ISSN: 2524-1354 (Online), ISSN: 2519-7851 (Print)
Africa Habitat Review Journal
Volume 19 Issue 2 (August, 2024)
http://uonjournals.uonbi.ac.ke/ojs/index.php/ahr

The Status of Food System in Kenya:
The Case of Kakamega Municipality, Kenya

***Shileche Sammy Shikoli, Onyango George Mark, Midheme Emmanuel and Denyse J. Snelde**

Received on 16th May, 2024; Received in revised form 11th June, 2024; Accepted on 25th June, 2024.

Abstract

Urban food system is integral for the growth of cities. The contemporary critical challenge facing cities in the world is how do they feed. This paper discusses the status of local food system in Kakamega Municipality, Kenya. It specifically looks at the administration of urban food system and the components of food system in Kakamega Municipality. Cross sectional survey was conducted in 8 wards of Kakamega Municipality. A total of 382 households were interviewed and 175 market traders from the seven markets in the Municipality were engaged. Key informant interviews were also conducted with the Director – Agriculture, Director – Urban Planning, Director – Finance and economic planning and the market administrators. The data was electronically collected using the Kobo Collect application. The data was then sorted, coded and analyzed using the statistical package for social sciences (SPSS), Microsoft excel and geographical information system (GIS). Qualitative and quantitative data was analyzed and presented in tables, graphs and maps using descriptive and inferential statistics. The findings revealed that Kakamega Municipality is net food importer. The paper concludes by stating that the local food system is informal, undocumented and unstable. It recommends formulation of a food system strategy for Kakamega Municipality.

Keywords: Food system, Kakamega municipality, urban food system

INTRODUCTION

Kakamega Municipality is a rapidly urbanizing urban center in the Western part of Kenya. Studies indicate that 95% of the residents in Kakamega Municipality are food insecure. It is further provided that the Municipality produces only 2% of the total food consumption (KCG, 2017). While the Municipality is sustained by urban foot prints beyond its administrative boundaries (KCG, 2016), the food supplies are mainly determined by the market forces of demand and supply factors. This was evident during the COVID 19 pandemic when the Kenyan government was prompted to block administrative borders leading to food insecurity. As urbanization accelerates so does the demand for food continues to increase. Majority of food purchases in Kakamega Municipality are from the informal food vendors as they supply food close to residences in smaller quantities and at negotiated prices. Therefore, by pointing out these limitations, the following study was articulated to analyze the status of food system in Kakamega Municipality, Kenya.

THEORY

The concept of food system has become an integral agenda in the global policy summits (Sonnino, 2022). In 2021 the UN Food Systems Summit acknowledged the need for a "healthier, more sustainable and more equitable food systems and collaborations of nations to work together to transform the way the world produces, consumes and thinks about food" (United Nations, Food systems summit: The vision, 2022). As rapid urbanization continues to take place in African and Asian cities, the question still lingers in every local governance is how do they feed people. Food system arose out of a critic by the urban planners who discovered that they had addressed all the essentials of human life namely; housing, infrastructure, air, water and socio-economic except food (Morgan, (2014); Steel, (2008)). Food as a commodity and food production as a practice were termed as rural functions and therefore treated as private sector activities (Steel, 2008). The concept had been largely ignored throughout the twentieth century until late in 1990's. By the

**Corresponding author:*
Shileche Sammy Shikoli, *School of Planning & Architecture, Maseno University, Kenya.*
Email: sshileche@yahoo.com

AFRICA HABITAT REVIEW 19(2) 2024

new millennium, food system was christened by Pothukuchi & Kaufman (2000) as a "stranger in the planning profession". The perspective of this 'stranger' received more emphasis in 2000 when the United Nations Millenium Development Goals (MDG's) were established. Goal 1: which focused on eradicating extreme poverty and hunger became the precursor to decipher the urban food system (United Nations, 2015). Similarly, as the urban development landscape was transforming; policymakers were confronted to appraise active strategies to address contemporary urban challenges (World Bank, 2000).

The world population is estimated to be at 9.8 billion by 2050. By then the food demand will be 70% as more than it is being consumped nowadays (World Economic Forum, 2022). It is also established that by 2050, approximately 80% of the global food production will be consumed in urban areas (ICLEI, 2021). As cities are the frontiers of food value chains, their food vulnerability is very high as they only produce 2.0 – 2.5 % of food comsumptions (Santandreu, 2021).

Food system is a web of interconnected activities starting from food production, distribution, marketing, consumption including how food wastes are managed. In other words, food system is defined as" the public policy decisions; the national and global systems and supply chains; and the individuals and groups – public and private – that influence what we eat" (Unicef, 2022, p. 1). It encompasses a network of interconnected actors collaborating for value addition activities in processing food from production to consumption levels. In essence food systems are characterized by drivers clustered within the socio-cultural, environmental and economic parameters aimed at achieving sustainable development (Kelonye & Juma, 2022). Sustainable food systems should therefore have the ability to address food availability, affordability, stability and utilization (Guiné, 2021). Food systems are classified depending on their range of functionality. For instance simple or local food systems could refer to a short range chain which involves a farmer and his household (Brand, 2017). While complex food systems may involve food being transported long distances to arrive at fork and plate (Aragrande & Argenti, 2001). It may also depend on the scale of food absorbtion and the spatial coverage of foot prints (Cohen, 2021). The food systems in developed nations are termed to be very stable and sustainable as compared to the developing nations that have weak networks. In classifying food systems based on agglomeration (Stray Dog Institute, 2022); international systems comprises of extensive networks of food value chains across the world; regional systems are countries that colaborate to feed their citizens while local systems are clusters of simple food systems that are self sustaining as they engage with the regional or international food systems. In this regard, urban areas can be grouped within the local food system category (Jenkins, Keeffe, & Hall, 2015).

Kenya sustains a total population of 57.57 million people, of which 25% live in urban areas (United Nations, 2022). The concept of food system is still new in the Kenyan policy discourse. The national and the local governance are yet to appreciate its significance in urban growth. Similarly, the urban managers and technical staff look astounded when they hear of food system. Perhaps they do not understand its existence. According to Kelonye and Juma, (2022) the Kenyan food systems is challenged by both policy, socio-economic and cultural factors which include, high urbanization, increased poverty among small-scale farmers, depleted organizational structures, cheap food imports and supply of low-quality farm inputs. This points out that the Kenyan food system deserves transformation. For instance, in 2021, it was documented that at least 2,147,889 Kenyans were in need of immediate food supplies (National Drought Management Authority, 2021). At the same time, studies indicated that every Kenyan discards on average 99 kilograms of food annually (UNEP, 2021).

