

**ASSESSMENT OF THE STATUS OF FOOD CONTROL IN THE
INFORMAL FOOD MARKETS IN NAIROBI, KENYA**

By:

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REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN FOOD SAFETY
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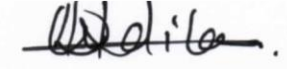
DEPARTMENT OF FOOD SCIENCE, NUTRITION AND TECHNOLOGY

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August 2020

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APPROVAL

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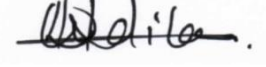
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ABSTRACT

Food control is a crucial factor in assuring public health and must be applied consistently along the entire food value chain for the protection of public health. Informal food markets, despite their role in food security, raise concerns relating to safety and quality of food sold, and they have been associated with food borne illnesses. This study sought to assess the factors that affect food control in the informal food markets in Nairobi, Kenya and give recommendations for the improvement of informal food trade. A descriptive cross-sectional survey with observational aspects was carried out in purposely selected informal food markets in Nairobi. The Fischer's formula was used to draw a sample of n=370 respondents who provided quantitative and quantitative data through interviewer-led questionnaires, focus group discussion and key informant interviews. More data was collected from desk research on the various food laws and regulations and from observations of the market structures, arrangement, and hygiene status. Analysis of data revealed that 72% of food vendors operate in non-designated markets that proliferated out of convenience to be near the buyers and be able to operate long hours. The non-designated markets however lacked requisite infrastructure and utilities that support the practice of proper hygiene, such requisites including but not limited to toilets, market wash areas, running potable water, disposal of waste and proper food storage and preservation facilities. Enforcement of law and regulations was low despite well-established laws; activities of which were reduced to limited market visits by public health officers. The study revealed that 77% of the traders had no awareness of food safety hazards nor the existence of food laws and regulations. Lack of collaboration among the various regulatory bodies along the food value chains and the county governments left gaps that could be exploited by unscrupulous traders to infiltrate compromised foods and produce in the informal food markets. It was concluded that food control in the informal food markets was not effective owing to the challenges of market infrastructure, lack of awareness among traders, low regulatory activity, and uncoordinated regulatory and government

efforts. Expanding and improving market facilities, creating food safety awareness among food business operators, collaboration among regulatory authorities, county governments and other stakeholders were some of the recommendations given to improve food control in the informal food markets.

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DEFINITION OF TERMS

Designated Markets: Custom built infrastructure set aside by city planner and recognized for distribution and sale of food articles.

Food Business Operator: Person responsible for making decision about a food business under their control

Food Control: Legal framework for protection of human health through ensuring food placed in the market is safe, wholesome, and authentic and meets the desired quality

Components of Food Control:

- i. Food laws and legislation
- ii. Food control management - policy and operational coordination
- iii. Inspection services
- iv. Information, Education, Communication and Training,
- v. Lab services – food surveillance and epidemiological data

Food Handler: Person who directly engages in handling food or food surfaces in a business

Food Risk: Potential adverse health effect caused by consumption of food containing hazardous agents

Food Safety: The concept that the food does not cause adverse health effect to the consumer when consumed in the intended manner.

Informal Food Markets: Unstructured economic sector encompassing food trade, and on which taxes are not paid.

Non- designated food markets: An area devoid of appropriate infrastructure and utilized by food traders for display and sale of food articles.

Regulatory Agency: See Regulatory Authority

Regulatory Authority: An agency of the government appointed to implement and/or enforce food laws and regulations

ACRONYMS/ABBREVIATIONS

AFA:	Agricultural Foods Authority
CAC:	Codex Alimentarius Commission
CBD	Central Business District
EU:	European Union
FAO:	Food and Agricultural Organization
FBO:	Food Business Operator
FGD	Focus Group Discussions
KDB:	Kenya Dairy Board
KEBS:	Kenya Bureau of Standards
KEPHIS:	Kenya Plant Health Inspectorate Services
KII	Key Informant Interviews
MRLs	Maximum Residue Levels
NFC:	National Food Control
SDGs	Sustainable development goals
SPS	Sanitary and Phyto-sanitary Standards
FDA:	Food and Drugs Authority
WHO:	World Health Organization

1 CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Food safety hazards and malpractices have enormous impact to public health and economic development around the globe. They are of great and increasing concern to the consumers, producers as well as policy makers. In the developing countries, foodborne diseases remain among the top five causes of sickness and death (Kristina and Delia, 2015) thus making food safety an important contributor to the burden of disease. Food risk is compounded by emerging threats like food fraud and low-quality products and counterfeits from unscrupulous traders. Food control systems are an important component in national governance policy for the protection of public health and economic advancement of a country. Food control therefore is essential to protect public health, prevent fraud and deception, avoid food adulteration and facilitate trade (FAO/WHO, 2003). An effective food control system has been demonstrated to reduce the burden of food borne diseases a country is likely to face. Developed countries like Canada, Ireland, and France among others are reputed to have some of the safest food in the world (Jean-Charles et al, 2014) owing to their well-coordinated food control system.

However, the informal sector is large in developing countries where incomes are low, lack of employment in government and formal private sector is high and regulation is poor due to weak governance (FAO/WHO, 2017). Previously undervalued, the informal sector is now a crucial sector providing employment and driving the economy. In Kenya for instance, the informal sector represents 83.6% of employment (KNBS, 2018) and contributing 34.4% of national GDP (KNBS, 2017). Among the activities the sector is involved in include sale of fruits and vegetables, animal-source products, food catering and processing among other non-food activities (World Bank, 2006). The informal food markets are popular because they sell foods at lower prices and they have other desirable attributes like freshness and availability of indigenous

products (Kristina and Delia, 2015). The fresh fruits, vegetables and animal-source foods are classified as high-risk foods and are associated with food borne illnesses. There are many factors that may undermine food safety in the informal markets selling these foods. Some of them include ignorance of food handlers to the risks associated with food, dirty environments, and irresponsibility. The premise of a national food control system is that food systems should deliver sufficient safe foods to the populations. It is the principle role of a country through its government to ensure effective food control mechanisms exists with proper infrastructures for production, handling, processing, and service of safe foods for domestic and foreign consumption (FAO/WHO, 2003).

This study sought to find out how the informal food markets are regulated in the city of Nairobi in Kenya and establish the challenges experienced in regulating the supply of food through informal food markets. Nevertheless, the assessment of the markets provides important information for identifying areas of interventions required to improve food safety management and catalyze organization and formalization of the markets. This could have important implications for economic growth and health protection of Kenya public.

1.2 Statement of the problem

Kenya is characterized by rapid urbanization and urban growth which is projected to grow even more rapidly in future (UNDP, 2016). To supply sufficient foods to the urban population, both informal and formal food markets have experienced growth. The informal food markets have proliferated in non-designated areas near residential estates, along the streets and on the roadside, as well as on mobile carts selling fresh farm produce and ready to eat foods. Some form of processing and food preparation is also practiced in the markets; for example, chopping leafy vegetables, shelling peas, peeling fruits and cutting to smaller portions and squeezing fresh juice from fruits and vegetables. Preparation of other ready to eat foods include roasting maize, frying

fish, making 'chapatis', roasting small pieces of meat and deep frying of potato chips. Informal food markets offer convenience to the consumers in terms of accessibility, freshness of produce, variety of food and produce, and availability in small portion sizes at affordable prices that allow daily sustenance for day-wage workers and low-income households.

However, informal food markets operate from areas where crucial infrastructure for preservation of food safety and quality is lacking. Food is processed, prepared, and displayed in polluted environment, lacking in portable water, washrooms, waste removal and disposal mechanisms, food storage areas or even hygienic food display units.

Undoubtedly, hazards exist in foods sold in the informal food markets, and food cases have been extensively reported in the media and blogs. Tezira Lore (2016) has reviewed on yearly basis and documented in the blog site numerous food cases reported through the media and went to show that there are risky products in the local market. The subject of safety of raw hawked milk is a perpetual problem, and Ocharo (2017) featured the presence of drug residues that included pesticides and antibiotics as well as Hydrogen peroxide and formalin used for preservation of raw milk contrary to the law. Lore (2016) reviewed reports on sale of fraudulent yoghurt, fraudulent because it did not contain any milk, and Aflatoxin prevalence in maize (2019) in the country. Incidents of Cholera outbreaks have been reported in Kenya every year with large cyclic epidemics every five to seven years (WHO, 2017). It was also reported that in the first half of 2017, about 1216 cases of cholera were recorded with 14 case fatalities. Other Numerous studies carried out by researchers reveal the foods sold in informal markets carry with them dangerous pathogens and chemicals to harmful to human health. Obi (2017) found out that 'sukuma wiki' (local kales) sold in the informal food markets were farmed along raw sewer lines which the farmers used to irrigate, while Chacha (2017) reported the practice of ripening bananas with calcium carbide in the informal food markets.

The food control framework in Kenya has not demonstrated assurance of food safety and protection of public health from informal food markets. Food laws are enacted, and regulatory agencies are appointed, but the positive results of food control are not realized. There exist scanty of documentation of the status of food control in the informal food markets that may be used to streamline the informal food markets.

1.3 Justification of study

The informal food markets are indispensable in achieving some of the Sustainable Development Goals (SDG) in developing countries. They include SDG 1: No Poverty – inclusive economic growth to provide sustainable jobs and promote equality, SDG 2: Zero Hunger - promote sustainable agriculture and achieve food security, and SDG 8: Decent work and economic growth especially for the youth. Informal food markets offer a livelihood to the vendor families, they empower women and youth and they provide last mile conveyance of food to the consumer thereby supporting food security. In line with the SDGs, Kenya unveiled the Big Four Agenda among them, Food Security (Bankelele, 2018). The big-4 agenda is a five-year program instituted in 2017 to achieve rapid results in four identified development sectors. Understanding the status of informal food markets will allow for policy intervention to grow the sector into a decent economic activity providing safe quality foods to the public.

The capacity building of vendors through training and provision of infrastructures is essential for the growth of the informal sector (Zusmelia et al. 2019). This study will identify areas where training for vendors is required as well as infrastructural requirements for sustainable informal food markets.

