural food security, subsistence agriculture, and seasonality. *PLoS ONE*. 2017; **12(10)**:e0186406.
32. **De Jager, Giller, Brouwer, de Jager, I, Giller KE and ID Brouwer** Food and nutrient gaps in rural Northern Ghana: Does production of smallholder farming households support adoption of food-based dietary guidelines? *PLoS ONE*. 2018; 13(9).
33. **Owino FO** Determinants of Food Security and Consumption Patterns in Kisumu, Kenya. *Journal of Food and Public Health*, 2019; **9(4)**:119-124.
34. **Ombogo JO** Food security problems in various income groups of Kakamega County. *Journal of Nutrition Health and Food Engineering (JNHFE)*. 2017; **7(1)**:222-226.
35. **Ayieko M, Tchirley DL and M Mathenge** “Fresh Fruit and Vegetable Consumption and Trade in Urban Kenya: Implications for Policy and Investment Priorities”. Tegemeo Institute of Agricultural Policy and Development, Working Paper 16, Egerton University. 2005.
36. **The GOK**. The National Treasury and Planning Republic of Kenya. Third Medium Term Plan 2018 – 2022. *Transforming Lives: Advancing socio-economic development through the “BigFour”*. 2018.

37. **Wolfson JA, Ramsing R, Richardson CR and A Palmer** Barriers to healthy food access: Associations with household income and cooking behaviour. Preventive medicine reports. 2019; **13**:298–305.
38. **Monari F** Food security for sustainable development: the case of Bomet County, Kenya. International Journal of Social Sciences and Information Technology. 2018; **4(2)**.
39. **Sjöberg A, Hallberg L, Höglund D and L Hulthe** Meal pattern, food choice, nutrient intake and lifestyle factors in The Göteborg Adolescence Study. European Journal of Clinical Nutrition. **2003**; **57**:1569–1578.
40. **Kimani-Murage EW, Fotso JC, Egondi T, Abuya B, Elungata P, Ziraba AK, Kabiru CW and N Madise** Vulnerability to Food Insecurity in Urban Slums: Experiences from Nairobi, Kenya. Journal of Urban Health. 2014; **91**:1098–1113.