RESEARCH METHODS

The study was carried out in the eight wards of Kakamega Municipality measuring approximately 123 Km2. The location map is presented in **Figure 1**. Kakamega township was established in 1903 to serve as a military base for the colonial administration. It became a district in 1920 and declared a Municipality in 1974. The Municipality is within geographical coordinates of 0.283333°N 34.75°E with varying altitude of 1520 – 1680 meters above sea level (KCG, 2017). It premises a total population of 285, 882 residents of which 75% live in the urban core while 25% in the peri-urban areas. As it is reported, 32% of the

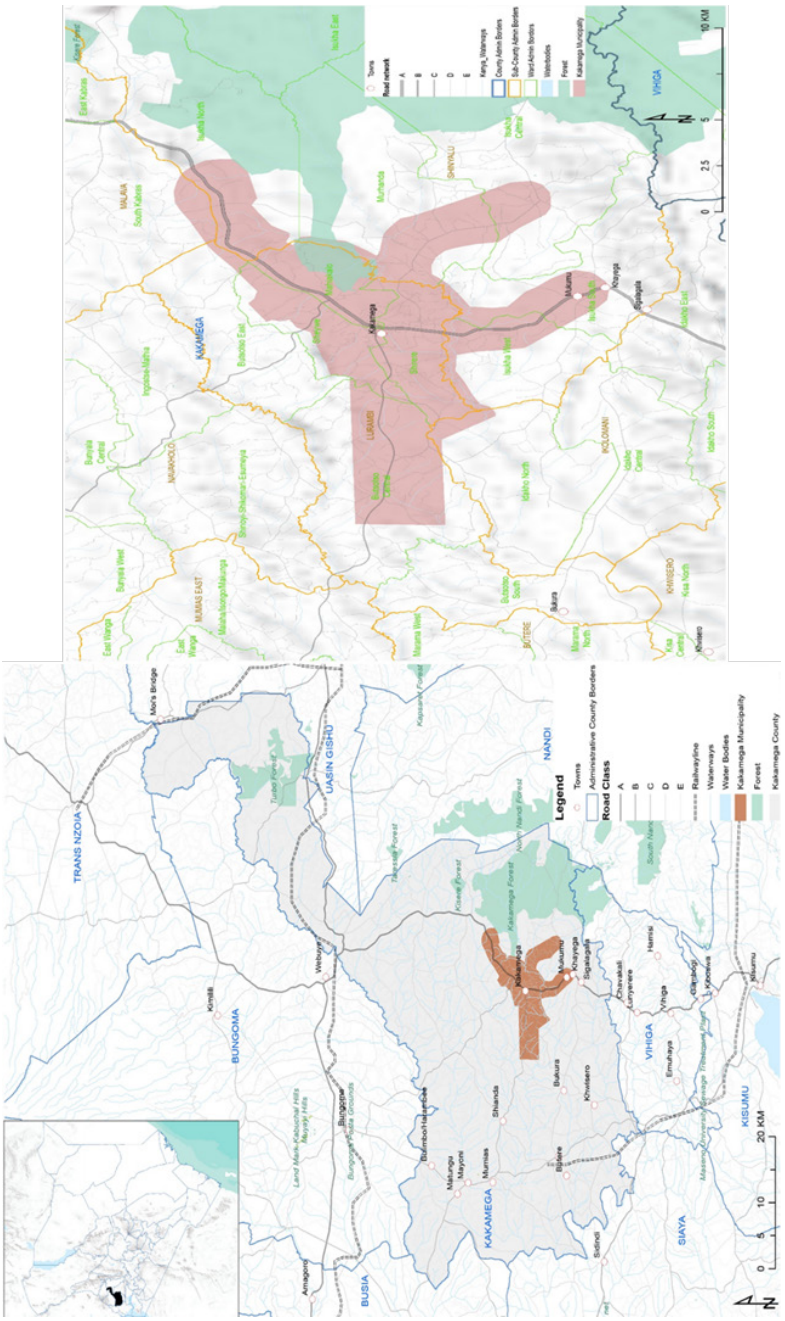


FIGURE 1
Kakamega Municipality location at National, Regional and local context
Source: Esri, 2021

population live below the poverty margins (KCG, 2017). The Municipality receives rainfall ranging between 1,000mm to 2,400mm per annum with temperatures varying between 11oC to 32oC (KCG, 2018). The settlement patterns within the Municipality profiles an urban divide based on income levels of upmarket, the above average, medium and low-class housing estates.

The cross-sectional research design was applied. Household questionnaires were administered and a total of 382 households were interviewed.

The Morgan formula (Krejcie & Morgan, 1970) was applied to derive the statistical sample size of households as follows:

$$S = \frac{X^2 NP\,(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

Where;
S = required sample size
X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

AFRICA HABITAT REVIEW 19(2) 2024

N = the population size **(52,015)**.

P = the population proportion (assumed to be 50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (0.05).

The provided sample size was 382 for the population size of 52,015.

Furthermore, a sample frame was used to determine the desired statistical sample size per ward. Initially, population projection for 2021 (period of field work) was derived by applying the exponential population growth formula (Halvard & Henrik (2013); Gang, et al., (2019) as provided below:

$P_1 t = P_o e^{r*t}$

Where:
$P_1 t$ – Number of people at the future time
P_o – Population at the start time
e – Base of the natural logarithm – 2.71828
r – Rate of increase (natural increase divided by 100)
t- Time period involved.

The total population for 2021 was projected at 285, 882 persons.

Therefore, the sample frame determined the sample size per ward as presented in **Table 1**:

As well, interviews were carried out with the 175 market traders (25 traders in each market) who were randomly selected from the seven markets in the Municipality. The 7 market administrators were also engaged; who provided insights on how market operations were administered. To seek insights on administration and technical matters, key informant interviews were conducted with the Director – Agriculture, Director – Urban Planning and Director – Finance and economic planning.

The data was electronically collected using the Kobo Collect application. The data was then sorted, coded and analyzed using the statistical package for social sciences (SPSS), Microsoft excel and geographical information system (GIS). The presentation of the data was by charts, graphs, tables and maps.