The findings of this study are important to strengthen the implementation of food safety legislations and regulations in the informal food markets in Kenya. In many developing countries, informal food markets and food safety are inextricably linked (Kristina & Delia,

2015), and regulating these markets is a daunting task because they are enormous and complicated (Hodur, 2018). Building effective food systems will ease the regulatory activities without creating unintended negative consequences in the food systems.

In the wake of devolved government system in Kenya and the ongoing effort to build cities and county infrastructure, population growth and urbanization must come to mind. City/town planning, county regulations and policy formulations must be well advised regarding contribution of informal food markets in food security, nutrition and safety. This study can be utilized by county governments to effect early planning for food markets in the county urbans and avoid chaos in the sector in the future.

1.4 Aim of study

The aim of this study was to debunk the challenges and problems that the regulatory framework must overcome to effectively control food safety and quality in the informal food systems.

1.5 Purpose

The purpose of this study was to provide a resource to the national and county governments in developing policies and regulatory frameworks for sustainable food safety and security in the informal food systems.

1.6 Objectives

1.6.1 Main objective

The overall objective of this study was to assess the factors that affect food control in the informal food markets in Nairobi, Kenya

1.6.2 Specific objectives

1. To assess the socio-demographic characteristics of the food business operators in the informal food markets,
2. To assess the problems and challenges that affect supply of safe quality foods in the informal food markets in Nairobi, Kenya
3. To assess the legislation and regulations that govern informal food markets and the effectiveness of their enforcement in informal food markets in Nairobi, Kenya
4. To examine the opportunities for enhancement of food control in the informal food markets in Nairobi, Kenya.

1.7 Research questions

This research will apply research questions below.

- i How does the socio-demographic characteristics of food business operators influence their behavior, perceptions and practices in the face of food control in the informal food business?
- ii What are the problems and challenges experienced in the informal food markets that may compromise the safety and quality of foods traded?
- iii Are the laws and regulations implemented effectively and are there challenges in their enforcement?
- iv What opportunities exists for possible interventions to enhance operations, behavior and regulation of informal food markets in maintaining food safety and quality?

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Overview national food control systems

'Food control' is an inclusive term for a legal framework for protection of human health through ensuring food placed in the market is safe, wholesome, and authentic and meets the desired quality. The term National Food Control (NFC) was coined by Food and Agricultural Organization (FAO)/World Health Organization (WHO) to mean;

"....a mandatory regulatory activity of enforcement by national or local authorities to provide consumer protection and ensure that all foods during production, handling, storage, processing, and distribution are safe, wholesome and fit for human consumption; conform to safety and quality requirements; and are honestly and accurately labeled as prescribed by law."(FAO Food and Nutrition Paper 76)

The FAO/WHO identifies at least five key components of an effective national food control system; they include food laws and regulations (legislation); national food control management, inspection services, laboratory testing services and additionally, a mechanism for dissemination of information to all stakeholders including the consumers (FAO/WHO, 2003; SFI, 2003; Jukes, 2003; Vytelingum, 2003). The five elements are intertwined and interlinked in a manner that failure in one will cause a dent in effective food control.

The legislative authority besides enacting food laws, also establishes an agent giving it management authority for food control. Such an authority should have an effective leadership for its administration with clearly defined accountability mechanisms to the legislative body (Mutukumira and Jukes, 2003), as well as development of policies, implementation and monitoring structures for food control activities. An analysis of various countries including Canada, USA, Tanzania and Kenya elucidated the fact that the management authority can be a

single agent, multiple agents or a hybrid of the two whereby the role of the agents is integrated at different levels (FAO, 2003; Keenan et al, 2015; Jukes, D.J., 2003, Bagumire A. et al, 2009). Each of the system has its own pros and cons depending on the governance system, efficacy of legislation especially in collaborative matters and ability to integrate the entire food industry under a unified food safety policy.

In instances where multiple autonomous agencies are involved in food control, coherence is often a challenge coupled with duplication of activities/effort resulting to wastage of resources (FAO, 2003). Food value chains are not only multi-sectoral, they are also becoming longer and more complex in nature, and therefore cooperation and active participation of all stakeholders in the food value chain, as well as high level of political and policy commitment are critical ingredients in an effective food control system in a country. A healthy people are a pre-requisite to economic development and a thriving trade in food is built on consumer confidence. This can only be achieved through an effective national food control system.

2.2 History of national food control systems

It is the obligation of a government of a nation to protect the health of all the people consuming the food it produces within and without its precincts. Yet it is the challenges and experiences of a nation that leads a government to establish its laws and order. Food control measures differ from one country to another depending on the perceived need for control by the country (FAO/WHO, 2003). The main challenges that most governments faced that led to establishment of food laws include food related health effects, food adulteration, deception, fraud, and misrepresentation. Food control became necessary to provide a level playground for trade and protect consumer health.

In the USA up until 20th century, federal laws that provided a patchwork to protect against unethical practices in production and sale of food became overwhelmed by incidences and soon

led to the formation of a strong Food and Drug Administration (FDA) to enforce Food and Drug act introduced in 1906. The law was made stronger in 1938 with the enactment of Food, Drug and Cosmetics Act. Over the years, FDA has gone through many transformations with new acts coming to force and regulatory agencies formed, without major changes. But for the first time in 70 yrs, the USA is making a major overhaul to its food control system by establishing FSMA 2011.

The very first food laws in Kenya were established in the late 50's and early 60's to regulate production and sale of animal products (Kenya meat act) and crops like wheat, coffee and tea. The first food safety law CAP 254 Food, drugs and chemical substances act was established in 1965 to make provision for the prevention of adulteration of food, drugs and chemical substances and other matters relating to its enforcement. Over the time, the act has been amended severally with the latest being in 2013. There has not been much change in the regulatory framework for Cap 254 despite this being the main food safety legislation in the country. It has always been regulated by the Ministry of Health department of public health, whose arms were established in municipal councils and city council until advent of county governments where the control is now administered from.

2.3 Food control system in Kenya

Since independence in 1962, the population of Kenya has grown from below 8m to approximately 47 million in 2017 (KNBS, 2011). The food industry has grown many folds in primary production, value addition and processing. The food chains have continued to become longer and complex, accentuated by urbanization, import and export trade and trend from consumption of farm fresh produce to processed food and eating out of home. What at independence could be regulated by one or two agencies has now grown to demand a larger framework and expanded infrastructure for regulation.

Little is documented about the food control system in Kenya. However, according to Gathura and Kilonzo, (2014) the food law is enacted in at least 22 legislations and administered by least 17 regulatory agencies under various ministries of the government. Some of the laws are very old and have not been reviewed effectively to cater for the rapidly growing needs of food control system. For example, establishing MRLs (Maximum Residue Levels) for chemicals in crop produce sold in the domestic market and risk-based approach to food control are pressing food safety needs that have not been entrenched in national food control. There is also no known national food safety policy. Each of the regulating agency acts independently either in a single food value chain; for example Kenya Dairy Board whose mandate is to work within milk value chain, or in a sector that cuts across several food value chains; for example Department of Public Health which regulates food markets, or sometimes covering all sectors of all food value chains; for example Kenya Bureau of Standards that not only develops but also plays an active role in enforcement of standards in all sectors and carries out market surveillance.

2.4 Challenges of food control system in Kenya

The challenges of food control in Kenya are the challenges most developing countries face. One of the major challenges is limited resources allocated to develop and implement effective food control systems. The limited, resources are concentrated where returns are higher, for example in regulating food safety in produce for export market. Kenya Plant Health Inspectorate Service (KEPHIS) is an example of an agency mandated to control quality of agricultural inputs for crop safety. But their effort is felt more in regulation of crops for export and not for domestic markets. The export produce must adhere to WTO's SPS standards for trade, mainly the chemicals residue levels in the produce. KEPHIS is seen more inspecting farms and testing crops for MRLs specifically grown for export markets. Any produce that is condemned for export end up in domestic informal food markets and are consumed with least regard to their health implications.

The food control system in the country is multi-agency; essentially fragmented and remotely lacking in collaboration and coordination (Gathura and Kilonzo, 2014). Duplication of efforts is seen in multiple audits carried out on establishments for seemingly same requirements. An example is the Standardization mark (S-mark) enforced by KEBS. To get this S-mark, the food establishment must fulfill hygiene requirements established by the standard and the product passes the specification requirements. To operate the business, a license from the department of public health is required, and similarly hygiene requirements are audited. If the business is in dairy sector, it must acquire an additional license from KDB to certify that the hygiene requirements are fulfilled. This also applies to other product specific regulators for example from the different directorates in AFA (Agriculture and Food Authority). Cooperation and coordination of activities among the various agencies has not been clearly established, and the burden of compliance lies heavily on the business operator.

The micro, small and medium sized enterprise (MSME) is a fast-growing sector that has proliferated in all industries including in food value chains. From a small-scale farmer to a street food vendor. The MSMEs lack adequate knowledge, skill, financial muscle and the technological capability to build credible systems in their operations (KAAA, 2017). As a result, food safety systems in the MSMEs are not prioritized and so food safety is compromised. MSMEs are the biggest source of food cases in Kenya. The MSME sector is large and complicated and so is mostly shunned by regulators who lack the meticulous framework to enforce food safety standards. This has become the largely termed informal sector, characterized by low regulation.

Food safety awareness among the consumers is an important driver of food safety management. When consumers can demand safe foods, food handlers are compelled to uphold food safety. Unfortunately, food safety awareness is still incredibly low in a large part of the population and is foreman by food insecurity. Consumer education and sensitization is lacking even as unsafe

food find its way in the markets. Consumer groups are not strong enough or vocal enough to lobby for better controls in food safety. However, the scenario is changing, as consumers are learning more from experience the negative effect of loss of food safety, and the fact that safe food is a human right.

2.5 Informal food markets in Kenya

The informal food markets in Kenya are characterized by lack of formal business registration. As such, a lot of elements are overlooked, such as proper business premises, sanitary facilities, and hygiene practices among others. The informal food markets in Kenya operate mostly from open places, designated or non-designated areas, in makeshift premises or mobile structures selling quite a variety of foods. The fresh produce markets sell fruits and vegetables, cereals and pulses, varieties of meats and fish. The cooked foods businesses could also be cooking in the open air or in kiosks and make-shift premises. Others own mobile vending carts that they can move from one place to another selling snacks like sausages, hotdogs, eggs, pastries and nuts.