RESULTS AND DISCUSSION

Administration of Kakamega Municipality Urban Food System

Interviews with the key informants indicated that

TABLE 1
Ward sample size

Sno	Ward	Population (2017)	Factor	Population (2021)	Ward/ Municipal	% / Total	Sample size	Sample number
1	Mahiakalo	14,594	1.11	16,129	0.06	5.64	21.55	22.00
2	Butsotso South	21,015	1.11	23,225	0.08	8.12	31.03	31.00
3	Isukha West	24,569	1.11	27,153	0.09	9.50	36.28	36.00
4	Butsotso East	28,090	1.11	31,044	0.11	10.86	41.48	41.00
5	Butsotso Central	29,687	1.11	32,809	0.11	11.48	43.84	44.00
6	Shirere	40,526	1.11	44,788	0.16	15.67	59.85	60.00
7	Isukha Central	41,778	1.11	46,172	0.16	16.15	61.70	62.00
8	Sheywe	58,418	1.11	64,562	0.23	22.58	86.27	86.00
	TOTAL	**258,677**		**285,882**		**100**	**382**	**382**

Source: Field survey, 2024

the Kakamega Municipality urban food system exists and operates informally. Departmental officers recognized and associated with particular components of the urban food system but they could not define what role they played in the system. For instance, directorate of agriculture was involved with food production, Trade – marketing and distribution, Finance and economic planning – revenue collection, Urban planning – spatial planning and granting development approvals. The sectors performed functions independently without any collaboration and symbiotic relationship to each other. Notably, it was difficult to obtain data from the relevant departmental offices as it was not documented. The only data provided was on annual maize production which was actually captured at the County level. At the market level it was noted that there were no proper records showing the quantities or categories of food products being sold. The possible records captured was on revenue collection and this is where much focus was aligned and with strict control administration. Policies and legislation addressing matters on urban food systems was as well lacking.

Components of Kakamega Municipality Urban Food System

1. Production

The study revealed that Kakamega Municipality urban ecological foot prints extend beyond its administrative boundaries. The Municipality is actually a net food importer. That is, just 2% of the total consumption is produced within the Municipality. The demand exceeds the supply by greater margins, as maize is the stable food, the demand for 90kgs bags is higher than the municipality production as the urban population continues to rise as shown in **Figure 2**.

The main sources of food production are a) Mumias Municipality; b) Counties – Kisumu, Uasin Ngishu, Trans Nzoia, Nyeri, Narok, Nandi, Nakuru, Eldoret, Bungoma and Busia; and c) Countries – Egypt, Tanzania, South Africa and Uganda as shown in **Figure 3**. The fresh farm food products supplied are namely; sweet and irish potatoes, cabbages, tomatoes, carrots, onions, vegetables, cereals, sugarcane, watermelon including fish. Land fragmentation on arable

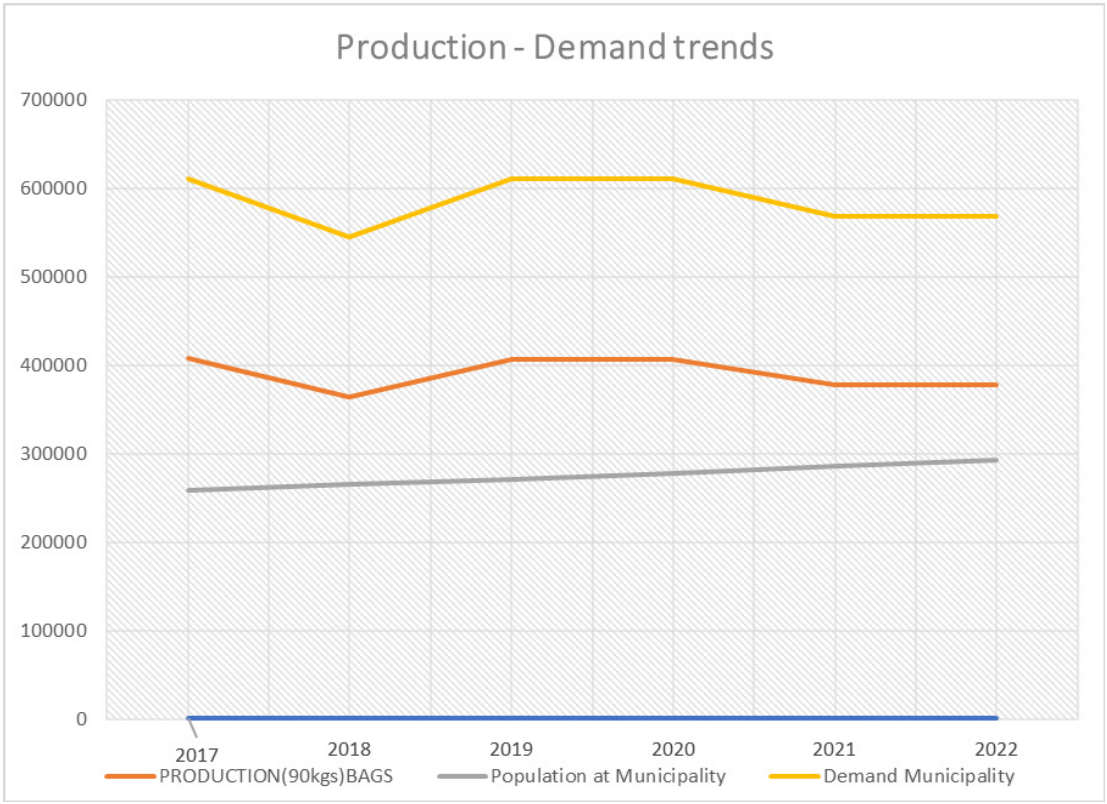


FIGURE 2
Maize production and demand trends in Kakamega Municipality
Source: Kakamega Municipality production data, 2022

agricultural parcels limit's ability for large scale farming. Chicken and cultivation of kales and maize crops are practiced at subsistence farm levels.

2. Transportation

The main mode of transportation is the road, through the means of lorries, pickups, buses, vans, saloon cars, motorbikes, bicycles and handcarts. To transport the food products, the suppliers are required to have public health certification, transportation permit, market offloading license and also pay cess fees at arrival in the municipal markets. The transportation expenses are incurred by the transporter, and are quoted based on the distance covered, category of food products and the choice of transportation means. The food transport routes are shown in **Figure 4**.

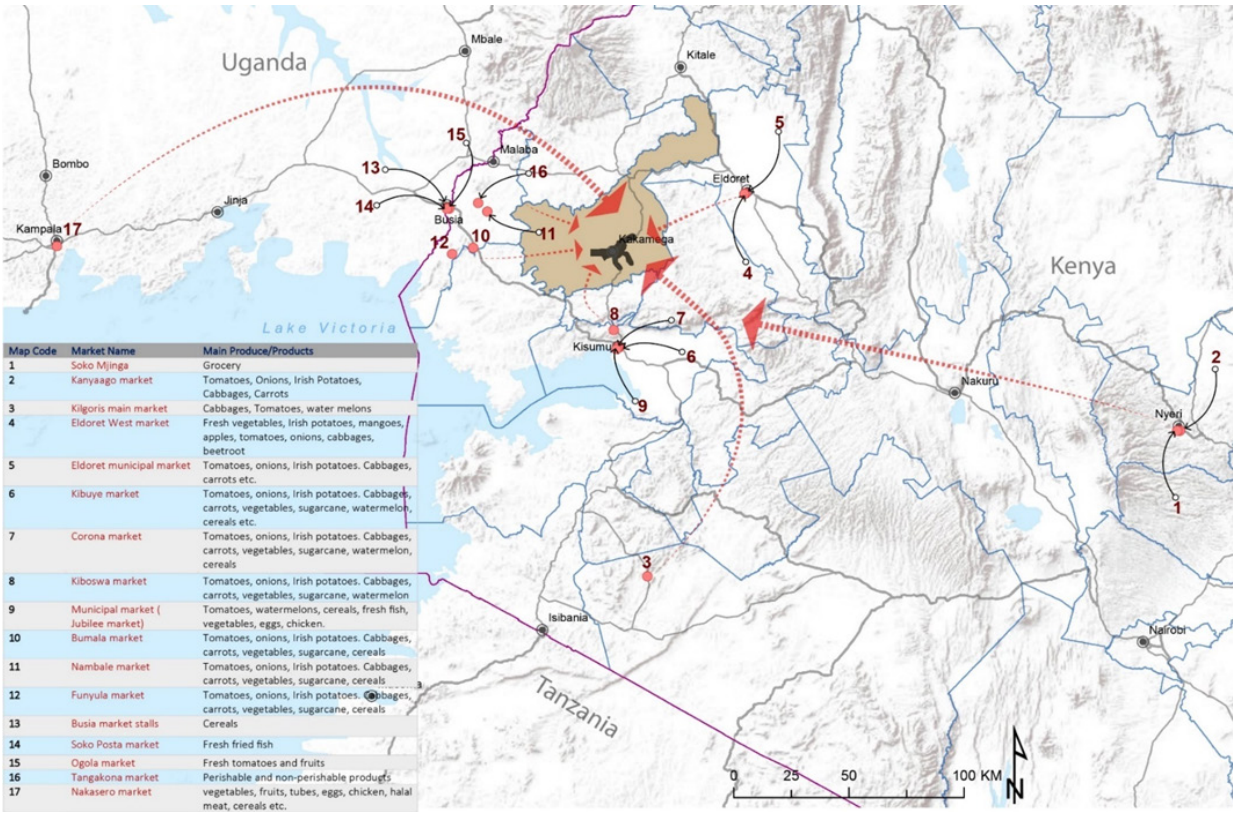
3. Processing

There has been no major industrial food processing in Kakamega Municipality since its establishment. The bread bakeries namely Broad Ways and Muranda were the main food processors in the Municipality. In 2022 the County Government established a fish processing plant which acquires its raw fish from Lake Victoria in Kisumu. Most of the supplied food products are fresh farm foods and value addition is done at the market level through cleaning, sorting, drying, preserving and weighing for sale.

4. Market and distribution

There are 8 distribution points in the Municipality that sales mainly processed foods at wholesale basis as shown in **Figure 5**. The food products are distributed and retailed in the markets or shops. The means of distribution are mainly vans, pickups, motor bikes, bicycles and handcarts.

The 7 markets as shown in **Figure 6** – Kakamega municipal, Eshibuli, Sheywe, Lubaho, Shirere, Khayega and Shinyalu – in the Municipality mainly allows retailing of farm products. The markets are opened daily for operations. Each market is assigned a day within the week where traders from different regions come to sell their products. Trading fees are charged depending on the assigned selling space. The trader with a stall within the market building paid Ksh. 2,500 while



Map Code	Market Name	Main Produce/Products
1	Soko Mjinga	Grocery
2	Kanyaago market	Tomatoes, Onions, Irish Potatoes, Cabbages, Carrots
3	Kilgoris main market	Cabbages, Tomatoes, water melons
4	Eldoret West market	Fresh vegetables, Irish potatoes, mangoes, apples, tomatoes, onions, cabbages, beetroot
5	Eldoret municipal market	Tomatoes, onions, Irish potatoes. Cabbages, carrots etc.
6	Kibuye market	Tomatoes, onions, Irish potatoes. Cabbages, carrots, vegetables, sugarcane, watermelon, cereals etc.
7	Corona market	Tomatoes, onions, Irish potatoes. Cabbages, carrots, vegetables, sugarcane, watermelon, cereals
8	Kiboswa market	Tomatoes, onions, Irish potatoes. Cabbages, carrots, vegetables, sugarcane, watermelon
9	Municipal market (Jubilee market)	Tomatoes, watermelons, cereals, fresh fish, vegetables, eggs, chicken.
10	Bumala market	Tomatoes, onions, Irish potatoes. Cabbages, carrots, vegetables, sugarcane, cereals
11	Nambale market	Tomatoes, onions, Irish potatoes. Cabbages, carrots, vegetables, sugarcane, cereals
12	Funyula market	Tomatoes, onions, Irish potatoes. Cabbages, carrots, vegetables, sugarcane, cereals
13	Busia market stalls	Cereals
14	Soko Posta market	Fresh fried fish
15	Ogola market	Fresh tomatoes and fruits
16	Tangakona market	Perishable and non-perishable products vegetables, fruits, tubes, eggs, chicken, halal meat, cereals etc.
17	Nakasero market	