The locations of operations could be in fixed locations, but sometimes they are mobile. In the later, the operators move around carrying their wares and looking for customers, an operation popularly known as hawking. But food markets are to be found literally everywhere without designation or restrictions. Food traders spread their ware on the ground sometimes using only a mat, or receptacles of various types like plastic, wooden crates or platforms, polythene bags, sacks etcetera.

Suppliers to the informal markets are both informal and formal producers, processors, and other markets. Emphasis is more on appearance and price of the commodity rather than quality or safety. So that vegetables could be fresh and spotless, but they have been grown on sewer lines, milk could look fresh but peroxide has been added to keep the freshness (Ocharo, 2017), and

bananas (Omuya, 2017), would look ripe but have been ripened by calcium carbide (Kiprotich, 2018).

2.6 Gaps in Knowledge

The informal food markets have been implicated a lot in foodborne cases (Kristina & Delia, 2015), but their contribution to the burden of foodborne diseases in the country is yet unknown. Foodborne cases in the country are rampant and so are taken casually and rarely treated, with victims preferring to self-medicate or wait out the symptoms to subside on their own. More study on the contribution of informal food markets to the foodborne disease burden could inform policy makers to priorities food safety in the markets.

The relationship between urban population growth and informal food markets in the country has not been studied so the challenges of conveying safe and sufficient food to the urban population are not being addressed effectively. This study will play a small part, but more studies are required for effective change.

3 CHAPTER 3: STUDY DESIGN AND METHODOLOGY

3.1 Study setting in Nairobi, Kenya

The study was carried out in Nairobi County (**Figure 3.1**). Nairobi is the capital city of Kenya and the largest city by population. Nairobi occupies 696 km² and is estimated to have a current population of 4.4 Million people (KNBS, 2019), expected to rise to close to six million people in 2025 (World Urbanization Prospects, 2018). Nairobi is a county of its own right with 17 constituencies and 85 wards. Study markets were purposely selected from Embakasi North and Embakasi West constituencies (**marked with white arrows in Figure 3.1**).

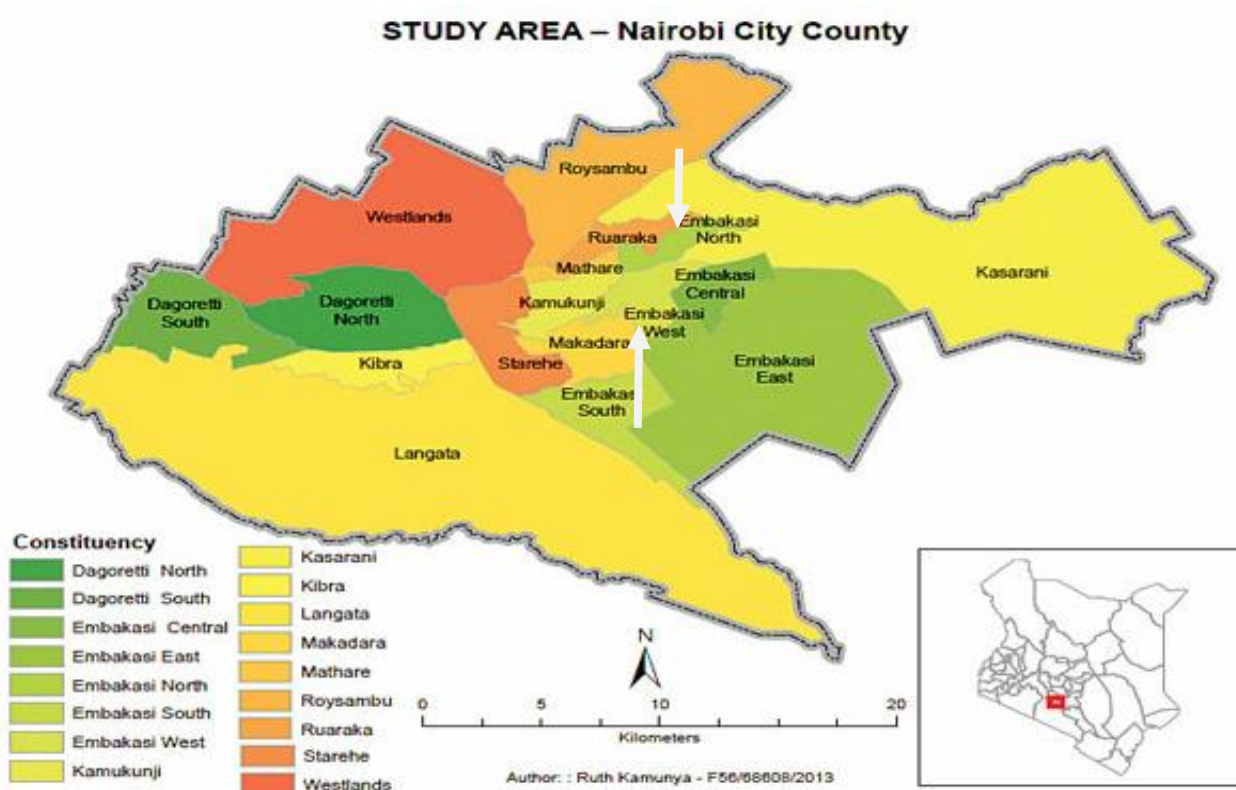


Figure 3.1: Study Area of informal food markets in Nairobi, Kenya

Nairobi city relies on food supplies from peri-urban farmers and other counties. The produce is delivered to wholesale markets and later distributed to retail markets nearer the residential areas, with some supplies going directly to the retail markets. Fresh produce supplies include horticultural produce, cereals and pulses, dairy produce and meats.

The informal food markets are regulated by various government institutions (**Table 3.1**), the main ones being the Department of Public Health under the Ministry of Health and the county government. Further, the county governments provide market spaces and structural facilities such as toilets and solid waste removals, water and sewerage services and, security among other services (Nairobi City County).

Table 3. 1: Regulatory Authorities for Informal food markets in Kenya

No.	Institution	Function/Mandate
1.	Ministry of health, Department of public health	Public health and food safety inspection in the market
2.	County government	Provision of market spaces, structures and utilities, licensing of traders, maintenance of markets and solid waste disposal
3.	Agriculture and Food Authority	Regulating crop production at the farm and post-harvest handling including transportation to the market

3.2 Study design

The study was a cross-sectional survey with observation of the infrastructure, types of foods and produce traded, organization of market, space, busyness, among others. Qualitative data was collected from primary and secondary sources, while quantitative data was collected from primary sources.

3.3 Sampling

Nairobi County has 44 markets 20 of which are open-air while the rest are closed-stall markets. For the purposes of this study, closed-stall markets were referred to as designated markets while open-air markets were referred to as non-designated markets. The designated markets were defined as areas segregated and custom designed as food markets by the county governments. Non-designated markets were emerged out of convenience in areas not planned nor designed for food markets by county government.

For the purposes of this study, two designated and two non-designated markets were purposively selected. The designated markets included Kariobangi North and Umoja, while non-designated markets included Dandora and Korogocho.

In each of the designated food markets and non-designated food markets, respondents were randomly drawn from food business operators. The food business operations included in the study were those trading in fruits and vegetables, meat and meat products, dry cereals, ready to eat food catering outfits and mobile food vendors.

The operations office for regulating agencies were identified, and the senior officers were purposively selected because they had the information needed to address the research questions.

A summary of the sampling plan can be found on **Table 3.2**.

Table 3. 2: Sampling Plan

Sampling Frame	Sampling method	Inclusion criteria	Sample size
Designated Food markets	Purposive	Designated market facilities	2 markets
	Random	Food business operators	-2 FGD * 6 -8 participants -165 individual respondents
Non-designated food markets	Purposive	Non-designated food market facility	2 markets
	Random	Food business operators	-2 FGDs *6-8 participants -165 individual respondents
Documented food laws and regulations	Exhaustive	Food laws and regulations	4
Regulatory agencies	Exhaustive	Food markets regulators	4
	Purposive for respondents	Senior officer in the regulatory agency	4

3.3.1 Sample size calculations

3.3.1.1 Focus Group Discussion

From the four food markets selected ie Korogocho, Umoja, Dandora and Kariobangi North; one FGD was conducted in each market. There were 6-8 participants in each FGD.

Sample size =2 FGDs for designated market and 2 FGDs for non-designated markets

$$= (2*1) + (2*1) = 4 \text{ FGDs giving a total 24-32 respondents}$$

3.3.1.2 Interviewer-led questionnaires

Total Population in all the 43 markets was $N > 10,000$, so the Fischer's Formula was used to determine the population sample as adopted by Mugenda and Mugenda.

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where:

n₀ is the sample size,

Z² is the abscissa of the normal curve that cuts off an area α at the tails;

$(1 - \alpha)$ equals the desired confidence level, e.g., 95%);

e is the desired level of precision,

p is the estimated proportion of an attribute that is present in the population. Since this proportion could not be obtained from previous studies; the study used a proportion of 0.5, which assumed maximum variability in the population. Thus, the estimated sample size was likely to be more conservative, that is, the sample size was likely to be more than what was required;

q is 1-p.

The value for **Z** is found in statistical tables which contain the area under the normal curve. e.g. $Z = 1.96$ for 95 % level of confidence

The sample was exceeded by 10% to cater for non-response and the out of reach especially in questionnaires.

$$n_0 = \frac{Z^2 p(1-p)}{e^2}$$

Where:

n_0 is the sample size,

$Z = 1.96$

$(1 - \alpha) = 95\% \text{ CI}$

$e = 0.05$

$p = 0.5$

$1-p = 0.5$

$$n_0 = \frac{1.96^2 0.5 \times 0.5}{0.05^2}$$

$$n_0 = 1.96^2 * (0.5(1-0.5)) / (0.06^2)$$

$$n_0 = 300$$

10% of the sample to cater for non-response will be 30 giving a total sample of **330** respondents

3.3.1.3 Key informant interviews (KII)

Each market, designated and undesignated, was assigned an officer from the public health department. Three KIIs were conducted from the three public health officers assigned to the markets, the fourth key informant was not available by the time data collection was completed. In addition, each market had a market driven leader elected by traders (*Chamas*). The four leaders were also interviewed, giving a total of **seven KIIs**.

3.4 Data collection methods

3.4.1 Primary data

Primary data was collected from surveys and observations. Pre-designed structured questionnaires were used for data collection for the various respondents. The questionnaires were

also translated into Kiswahili language for the majority respondents who were not fluent in English. The following tools were used to collect primary data.

- i. **Interviewer-led questionnaires** were used to collect data through individual respondents. Individual questionnaires were used to collect demographic data pertaining age, level of education, knowledge and practices of individual food business operator.
- ii. **Observation checklist** were used by research assistant to collect data pertaining market infrastructure, hygiene status, organization of markets, practices, busyness among others.
- iii. **FGD questions** were used to guide the focus group discussions. Voice recording devices were used to record group discussions pertaining to the challenges and perceptions of traders
- iv. **Key informant interview checklists** were used to collect data from regulatory agencies' officials and market leaders pertaining to the activities of regulation and the challenges faced.

A full-scale pretest of the tools was carried out on a sample size of 10 respondents and one KII from Kariobangi food market. The response was satisfactory, but a few corrections were made to refine the structure for a good flow of data collection and enhance clarity of content.

3.4.2 Secondary data

Secondary data was obtained from regulatory agencies desk research of the:

- ≈ Policies, laws, regulations of the government
- ≈ Statements of mandate, enforcement framework and county by-laws published in government publications, agency websites and agency records.

3.5 Data analysis

Qualitative data and information was analyzed by identifying and linking patterns and themes identified; whereas quantitative data was analyzed by use of percentages, chi-square test, binary logistic regression, odds ratios, descriptive statistics such as frequencies, mean, standard deviation, minimum and maximum (**Table 3.3**).

3.5.1 Qualitative Data

Transcription of the data was first done from the Swahili language to English. Qualitative data was analyzed by thematic content analysis. Open manual coding was done, and the codes were exhaustive of study scope, mutually exclusive and clearly specified to collate common themes and summarize findings.

Analysis of FGDs data started by computer based manual coding of elements of research with meaningful titles. Subsequently, common phrases and concepts as well as missing information were identified in each of the focus group recording. Finally, a narrative was prepared to tabulate the findings, and some key verbatim reported.

3.5.2 Quantitative Data

The data was organized in SPSS version 21. Descriptive statistics such as frequencies, mean, standard deviation, minimum and maximum was obtained for the socio-demographic and economic characteristics, hygiene and safety practices of fresh food markets and adherence to food safety and hygiene requirements for the informal food markets. Chi-square test for association was used to test for association between socio-demographic and economic characteristics and hygiene and safety practices in the informal food markets. Binary logistic regression was used to evaluate the predictive model of socio-demographic and economic characteristics on likelihood of operation of licensed business. Odds ratios was used to establish

the relationship between licensing practices and adherence to food safety and hygiene requirements in the informal food markets.

Table 3. 3: Summary of data collection and analysis methods

Data collection tool/source	Source of data/target population	Sampling method	Data collection method	Type of data	Data analysis method
Individual Questionnaires	Individual respondents	Purposive for markets and random for individual respondents	Individual questionnaires	Quantitative	Thematic content analysis
Observation Checklist	None	Exhaustive	Observation	Quantitative and qualitative	Summaries
FGD Questions	Groups of 6-8 individuals	2 groups per market and random for individual in the group	Focus group discussions	Qualitative	Summaries and descriptives
Desk research questions	Documented Law and regulations	Exhaustive	Desk research	Qualitative	Summaries
KII Interview Checklist	Key personnel in the regulatory institutions	Exhaustive institutions and purposive for key respondents	Key informant interviews	Qualitative	Summaries and descriptives

4 CHAPTER FOUR: RESULTS

4.1 Socio-demographic characteristic of food business operators in informal food markets in Nairobi, Kenya

This sub-section addresses research question one on the influence of socio-demographic characteristics of food business operators on their behavior, perceptions and practices in the face of food control. Socio-demographic information collected included age, gender, education level, training, marital status, daily income, and motivation to engage in informal food business.

The socio-demographic characteristics of the business operators of the informal food market in Nairobi County are as summarized in **Table 4.1**. Majority (62.7%) of the food business operators in informal food market were female. Seven in every ten (69.2%) of the food business operators were married with the rest (30.8%) being not married or separated. About six in every ten (60.7%) of the food business operators in the informal food market had attained secondary education and beyond with the rest (39.3%) not having been educated beyond primary school. Majority (86.0%) of these food business operators in the informal food market were Christians while Muslims and Traditionists comprised the minority (13.4%). The average mean age of the food business operators in the informal food market was 36.78 ± 10.18 years with a minimum and maximum age of 20 years and 75 years, respectively.

Majority (85.2%) of the food business operators had it as their main source of livelihoods with other means of livelihood included salaried employment (11.7%), rental houses (3.9%) and farming (6.0%). Over half (55.1%) of the food business operators in the informal market had been in the business for less than five years with those having been in the business for more than twenty years being the least (2.7%). The average daily income of food business operators in the informal food markets was KES. 2407.29 ± 3801.03 with over half (59.2%) of those interviewed

earning a daily income of less than KES. 5000. The daily customer base in the informal food market averages at 39.59 ± 23.73 with about seven in every ten (72.6%) of the food business operators registering a daily customer base of between 20 and 100.

Table 4. 1: Socio-demographic characteristics of food business operators in the informal food markets in Nairobi, Kenya

Socio-demographic characteristics	Percent (%)n=292
Gender	
Female	62.7
Male	37.3
Residence	
Korogocho	38.4
Umoja	28.1
Dandora	19.2
Kariobangi North	14.4
Marital status	
Married	69.2
Single	19.5
Divorced	7.2
Separated	4.1
Level of education	
Secondary	56.2
Primary	34.6
None	4.8
Tertiary	4.5
Religion	
Christian	86.0
Muslim	11.3
Traditionist	2.1
Informal food market as the main source of livelihood	
Yes	85.2
No	14.8

Other sources of livelihood	
None	78.4
Salaried employment	11.7
Farming	6.0
Rentals	3.9
Duration as a food operator in the fresh food market (years)	
<5	55.1
5-10	20.2
11-15	16.1
16-20	5.8
>20	2.7
Daily income for food operators in informal food market	
>500	30.1
500-5000	29.1
5000-10000	28.8
10000-15000	5.1
15000-20000	6.2
>20000	0.7
Daily customer base	
20-100 customers	72.6
<20 customers	27.1
>100 customers	0.3

Most of the businesses (86.5%) in the informal food market had an active involvement of the owners. Over half (55.8%) of the food business operators ran their own businesses individually, while 44.2% had employees. Almost eight in every ten (77.4%) of the food business operators had no training or knowledge in food safety while only 23.6% had knowledge in food safety. Majority of the food business operators obtained produce for sale from merchants while only 7.2% obtained their products from their own farm (**Figure 4.1**).

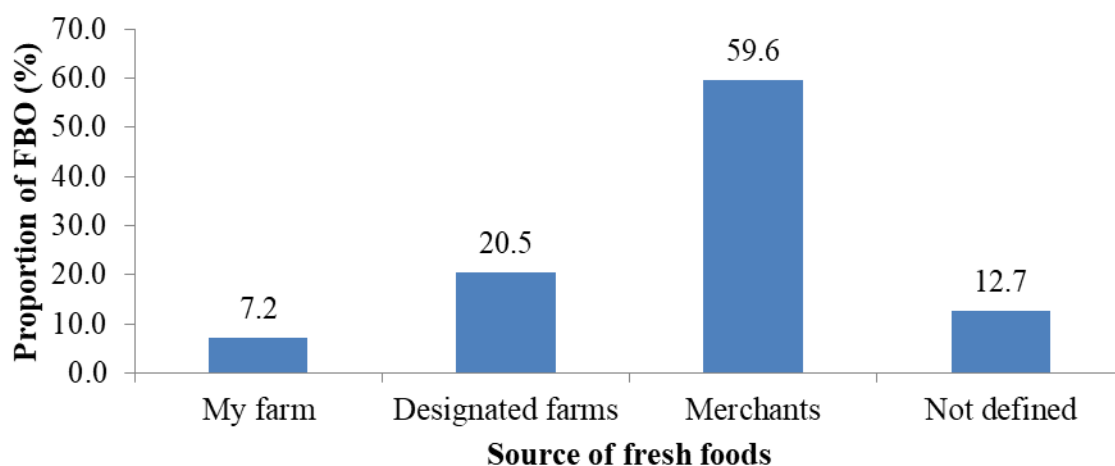


Figure 4. 1: Sources of fresh produce for informal food markets in Nairobi, Kenya

4.1.1 Association between socio-demographic and economic factors of the food business operators and the products sold in the informal food market in Nairobi, Kenya

Majority (56.9%) of the food business operators in the informal food market dealt in cooked foods. The food business operator's gender (p-value=0.01), residence (p-value=0.001), duration in the business (p-value=0.001), daily income from the business (p-value=0.001), and the involvement in food market for livelihood (p-value=0.02), were significantly (p<0.05) associated with the product being sold (**Table 4.2**).