FIGURE 3
Sources of food production for Kakamega Municipality
Source: Esri, 2021

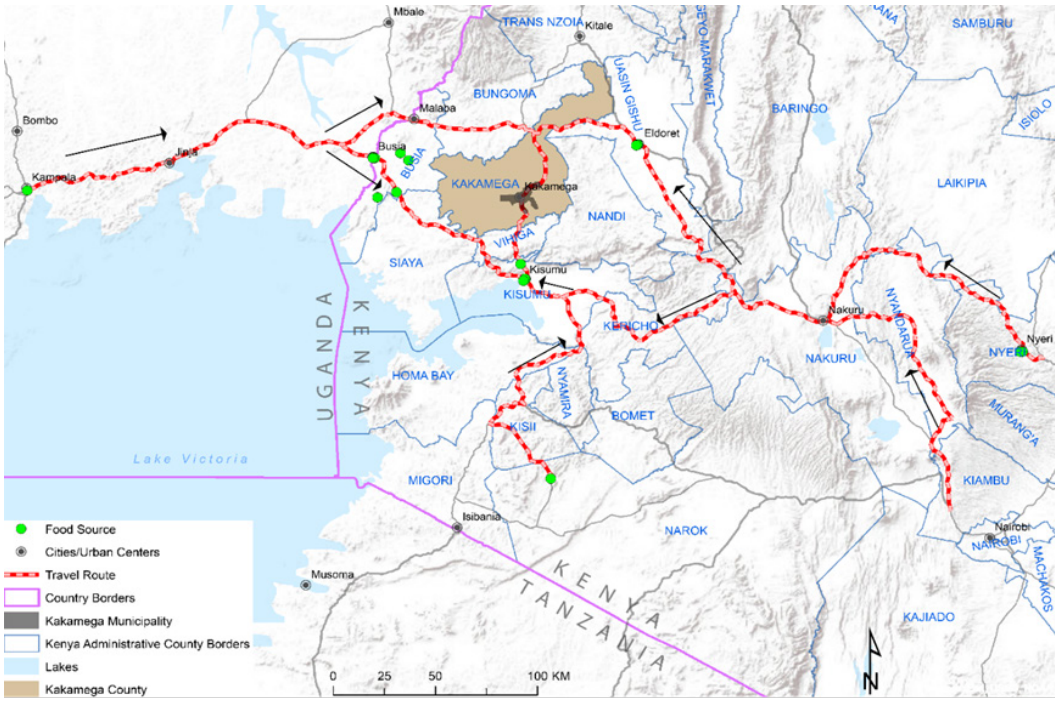


FIGURE 4
Food transport routes to Kakamega Municipality
Source: Esri, 2021

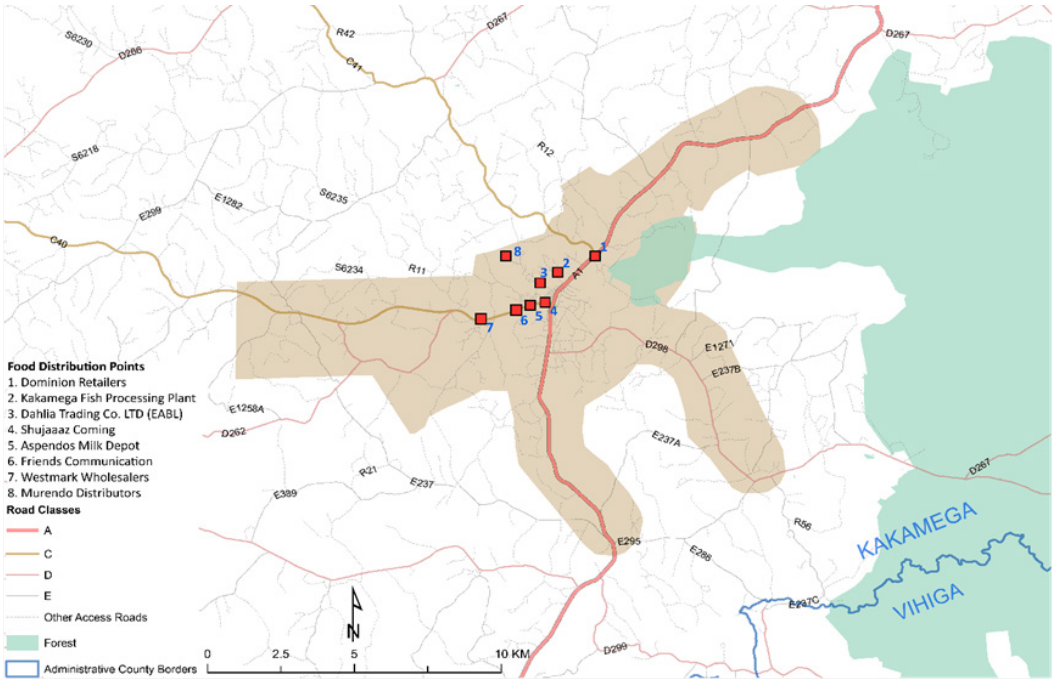


FIGURE 5
Food distribution points in Kakamega Municipality
Source: Esri, 2021

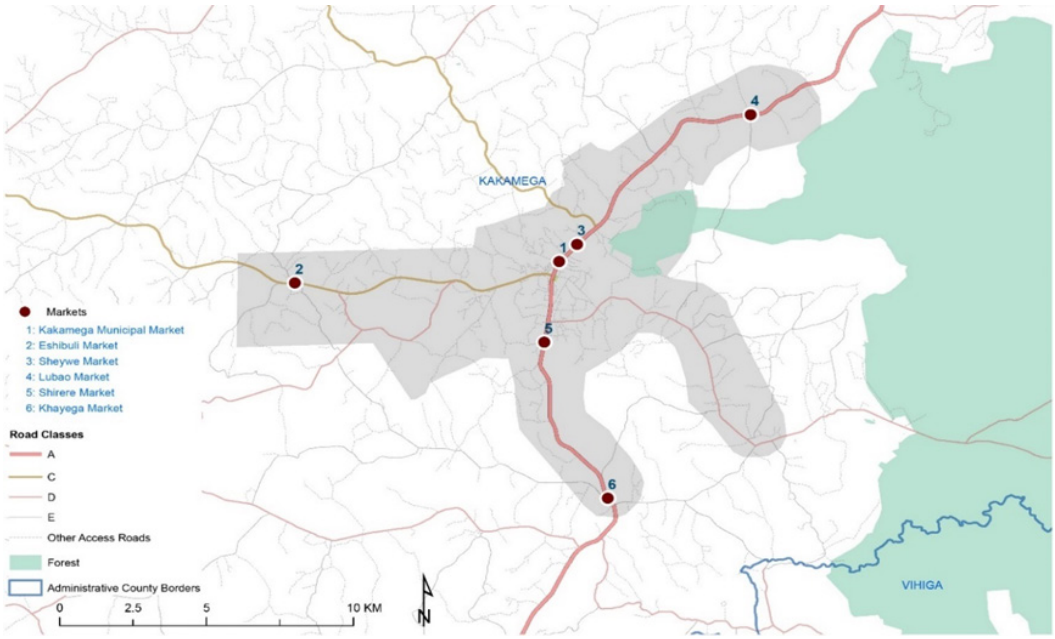


FIGURE 6
Food markets in Kakamega Municipality
Source: Esri, 2021

a trader allocated space outside the building paid Ksh. 500 per month. The traders who visited the market on assigned days paid Ksh. 50 trading fees. Almost all food products were sold in the 7 markets with no market specializing for selling a particular product. Classification of the traders was done based on category of food products sold. These included:

A. Cereals
The cereals sold in the markets comprised of maize, rice, sim-sim, cow peas, beans, nuts, and green grams. **Figure 7** presents how cereals are displayed for sale.

B. Fruits
The fruits sold in the markets were sourced from different source points. They included the following; Uganda - Pineapples, bananas, oranges, tamarins and water melon; South Africa and Egypt - apples. Marakwet and West Pokot Counties - Mangoes. **Figure 8** shows sale of water melon and pineapples in Kakamega Municipal market.

C. Vegetables
The category of vegetables traded in the markets included and sourced from; onions – Tanzania and Mt. Elgon; Tomatoes – Uganda; Kales – Nandi County and Cabbages – Njoro, Mt. Elgon, Eldoret, and Ole Tipis. **Figure 9** shows how a trader displays vegetables for sale in the market.

D. Fish
The traders mainly sold fish – tilapia and fingerlings sourced from Lake Victoria. The fish were displayed on tables within the market stalls or on the ground for those traders operating outside the market. **Figure 10** presents selling of fish at Khayega market.

E. Tubers
The tubers sold in the markets comprised of the following products sourced from different regions as follows; Carrots – Kisumu and Nyeri, irish and sweet potatoes - Marakwet, yams - Uasin Gishu, and Busia County. The traders packaged the tubers in sachets or in packets and displayed the products on the ground as shown in **Figure 11**.

F. Meat
The meat sold is mainly for beef, pork, goat and chicken as in **Figure 12**. There is provision of two public abattoirs served by the Kakamega County Government. The Kenya Meat Commissioner regulates the public health standards and pricing of meat in the Municipality.

G. Poultry
Chicken is mainly sold in the Municipal markets. The chicken is kept in cages and often slaughtered

FIGURE 7
Cereal trading in Kakamega Municipality
Source: Author, 2021

FIGURE 8
A fruit trader in Kakamega Municipal market
Source: Author, 2021

FIGURE 9
Vegetables selling in Kakamega Municipality
Source: Author, 2021

FIGURE 10
Selling of fish in Kakamega Municipality
Source: Author, 2021

on order. The slaughtered chicken is also sold in supermarkets and butcheries. The poultry is obtained from Kakamega Municipality, Nandi, Trans Nzoia and Uasin Gishu counties.

5. Food consumption

The study showed that a majority of households preferred feeding on fresh farm food products sold in the markets. A few families that practiced subsistence farming eat from their home farms. Not much food processing is done. Sorting, cleaning, drying and resizing practices before cooking are applied. The choice of food consumed depended on the household's income levels, cultural values, market knowledge and the distribution networks. This is explained as follows:

FIGURE 11
Selling of sweet potatoes and yams in Kakamega Municipality
Source: Author, 2021

FIGURE 12
Beef and Pork butcheries in Kakamega Municipality
Source: Author, 2021

A. Income levels
The level of spending always depends on the finances a household earns. The higher the income level, the higher the purchase power. The study revealed that a majority of the sample population (57%) were middle income households earning income ranging between Ksh. 23, 670 – 119,999. 39% were low-income households earning below Ksh. 23, 670, while 4% were within the high-income margins earning above Ksh 120,000 as shown in **Figure 13**. The proportion of income spent on food products was computed at 56% of the total household expenditure as shown in **Figure 14**.

B. Weekly consumption pattern
A unique pattern of food consumption was realized as presented in **Figure 15**. It was noted that a majority of people dependent on the green leafy vegetables (48%), fresh milk (56%) and cooking oil (96%) for the seven days. The households fed for four days on pulses (31%) and fresh fruits (25%) and actively fed for three days on staple foods (cereals and tubers) (27%), red meat (37%), fermented milk/yogurt (34%), dried fruits (31%), processed snacks (28%) and chocolate (27%). The household considered feeding for a day on chicken (42%) and fish (48%).

C. Food Purchasing Points
Households preferred purchasing food products from different purchasing points. A majority of them bought from specialist retail stores (98%), temporary/farm markets and super/hypermarkets (97%), neighbourhood grocery stores (95%), traditional wet markets and street vendor stalls