Table 4. 2: Association between socio-demographic and economic factors of the food business operators and the products sold in the informal food market in Nairobi, Kenya

Socioeconomic and demographic factor	Proportion of respondents selling the product (%)					P-Value (χ^2 , df)
	Fruits	Vegetables	Both fruits and vegetables	Cooked foods	Prepared Salads	
Total	11.0	7.8	18.1	56.9	6.4	
Gender						
Male	15.2	9.5	13.3	23.8	29.5	0.01
Female	8.5	6.8	20.9	9.6	49.2	(21.7, 5)
Residence						
Umoja	6.1	9.8	19.5	14.6	45.1%	0.00
Dandora	18.0	14.0	28.0	4.0	36.0%	(42.3, 15)
Korogocho	13.9	6.5	12.0	22.2	37.0%	
Kariobangi North	4.8	0	19.0	9.5	54.8%	
Duration as FBO (years)						
<5yrs	15.3	10.2	23.6	10.2	31.8	0.00
5-10 years	10.5	7.0	10.5	22.8	42.1	(67.8, 20)
11-15	2.3	4.7	11.6	11.6	69.8	
16-20yrs	0	0	0	47.1	52.9	
>20 yrs	0	0	37.5	0	62.5	
Daily Income (KES.)						
<500	20.2	9.5	25.0	2.4	34.5	0.00
500-5000	10.1	5.1	17.7	8.9	50.6	(95.2, 25)
5000-10000	2.4	9.5	7.1	26.2	48.8	
10000-15000	0	13.3	53.3	33.3	0	
15000-20000	11.1	0	11.1	33.3	44.4	
>20000	100.0	0	0	0	0	
Dealing in fresh food market as the main source of livelihood						
Yes	10.3	7.0	16.1	16.1	43.0	0.028
No	12.8	12.8	30.8	7.7	35.9	(12.5,5)

Key: FBO-food business operator, χ^2 =chi-square value, df-degrees of freedom.

Themes from the focus group discussions showed that traders saw the business as their main source of income which informed their reasons to get into the food business as an easy way of earning a living and provide for their families. Nonetheless, other factors also influenced their choice of getting into the food business including the fact that they could use same food to feed their families avoiding a loss from the leftovers and excesses.

This sentiment was best illustrated by one respondent from Dandora who stated:

'I knew that the food remains will help us at home and I thought the hotel business was good because even if I don't sell my kids will just eat the remains.' – Ready-to-eat food vendor, Dandora market, FGD

Furthermore, from the interviews, two traders from Kariobangi stated that food business had an easy ready market which was always booming. This readiness of the market meant that they were assured of a steady supply of income unlike other businesses which had high season and low seasons when the risk did not guarantee a decent return of their investment.

As one trader stated:

"Business that involves food is good because money circulation is faster. Sometimes you buy commodities, you sell well and everything goes on well, but there are still challenges, you may find that tomatoes are not fairing with you well and at times you find that it is faring with you well. And that's why I chose this business. Because it's good, you can't lack". Food vendor, Kariobangi market FGD

Their sentiments were collaborated by another trader from Dandora who stated.

"I realized many people prefer food that is prepared and ready to cook, so they could come in the evening, I prepare for them vegetables then they go cook. So, I saw a business opportunity for me that will assist me". - Vegetable vendor Dandora FGD

4.2 Problems and challenges of informal food markets in Nairobi, Kenya

This sub-section addressed research question two about the problems and challenges experienced in the informal food markets that may compromise the safety and quality of foods traded. The issue analyzed included Infrastructural characteristics of the informal food markets in Nairobi (Section 4.2.1), Hygiene and sanitation in the informal food markets (Section 4.2.2) Food handling practices among food business operators (Section 4.2.3), Perceptions on sources of food hazards and their mitigation (Section 4.2.4), Insecurity (Section 4.2.5), and Consumer behavior in the informal food market (Section 4.2.6).

4.2.1 Infrastructural characteristics of informal food markets in Nairobi, Kenya

a) Designated markets:

From the observations, designated food markets were similarly built in terms of size, structure and facilities. Each had three hundred stalls permanently partitioned and numbered.

Kariobangi North Market popularly known as ‘*Soko la Mawe*’ (meaning stone-built) was located off Outering road in Nairobi. Majority of business operators were hairdressers and textiles vendors. The market stalls numbered three hundred and an additional seventy in the adjacent trading center. Of the three-hundred and seventy stalls, only eighty (80) were food-based operators running eateries, meat butcheries, milk vending, and groceries. There were four water points, fifteen toilets and one urinal.

Umoja II Market located off Outering Road and was also stone-built with three hundred stalls. One hundred stalls were occupied by Food Business Operators most of them selling fresh produce and meats. There were four water points, fifteen toilets and one urinal.

b) Non-designated markets:

Korogocho market was located off Komarock Road within an informal settlement. Further research revealed the informal settlement is within 1.5 square kilometers and home to 150,000 to 200,000 inhabitants (Vries, 2017). The market association secretary in KII stated the markets is host to over eight hundred traders, of which approximately five hundred were Food Business Operators (FBOs). The market had no central sewer system nor piped water, sanitation within the market was provided by Community Based Organizations (CBOs) and Non-Governmental Organizations (NGOs) which comprised of approximately forty toilets, four urinals and three water points.

Dandora Market was located next to Tom Mboya Primary School, off Muigai Kenyatta Road in Nairobi. The market had no form of organization and there were no sanitary provisions in the market.

The ratio of the market occupation of Food Business Operators (FBOs) in designated markets to those in non-designated markets was 3:8 that is, approximately slightly over 72% of the FBOs were located in non-designated markets. The designated markets had a large mix of trades that did not deal with food while non-designated markets remained principally food markets, particularly fresh fruits and vegetables, fish, chicken and other meats, and ready to eat food.

4.2.2 Hygiene and sanitation in informal food markets in Nairobi Kenya

Evaluation of the hygiene status of the food markets revealed that three quarters (75%) had daily cleaning services; about 73.6% of these markets being under the county governments. About eight in every ten (82.5%) FBOs had accessible sanitary facilities during working hours; 81.9% of the food business traders took part in the cleaning of the market (**Table 4.3**).

Table 4. 3: Hygiene and sanitation status of informal food markets in Nairobi, Kenya

Hygiene status of informal food market	Frequency (%), n=292
Cleaning of marketplace	
Daily	75.0
More than once a week	13.2
Once a week	5.6
Once a month	5.9
Not at all	0.3
Entity responsible for cleaning	
County government	73.6
Contracted firm	26.4
Participation of business operators in the cleaning of the market	
Yes	80.9
Availability of waste disposal and collection services	
Yes	81.9
Accessibility of sanitation facilities during working hours	
Yes	82.5

More than eight in every ten (85.6%) FBOs in the informal food markets had access to clean water services. However, over half (53%) of the food business operators were dissatisfied with the hygiene status of these markets (**Figure 4.2**). Tests for associations showed that food business operators from Kariobangi North viewed their markets as largely dirty as compared to other areas at $p=0.05$, $\chi^2=49.1$ and $df=9$.

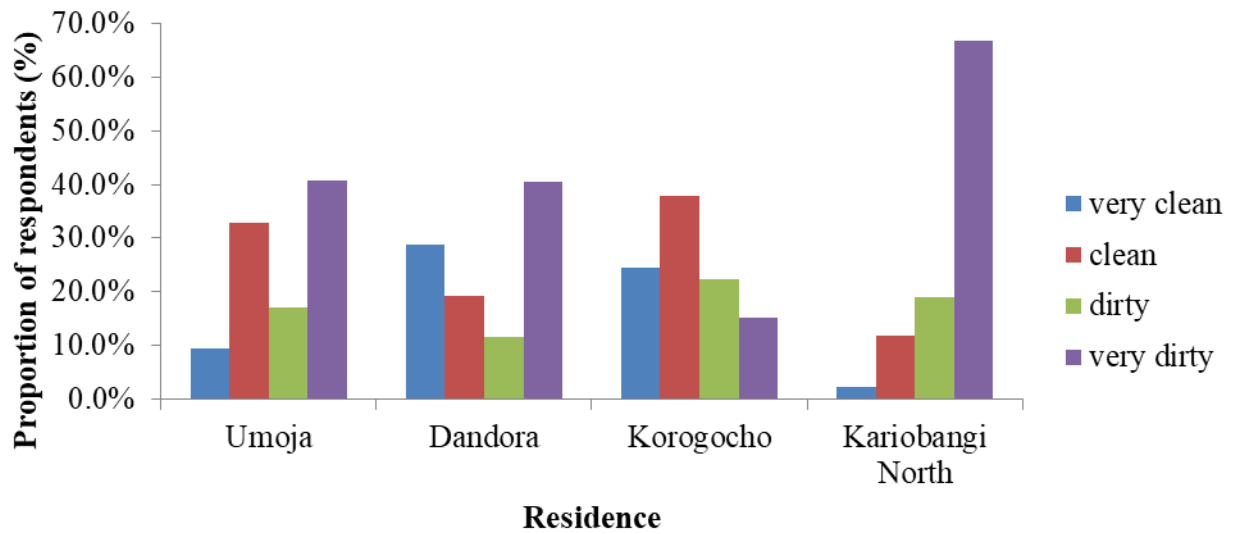


Figure 4. 2: Rating of market cleanliness by food business operators based on their residence in informal food markets in Nairobi Kenya

Waste disposal was a common challenge across all markets, while traders were quick to acknowledge that the county government and current governor of Nairobi County *Sonko Rescuer Team* were making significant efforts to collect garbage from the various collection points, a lot was left to be desired especially because the waste produced by the markets grew in volume outrunning scheduled collection routines. This led the market to have pungent smells that at times repelled customers.

“The county and ‘sonko’ people come and collect garbage about twice a week, this is good change from how we used to dump in the river but they could try and increase the number of times they collect so the market doesn’t stink” - Vegetables vendor, Korogocho Market FGD

Designated markets had water points, these water points had running water for up to three days a week, which left traders to fend for themselves for the remaining days of the week. Non-designated markets on the other hand lacked sufficient water points with running water. Traders were therefore left no choice but to buy water from water vendors obtained from questionable

sources and whose quality could not be verified by the traders. In Korogocho market, there were self-help groups and non-governmental organizations that had erected water points next to toilets. These facilities however had to be paid for and the structures were located a little further from the operation areas. Some toilets were particularly dirty since they were unattended due to inadequacy of water. However, most (60.2%) of food business operators worked in markets under the maintenance of contracted firms with only 39.8% under the county government, a trend repeated across various markets.

4.2.3 Food handling practices among food business operators in informal food market in Kenya

4.2.3.1 Food safety and quality checks practices in informal food markets in Nairobi, Kenya

In the absence of food safety awareness, food quality was more referenced. Freshness of the products was the most used quality check among the food business operator in the informal food market at 59.9% followed by product appearance (58.5%) and taste/smell (53.1%) in second and third position, respectively (**Table 4.4**).