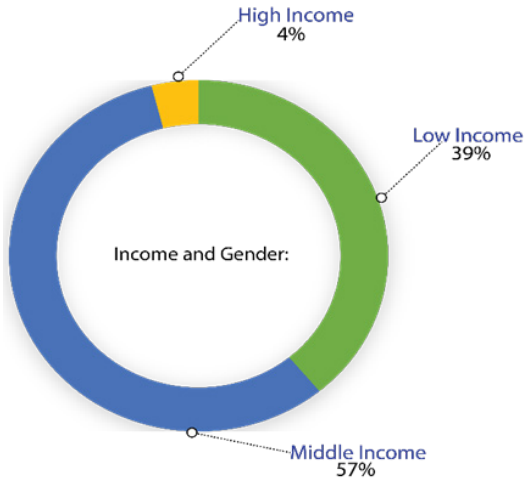


FIGURE 13
Income levels
Source: Author, 2021

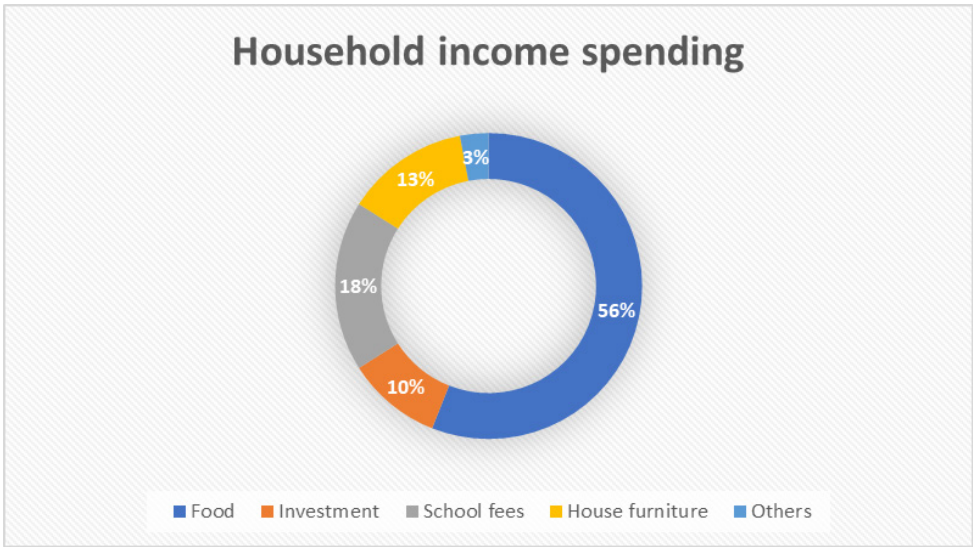
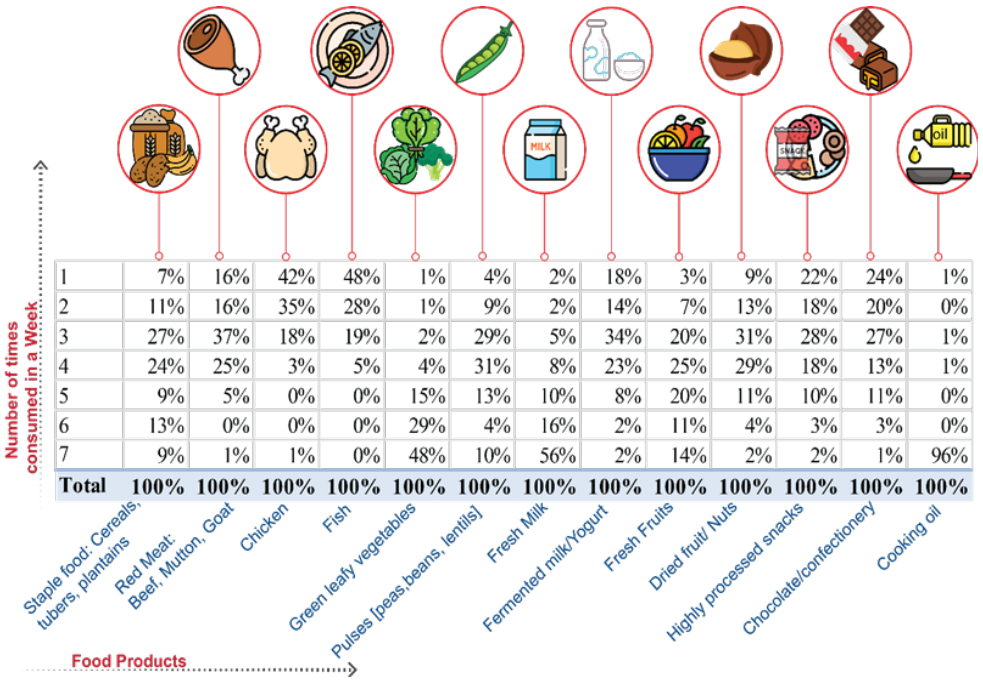


FIGURE 14
Proportion of income spending
Source: Author, 2021



1	7%	16%	42%	48%	1%	4%	2%	18%	3%	9%	22%	24%	1%
2	11%	16%	35%	28%	1%	9%	2%	14%	7%	13%	18%	20%	0%
3	27%	37%	18%	19%	2%	29%	5%	34%	20%	31%	28%	27%	1%
4	24%	25%	3%	5%	4%	31%	8%	23%	25%	29%	18%	13%	1%
5	9%	5%	0%	0%	15%	13%	10%	8%	20%	11%	10%	11%	0%
6	13%	0%	0%	0%	29%	4%	16%	2%	11%	4%	3%	3%	0%
7	9%	1%	1%	0%	48%	10%	56%	2%	14%	2%	2%	1%	96%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

FIGURE 15
Weekly consumption for food products
Source: Author, 2021

(92%) and convenience stores (89%). While 58% purchased from mobile door -to- door food vendor only 33% used internet to acquire food products as shown in **Figure 16**.

D. Food purchasing frequency

The frequency of purchasing also depended on how the households engaged with the purchasing points as presented in **Figure 17**. The pattern indicated that households engaged highly with street vendor (60%), door to door (51%) and internet (43%) every day. They engaged 2 – 3 times a week with the traditional wet market (54%), temporary/farmers market (58%) and the neighbourhood groceries (26%). While others preferred engaging once a week with the traditional wet market (38%), temporary/farmers market (27%) and neighbourhood groceries (26%). It was also noted that the engagement with the specialist retail (43%) and super/hyper market (36%) was within 2 – 3 times in a month.

6. Waste management

The study showed that food waste and losses were experienced at every stage of the food system components namely; production, transportation, distribution, marketing and at the consumption point. The management of wastes was purposely done at the marketing and consumption processes since they were within organized structures. At the markets, the wastes were separated within the waste bins. The food wastes from the wet and fresh produce markets were sold by the traders to farmers as animal feeds. The other organic waste materials were carried away to waste dump sites designated by the Kakamega County Government as shown in **Figure 18**. At the consumption phase, the households managed wastes by disposing the none organic materials in composite pits. The organic wastes were used as manure for crop growing in the kitchen gardens. A few households mentioned of preserving the waste foods by drying, using preservatives as well as cleaning. Other wastes were used as feeds for domesticated animals.

CONCLUSION AND RECOMMENDATIONS

The study observed that Kakamega Municipality is a net food importer. The existing urban food system is unstructured, informal and unstable. There is limited food processing and value

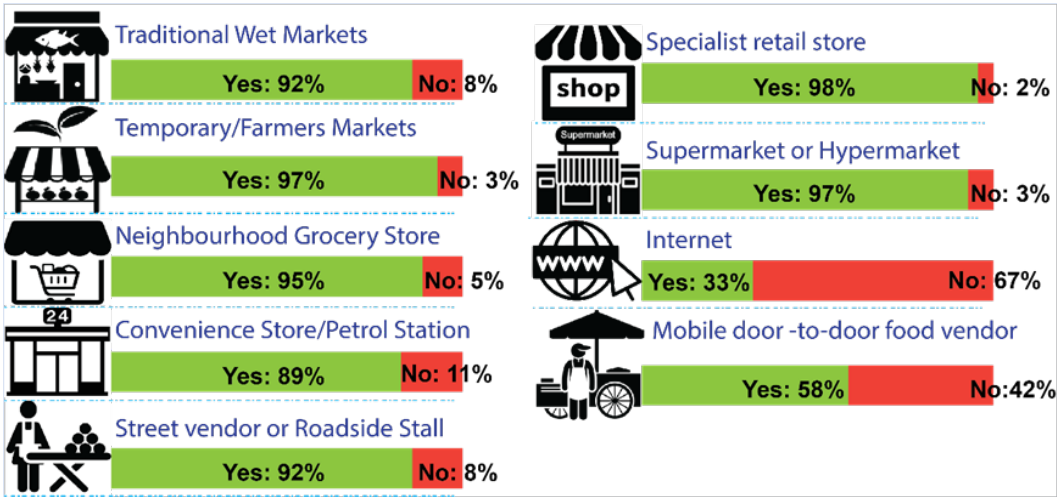


FIGURE 16
Food purchasing points
Source: Author, 2021

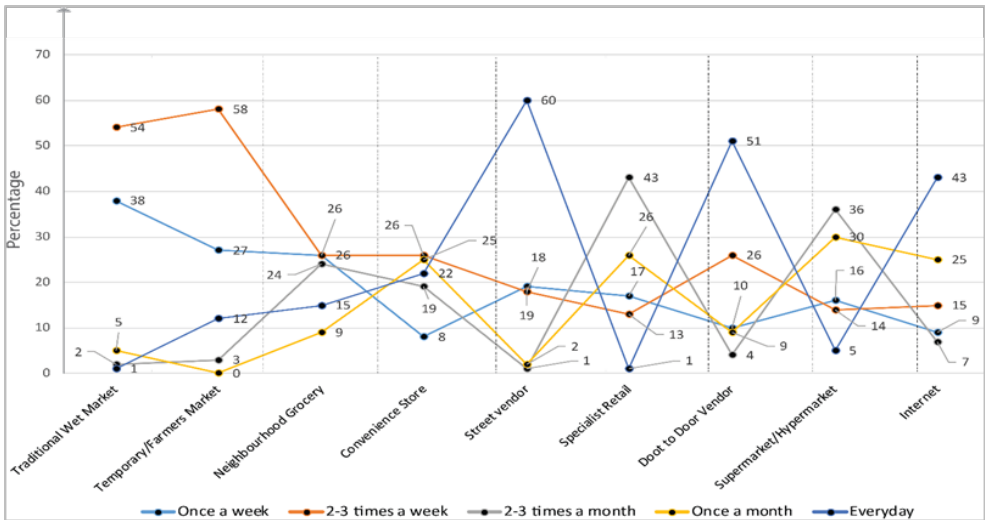


FIGURE 17
Purchasing frequency
Source: Author, 2021

FIGURE 18
Waste Management chamber at Kakamega Municipality market
Source: Author, 2021

addition to food produce which contributes to food insecurity. The disconnect between the Municipal departmental and units that handle food system functions is evident. The gap between the administrative policies and what happens on the ground is wide. Similarly, the functioning of food system in the Municipality seems to have been left on the market forces of demand and supply with main actors from the private sectors. Which has resulted into low food purchases for the low-income earners because of the increased food prices. In return leading to increased food insecurity in Kakamega Municipality.

The study therefore recommends transformation of the Kakamega Municipality urban food system. That the Kakamega Municipality food system strategy be prepared. Documentation of food production, supplies, purchases, consumption and level of food wastes should be encouraged. A directorate within the Municipality should be established to handle administrative, operation matters as well as formulate legal and policy frameworks concerned with food systems. This will not only ensure food security but shall also lead to the Municipal sustainable urban growth.

CITED REFERENCES

Aragrande, M., & Argenti, O. (2001). *Studying food supply and distribution systems to cities in developing countries*: *Methodological and operational guide. Food into cities collection*. Rome: FAO.

Brand. C, B. N. (2017). *Urban agriculture: Designing urban food policies, concepts and approaches.* Switzerland: Springer.

Cohen, N. (2021). Unintentional food zoning; A case study of East Harlem, New York. In Y. C. Marocchino, *Integrating Food into Urban Planning* (pp. 312-334). New York: UCL Press.

Gang, X., Limin, J., Man, Y., Ting, D., Boen, Z., & Chunmeng, D. (2019). Landscape and Urban Planning. *How does urban population density decline over time? An exponential model for Chinese cities with international comparisons,* 183(3), 59-67.

Guiné, d. J. (2021). Food security and sustainability: Discussing the four pillars to encompass other dimensions. *Food*, 10(11), 2-26.

Halvard, B., & Henrik, U. (2013). An urbanization bomb? Population growth and social disorder in cities. *Global Environmental Change,* 23(1), 1-10.

ICLEI. (2021). *Towards circular food systems in Bonn*. Bonn: ICLEI – Local Governments for Sustainability.

Jenkins, A., Keeffe, G., & Hall, N. (2015).

Planning urban food production into today's cities. *Research gate*, 3, 35-47.

KCG, K. C. (2016). *Kakamega municipal integrated development plan (KMIDP).* Kakamega: Kakamega County Government.

KCG, K. C. (2017). *Integrated strategic urban development plan for Kakamega municipality: 2017 - 2037*. Kakamega: Kakamega County Government.

KCG, K. C. (2018). *County integrated development plan, 2018-2022.* Kakamega: Kakamega County Government .

Kelonye, F., & Juma, G. (2022). Climate change and food system in Kenya: Challenges and opportunities. In S. Muhammad, T. Guillermo, & M. Slobodan, *Challenges in Agro-Climate and Ecosystem*. Retrieved from doi: 10.5772/intechopen.102688.

Krejcie, & Morgan. (1970). *Determining sample size for research actvities*. Educational and Psychological Measurement, 30. Washington, DC.

Morgan, K. (2014). The New Urban Foodscape: Planning, Politics and Power. *In K. B. André Viljoen, Second Nature Urban Agriculture (pp. 18-23). London: Routledge.*

National Drought Management Authority, (2021). *Short rains assessment report.* Nairobi: Government Printers.

Pothukuchi, K., & Kaufman, J. (2000). The food system: A stranger to the planning field. *Journal of the American Planning Association*; ABI/INFORM Global, 66(2), 113-121.

Santandreu, A. (2021). Urban agriculture in Lima metropolitan area: One (short) step forward,two steps backwards – the limits of urban food planning. In Y. C. Marocchino, *Integrating Food into Urban Planning* (pp. 117-134). New York: UCL Press.

Sonnino, R. (2022). *Food system transformation*: Urban perspectives,. Retrieved March 20, 2023 from https://doi.org/10.1016/j.cities.2022.104164

Steel, C. (2008). *Hungry city*: How food shapes our lives. London: Chatto & Windus.

Stray Dog Institute, (2022). *What is a food system, types and how does the food system work?* Retrieved April 10, 2023 from https://straydoginstitute.org/food-system/

UNEP. (2021). *Food waste index report*. Nairobi: UNEP.

Unicef. (2022). *Food Systems: What they are, why they matter:It's time to transform the way the world produces, consumes and thinks about food. Our children's nutrition and well-being depend on it*. Retrieved May 5, 2023 from https://www.unicef.org/stories/food-systems

United Nations. (2015). *Millennium Development Goals and Beyond 2015.* New York: United Nations. Retrieved February 23, 2022 from https://www.un.org/millenniumgoals/

United Nations. (2022). *Food systems summit*: The vision. Retrieved March 9, 2023 from United Nations: https://www.un.org/en/food-systems-summit/vision-principles

United Nations. (2022). *World population prospects 2022.* New York: United Nations.

World Bank. (2000). *World development report 1999/2000*: Entering the 21st century. New York: Oxford University Press.

World Economic Forum. (2022). *Food system initiative*. Retrieved August 7, 2023 from https://www.weforum.org/communities/shaping-the-future-of-food