Table 4. 4: Ranking of food safety and quality checks observed by food business operators in informal food market in Nairobi, Kenya

Food safety quality checks on products	Ranking (percentage of respondents)				
	Not important	Somewhat important	Important	very important	Extremely important
Knowledge of source	20.4	29.1	14.5	18.3	17.6
Grade	3.8	16.0	16.7	14.9	48.6
Price	0.7	0	6.3	40.1	53.0
Appearance	1.0	0	10.4	30.1	58.5
Freshness	1.0	0	4.8	34.3	59.9
Smell or taste	1.0	2.4	10.4	33.0	53.1
Knowledge of supplier	14.2	28.7	18.0	21.8	17.3

4.2.3.2 Association between gender and quality checks on products in informal food markets in Nairobi, Kenya

Prioritization of quality checks differed with gender and location of the food business operators. Females related more importance to quality checks in terms of product freshness, smell and taste and supplier than males as shown in **Table 4.5**.

Table 4. 5: Association between gender and quality checks on products in informal food markets in Nairobi, Kenya

Gender	Not important (%)	Somewhat important (%)	Important (%)	very important (%)	Extremely important (%)	P-value (χ^2, df)
Product freshness						0.018 (11.4, 4)
Male	0	2.8	1.9	39.6	55.7	
Female	0	0	6.6	31.1	62.3	
Product smell and taste						0.015 (13.8, 4)
Male	0	4.7	4.7	38.7	51.9	
Female	1.6	1.1	13.7	29.7	53.8	
Product supplier						0.000 (23.4, 4)
Male	16.0	13.2	28.3	26.4	16.0	
Female	13.1	37.7	12.0	19.1	18.0	

4.2.3.3 Association between residence of the FBO and quality checks on products in informal food markets in Nairobi, Kenya

Food business operators in Dandora and Kariobangi markets put more importance on quality checks in terms of product prices, grade, appearance whereas putting less importance on the supplier and sources of the product than those from other areas as shown in **Table 4.6**.

Table 4. 6: Association between residence of the FBO and quality checks on products in informal food markets in Nairobi, Kenya

Parameter/ Residence	Not important	Somewhat important	Important	very important	Extremely important	P-value (χ^2, df)
Product grade						0.000 (40.6, 12)
Umoja	10.1	22.8	15.2	12.7	39.2	
Dandora	0	1.8	25.0	21.4	51.8	
Korogocho	2.7	13.5	16.2	16.2	51.4	
Kariobangi	0	28.6	9.5	7.1	54.8	
North						
Product prices						0.002 (26.8, 12)
Umoja	0	0	0	54.4	45.6	
Dandora	0	0	10.7	28.6	60.7	
Korogocho	1.8	0	10.0	34.5	53.6	
Kariobangi	0	0	2.4	42.9	54.8	
North						
Product appearance						0.000 (40.9, 12)
Umoja	0	0	0	34.2	65.8	
Dandora	0	0	5.4	33.9	60.7	
Korogocho	0	0	22.3	24.1	53.6	
Kariobangi	0	7.1	4.8	33.3	54.8	
North						
Product supplier						0.004 (29.0, 12)
Umoja	12.7	27.8	12.7	32.9	13.9	
Dandora	26.8	14.3	17.9	16.1	25.0	
Korogocho	25.0	29.5	17.9	10.7	17.0	
Kariobangi	14.3	50.0	4.8	14.3	16.7	
North						

Knowledge of the source of the products						0.000
						(35.6, 12)
Umoja	12.7	27.8	12.7	32.9	13.9	
Dandora	26.8	14.3	17.9	16.1	25.0	
Korogocho	25.0	29.5	17.9	10.7	17.0	
Kariobangi	14.3	50.0	4.8	14.3	16.7	
North						

4.2.3.4 Food display and preparation practices in informal food markets in Nairobi, Kenya

The food display and preparation practices of the food business operators in the informal food market are as summarized in **Table 4.7**. Sixty one percent (61.0%) of the food business operators in the informal food market had constructed platforms for display of products. About 79.7% of the respondents would clean the trading area daily. Freezers and wooden crates were the most exploited storage equipment for fresh products. Plastic bags were the most exploited packaging material by the food business operators in the informal food markets. The produce purchased from the traders had been subjected to washing as a preparatory process with over half (55.8%) of the business operators doing this.

Table 4. 7: Food display and preparation among food business operator in informal food market in Nairobi, Kenya

Food handling practices	Percent (%), n=292
Surface material for display of products	
Floor concrete	12.6
Soil/ground	4.7
Constructed platforms (wooden)	61.0
Sacks spread	21.7
Frequency of cleaning of trading area	
Daily	79.7
Once a week	9.4
Once a month	9.4
Not at all	1.4
Storage containers used	
Sacks	24.8
Wooden crates	27.9
Carton boxes	19.7
Freezer	27.6
Preparatory processes on produce before sale	
Washing	55.8
Shredding	20.0
Packing	24.2
Packaging material used	
Plastic bag	67.4
Kraft wrapping	12.8
Newspapers	19.8

4.2.4 Perceptions on sources of food hazards and their mitigation in informal food markets in Nairobi, Kenya

Only slightly over half (50.7%) of the respondents had confidence in the environment being free of food safety risks. Sewerage, dust and insecurity were cited as the challenges at 40.3%, 41.7% and 18.7%, respectively. About eight in every ten (82.9%) of the food business operators viewed

enhancing of hygiene as the most possible way to reduce food safety risks. Proper hygiene was the more utilized (59.4%) than proper storage (40.6%) as a measure for ensuring safety of products.

Given that most of the produce they sold were perishable, food vendors in this study pointed out the importance of being early to the markets to get the freshest produce as a way of ensuring and maintaining quality. They also pointed out lack of proper storage facilities as a hindrance to ensuring quality and safety of their products which sometimes leads to loss. As one trader from Umoja pointed out:

“we prepare enough for the day that cannot go up to the following day because with us we don’t have the possibility of having a fridge, we must buy fresh produce even if its oranges so that even if you don’t sell, it is still fresh the following day”- Ready-to-eat food seller, Umoja market FGD

The lack of proper means to manage the fresh food led to increased wastage, reason being perishability of fresh foods and the lack facilities such as cold storage. The workstations of most of the operators were makeshift roadside kiosks, table-tops and/or a mat on the floor. High temperatures during the day rendered most of the produce unsellable in the event they remained unsold.

‘People will only buy fish when they are still fresh so I might only make sales and good profits on the first day when I bring in fresh stock. If some of the fish remains unsold for the next few days, I might not make any sales.’ - Fish Monger, Korogocho market FGD

During transportation, produce could become contamination and damaged resulting to loses. Sensitive produce such as milk, mushrooms, coriander and bananas need delicate care and were easily damaged during food handling. This becomes a challenge to the traders as customers often

pick on produce before buying, some left without making any purchases. At the end of the day, the trader was left with spoilt goods that they either must sell for less or throw away all together.

An overwhelming number of traders in the focus group discussions said hygiene was the best practice to achieving and maintaining safe produce for sale. According to the participants some of the efforts they had in place included cleaning fruits and vegetables, using adequate water, preparing food in clean environments, displaying, and storing food in clean places.

“I will first ensure that the surrounding area where I'm selling food is clean, I wash all vegetables well and place them in crates and when customers come, I take out theirs, wash them again then cut, and package it in their containers.” - Vegetable seller, Kariobangi market FGD

4.2.5 Insecurity of assets in informal food markets in Nairobi, Kenya

Insecurity in the markets drew concern among all respondents. Often, products left unattended would disappear, at times traders woke up to broken storage facilities and missing stock. These they attributed to lack of proper security apparatus in the markets. Designated markets, according to the traders, were once manned by *city askaris* (city police), however they ceased to provide the service. Traders were therefore compelled to hire watchmen during the night. These watchmen at times due to little compensation conspired with thieves and aided in stealing their products from stores.

‘Sometimes our stores get broken into and our goods are stolen so insecurity is also another major challenge...we hire our own watchmen, but we don't pay them well, they end up helping others steal from us’ - Vegetable seller, Kariobangi market, FGD

Traders in Korogocho and Dandora complained that they lacked proper lighting to facilitate offloading of fresh food products very early in the morning as well as late into the night. This made safe food handling difficult and slow. Traders from designated markets were not affected by this challenge as their markets operated from 7am to 5pm.

4.2.6 Consumer behavior in informal food markets in Nairobi, Kenya

4.2.6.1 Frequency of complaints of foodborne illnesses in informal food markets in Nairobi, Kenya

Of all the food business operators interviewed, about six in every ten (61.8%) (**Figure 4.3**) agreed to have received complaints from consumers on foodborne illnesses. Food business operators serving a customer base of between 20 and 100 customers per day received more complaints at 78.3% ($p=0.006$, $\chi^2=10.2$, $df=2$).

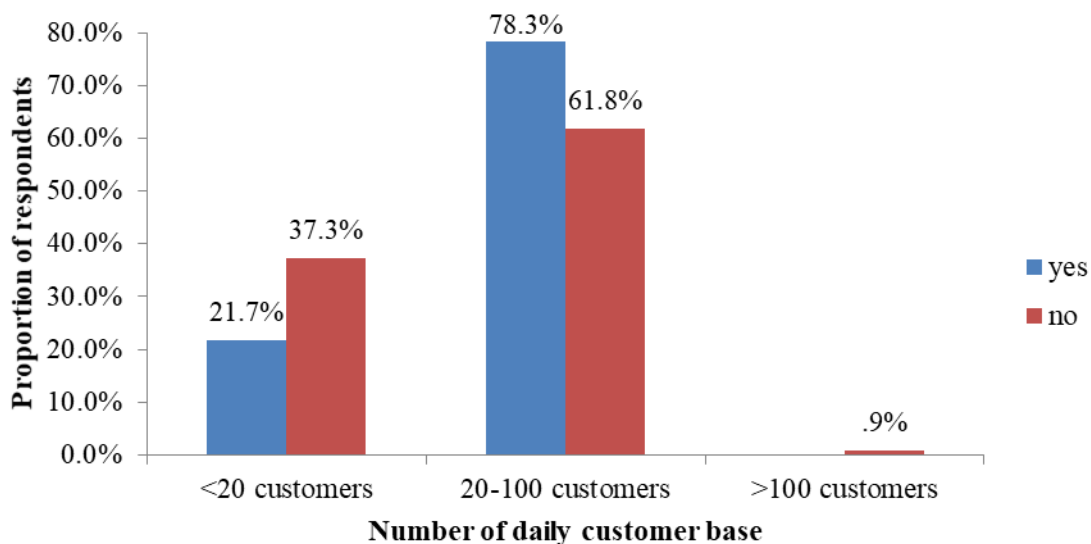


Figure 4.3: Proportion of complaints of foodborne illnesses received by food business operators based on their daily customer base in informal food markets in Nairobi, Kenya

4.2.6.2 Consumer behavior because of occurrence of foodborne illness in informal food markets in Nairobi, Kenya

About four in every ten (40.8%) of customers from whom the complaints were received did not change their purchasing behavior, with the rest (58.2%) changed product preference or moved to another trader (**Table 4.8**). Majority (51.7%) of the consumers from Korogocho would change the traders whereas majority of those from Umoja (54.2%) and Kariobangi North (57.1%) exhibited no change in purchase behavior. Majority of the (91.4%) food business operators rated

the consumer demand for safe foods as either *good* or *very-good*. There was no significant difference for trader perception of consumer’s food safety precautions.

The priority quality demands for food safety among consumers were ‘packaged produce’ (41.8%), produce washed in clean water (42.5%) and no signs of spoilage (14.7%). Only a paltry 1% did not have quality specifications during purchase. The quality specifications of food safety among the consumers were not statistically different in the different residential areas.

Table 4. 8: Association between consumer responses and their residence in informal food markets in Nairobi, Kenya

Response consumers	by Residence				P-value (χ^2 , df)
	Umoja (%)	Dandora (%)	Korogocho (%)	Kariobangi North (%)	
Avoided the product	27.1	34.4	51.7	11.4	0.000
Changed traders	18.6	18.8	25.3	31.5	(27.1, 6)
No change in behavior	54.2	46.9	23.0	57.1	

4.3 The legislation, regulations and enforcement challenges in informal food markets in Nairobi, Kenya

This sub-section addresses research question three on laws and regulations applicable to the informal food markets, the effectiveness of their implementation and the challenges in their enforcement. The information on Food laws and regulation applicable in informal food markets (Section 4.3.1), Regulatory agencies in the informal food markets (Section 4.3.2), Regulatory activities (section 4.3.3), and Challenges faced by regulatory framework in the informal food markets (Section 4.3.4).

4.3.1 Food laws and regulations applicable to informal food markets in Nairobi, Kenya

i. Food, Drugs, and Chemical Substances Act cap 254 Laws of Kenya

Food, Drugs, and Chemical Substances Act cap 254 is the main food safety law in Kenya. The law prohibits the sale of unwholesome, poisonous, or adulterated foods, and further provides that food standards where that is provided were adhered to. These may include standards for product definition and quality, packaging and labeling, shelf life, among others. Preparation and sale of food under unsanitary conditions is also prohibited. The Kenya Bureau of Standards has established numerous food standards particularly for prepared and processed foods that include food safety and quality requirements as well as the hygiene code for the food premises. Under this act, an authorized officer may obtain sample articles to be subjected for analysis to ascertain their safety and quality.

Cap 254 gave rise to an administrative arm; The Public Health Board established under the ministry of health with powers to establish necessary regulations for compliance to food safety and monitoring, and a standards body, Kenya Bureau of Standards to publish corresponding standards.

ii. Public Health Act cap 242 Laws of Kenya

In relation to the sale of food, Public Health Act compliments cap 254, and in some articles, it also duplicates it. For instance in prohibition of the sale of unwholesome foodstuffs. Public health act regulates public nuisance that may lead to public health problems. Such nuisance includes dirt, waste, pest infestation, unclean water and air pollution in any public areas, residential areas, and work premises. Further the law regulates the construction designs for food facilities, supply of clean safe water, responsible disposal of waste, provision of hygiene facilities, among others.

What stands out also in this law is the requirement for food handlers to undergo medical screening every six months and the prohibition from handling public food while sick or carrying an infection.

iii. Crop Act No. 16 of 2013 Laws of Kenya

Legal notice no.16 is a food crop regulation established in 2018 under the Crops Act of 2013. While the crop act regulates more the growing of crops on the farm, the legal notice no. 16 touches on some aspects of buying and selling of the crop produce. The law states that;

'A person shall not purchase, collect or bulk raw produce from a grower without a valid license from the respective county government' (article 14 (1) crop act no. 16).

'A person shall not sell food crop produce at wholesale in a designated market without a license' (article 14(2) crop act no.16)

This is to say that the regulation of marketing of crop produce begins at the farm gate, a step good for traceability and control of quality along the value chain. Crop inspectors are appointed to carry out inspections on farm and along transportation of the crop produce. This ensures crop produce is packaged and transported in clean and preserving manner. One of the roles therefore of market inspectors would be to ensure the suppliers of the market are licensed to sell in the respective market.

From the study, there was little or no information on management of markets, standards of markets or clear regulations on safety and quality of street vended foods. Hygiene standards and facilities on the streets that can assure food safety and monitoring of the same were also lacking. A mention of food carts and ice-cream trolleys in the city laws indicated that such vendors should obtain permits to operate, perhaps to control the population of such vendors.

4.3.2 Regulatory agencies in informal food markets in Nairobi, Kenya

Food, Drug and Cosmetic Act Cap 254 is enforceable by the county government under the devolved ministry of health. Public health officers are employees under the ministry of health who are authorized to carry out inspection in any food premises; whereby food “premises” include a street, open space, place of public resort, vehicle or any vessel utilized for the preparation, preservation, packaging, storage, or conveyance of food. They have the power to seize, detain, destroy, or dispose of food deemed to be injurious to public health.

Some sections of the Public Health Act cap 242 are enforced by the county government as well. The law states that it is the duty of local government to maintain cleanliness and sanitation in their jurisdiction at all time, and to remedy such situations when out of order. The county governments are therefore mandated to ensure the cleanliness of their jurisdictions by provision of clean water, sewer systems, drainages, waste removal, proper land planning and control of congestion. In addition, ensure that citizens comply to set standards and regulations.

Compliance to cap 254 and cap 242 are demonstrated through issuance of certificates, licenses, and permits. FBOs are required to meet the requirements stipulated in the law and apply for a certificate. Inspection of their business premises and facilities is first carried out and upon satisfactory compliance a certificate is issued. Food handlers are also required to have valid medical certificates as a prerequisite requirement. The health inspectors have authority to collect food samples to be subjected to compliance analysis. They also have powers to seize, detain, destroy or dispose of food deemed unsafe for human consumption.

The Crop Act No. 16 of 2013 is enforced by the directorate of crop under the Food and Agricultural Authority (AFA). The officers of AFA have the authority to inspect food crops at the farm level through postharvest handling, transportation, and delivery to the markets. They have authority to collect samples and subject them for analysis to determine the safety and

quality of the produce. They have the power to seize, detain, dispose of, or destroy any crop produce deemed unfit for human consumption. Compliance to AFA Act is demonstrated through issuance license to applicants who have qualified.

Since devolution into county governments, enforcement of laws is relegated to the county governments. ‘The Nairobi City County Inspectorate Service Act 2017’ gave rise to the Nairobi city inspectorate service, an arm mandated to carry out various inspections to check compliance to city standards and bylaws. Under this act, inspectorate officers (popularly known as ‘*city askaris*’) are appointed into various units and posts to check compliance to standards and bylaws. One such unit ensures that markets are regulated; levies, fees, permits and licenses are paid for, and that there is order. The ‘*city askaris*’ have the powers to arrest offenders and hand them over to the national police unit. The public health officers therefore work closely with ‘*city askaris*’ for whenever their services are needed.

4.3.3 Regulatory activities in informal food markets in Nairobi, Kenya

Public health department which is the main regulator of informal food markets issue licenses and permits to food traders who are complying to the required law and regulations. The traders are required to make application for the respective licenses, the public health inspector then inspects the proposed premises of operation for compliance and issues a license. A permit is a short-lived allowance to carry out a short operation for example transport a consignment. Public health department also require food handlers to undergo regular medical check-ups every six months and carry a certificate of clean health.

Market levies are collected from traders as a revenue to the county government, they are collected on daily basis, monthly or annually depending on the type of business. For instance, designated markets operators are required to pay annual trade licenses for their stalls, while open

market traders pay daily levies or monthly fees to display and sell their produce. Sometime the county government may waiver levies and fees as desired.

On average, a food business operator in the informal food market is required pay for a business license/levy/permit to the county government, in addition to public health license and a medical health certificate to the public health department.

4.3.4 Challenges faced by regulatory framework in informal food markets in Nairobi, Kenya

4.3.4.1 Challenges with licensing of informal food markets in Nairobi, Kenya

The study revealed that only a small proportion of business owners in the informal food markets had proper licenses and certification. It also came out that most entrants into the business had no prior knowledge of any licensing required to run the business.

Less than half (45.5%) of the food business operators in the fresh food market operated licensed businesses. The licensing body in these markets was only the county government with an annual renewal. Regression analysis was performed to test the predictive ability of socio-demographic characteristics on the likelihood of one obtaining a license. The results showed that the male gender, residence in Korogocho, salaried employment and duration in the fresh food business were significant ($p < 0.05$) predictors of the likelihood of one not obtaining a license with an R^2 of 0.22 (Table 4.9).

Table 4. 9: Distribution of operation of unlicensed businesses by socio-demographic in informal food market in Nairobi, Kenya

Socio-demographic characteristics	Odds ratio	
Gender	Male	2.451*
	Female ^R	
Residence	Umoja	1.501
	Dandora	1.441
	Korogocho	3.115*
	Kariobangi North ^R	
Marital status	Married	0.846
	Divorced	0.876
	separated	3.422
	Single ^R	
Level of education	primary	1.554
	secondary	0.807
	University and other tertiary institutions	0.435
	None ^R	
Other sources of livelihood	Salaried employment	0.364*
	Rentals	2.306
	Farming	0.713
	None ^R	0.364
Religion	Christian	0.000
	Muslim	0.000
	Traditionist ^R	
Duration in the fresh food business (years)	0.915*	
Income (KES)	1.000	
Customer base	1.006	

*The dependent variable is operation of unlicensed business, ^R Reference category, *significant at $p < 0.05$.*

Adherence to the set timelines for license renewal was slightly over half (51.4%). The overall view of the fresh food market business operators about licensing was that they are expensive with six in every ten (61.2%) holding this view. Only 21.1% of these operators held the positive view of licensing legitimizing business whereas 15.6% were unaware of anything on licensing. The regulation of these markets was largely (71.8%) implemented by the traders themselves with the only 28.8% of the traders citing the County government as the major regulator. About six in every ten (61.4%) of the traders were aware of some of the regulation governing the fresh food market. Almost an equal proportion (57.0) of the food business operators was aware of regulations on worker hygiene. Majority (57.2%) of the food business operators pointed out that the government had no regular inspection services of these markets. Over half (54.5%) of the food business operators were in markets on self-regulation.

Our study showed that markets were unique in the way they operated. Some like Umoja and Kariobangi were managed by the county government of Nairobi. Each trader in Umoja market paid levies and rent for their stalls to the county government. In Korogocho, the *Korogocho Market Traders Association*, a vendors' association for the market traders, paid for annual license for the traders and in turn collected contributions from their members for the same. In Dandora, the traders lacked mechanisms to honor levy obligations as the market was largely unregulated.

4.3.4.2 Perception of the food business operators on licensing in informal food markets in Nairobi, Kenya

The perception of the food business operators on licensing is as summarized in **Table 4.10**. Over half of the fresh food business operators (51.8%) received no prior emancipation on licensing before starting the business.

Table 4. 10: Perception of food business operators on licensing in informal food markets in Nairobi, Kenya

Perception of the food business operators	Proportion of the respondents (%)	
	Yes	No
Prior emancipation of traders licensing process	48.2	51.8
Has adequate knowledge on licensing	43.7	56.3
Costs of licensing are affordable	32.8	67.1

Association tests using chi-square tests showed that those who had prior emancipation on licensing were 1.3 times more likely to obtain licenses than those who did not ($p=0.019$) (**Table 4.11**).

Table 4. 11: Association between emancipation on licensing and likelihood of obtaining the license in informal food markets in Nairobi, Kenya

Emancipation on licensing	Operation of a licensed business		P-value (χ^2 , df)
	Yes	No	
Yes	53.3	39.3	0.019
No	46.7	60.7	(5.5, 1)

The results also showed that more than half (56.0%) felt deficient in their knowledge on food safety regulation in these markets. Two thirds (67.1%) of these traders believed that licensing was too expensive for them to afford. Majority (55.0%) of these traders also believed licensing had no benefits to them. The ease of obtaining license was rated poorly by almost five out of every ten (48.3%) traders shown in **Figure 4.4**.

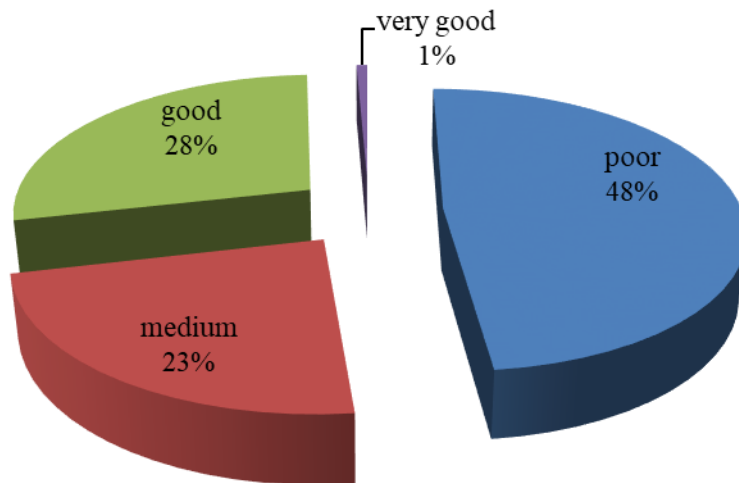


Figure 4.4: Trader perception on the ease of licensing process in informal food markets in Nairobi, Kenya

Respondents in focus group discussions had some knowledge on the requirement by authorities to obtain proper trade license but lacked adequate information on the right procedures. Only less than half of the traders interviewed had an idea of how to obtain a public health license through the right channels. Some mentioned that they had licenses which they paid for on daily basis to county government officials, which portrayed a misunderstanding of the different licenses required. However, they mentioned that the officers who used to collect the amounts for the daily licenses had stopped collections pursuant to a directive from the Nairobi county government to waive all levies for small scale informal traders.

“We pay twenty shillings daily but nowadays they don’t come”. (Fruit seller, Dandora Market FDG)

The traders from all the sample groups in Kariobangi, Korogocho, Umoja and Dandora cited long and cumbersome procedures as the main reason why they did not obtain the relevant food handling license. They mentioned that the procedures were tedious and full of bureaucracy. In

the end, they chose to accrue possible fines as opposed to the merits of obtaining these licenses and undergoing the long procedure.

‘I would like to take the license, but they need to have a clear procedure for its application not a long one and extended duration before it is issued’

4.3.4.3 Adherence to hygiene and sanitation requirements in informal food market in Nairobi, Kenya

The highest level of adherence to hygiene and sanitation requirements were witnessed in the design of the vending place in designated markets with the challenge only noted in the design of storage facilities where the adherence level was 64% as shown in **Table 4.12**. Over half (>50%) of the fresh food business operators worked in informal food markets where there were proper sanitary facilities, proper food handling practices and good personal hygiene of the business operators. Environmental hygiene posed the greatest challenge to food safety as the environment was littered with waste (73.2%) and infested with pests (55.0%).

Table 4.12: Adherence to hygiene and sanitation requirements in informal food markets in Nairobi, Kenya

Hygiene and sanitation requirements	Level of adherence (%)	
	Yes	No
Design of vending facility		
Sheltered vending place	87.3	12.7
Proper product display facilities	78.0	22.0
Clean display facilities	92.0	8.0
Proper storage facilities	64.0	36.0
Environmental hygiene and sanitation		
Pest-free environment	45.0	55.0
Clean environment such as without waste	26.8	73.2
Sanitary facilities		
Availability of sanitary facilities such as toilets	78.4	21.6
Clean sanitary facilities	63.0	37.0
Availability of clean water	95.2	4.8
Waste management and disposal		
Availability of proper waste disposal facilities	75.5	24.5
Food handling and preparation		
Operator packages sold products	63.7	36.3
Hygienic handling of food is observed	61.5	38.5
Personal hygiene		
Proper clothing for food handling	70.2	29.8
Clean clothing	86.4	13.6

4.3.4.4 Association between operation of licensed businesses and adherence to hygiene and sanitation requirements in informal food markets in Nairobi, Kenya

Tests for associations showed (**Table 4.13**) that food business operators in the informal food markets running licensed business were 1.7 times more likely to operate in an environment infested with pests; 1.4 times more likely to operate in an unclean trading environment; twice

more likely to have access to clean sanitary facilities; twice more likely to handle the product hygienically; thrice more likely to have appropriate food handling clothing; 1.6 times more likely to have inappropriate food display places; thrice more likely to have access clean water for washing of products ($p < 0.05$).

Table 4.13: Association between operation of licensed businesses and adherence to hygiene and sanitation requirements in informal food markets in Nairobi, Kenya

Adherence to Hygiene and sanitation	Proportion operating a licensed business (%)		P-value (χ^2 , df)
	Yes	No	
Business environment free of pests			
Yes	44.9	67.4	0.000
No	55.1	32.6	(13.7, 1)
Odds ratio (Yes/No)	0.7	1.7	
Clean vending place			
Yes	72.7	83.9	0.021
No	27.3	16.1	(5.2, 1)
Odds ratio (Yes/No)	0.7	1.4	
Availability of sanitary facilities			
Yes	89.4	68.7	0.000
No	10.6	31.3	(17.7, 1)
Odds ratio (Yes/No)	2.3	0.6	
Availability of clean sanitary facilities			
Yes	76.5	51.3	0.000
No	23.5	48.7	(19.5, 1)
Odds ratio (Yes/No)	1.9	0.6	
Hygienic handling of food product			
Yes	76.6	49.0	0.000
No	23.4	51.0	(22.0, 1)
Odds ratio (Yes/No)	2.1	0.6	

Food business operator has appropriate clothing for food handling			
Yes	87.9	55.8	0.000
No	12.1	44.2	(35.4, 1)
Odds ratio (Yes/No)	3.0	0.5	
Proper display facilities for products			
Yes	69.5	85.3	0.001
No	30.5	14.7	(10.2, 1)
Odds ratio (Yes/No)	0.6	1.6	
Use of clean washing water in products			
Yes	98.5	92.3	0.015
No	1.5	7.7	(5.9, 1)
Odds ratio (Yes/No)	3.3	0.6	

Some traders in focus group discussions felt that it was the responsibility of the County Government to ensure the markets were clean while others felt that it ought to be a joint responsibility of the County and National Governments to ensure cleanliness of the markets.

The county government was mentioned as having put the right hygiene measures to ensure that the traders had a clean working environment. Traders from Kariobangi said their market was cleaner than before:

‘county government has tried to maintain the cleanliness of the marketplaces including roads leading to those stalls unlike before’ – Vegetable seller, Kariobangi market FGD.

The Ministry of Health was mentioned as the agency with more repute in as far as ensuring and improving the safety of food as well as protecting the markets. However, the traders added that they had not seen any government officers for a while as one trader from Korogocho explained:

‘The Ministry of Health even though they don’t do daily patrols usually come to check if we are all clean and if we have already obtained the permits. They even encourage those who haven’t

done so to apply for the permits as soon as they can' – Vegetable seller, Korogocho market FGD.

4.3.4.5 Rapid proliferation of non-designated food markets in Nairobi, Kenya

One major distinction between designated and non-designated markets was business hours. Designated markets such as Kariobangi and Umoja had strict guidelines on where and when to operate. Each trader had a formal stall and business hours were restricted. Traders were required to open their stalls at 0700hrs and close at 1800hrs. Their counterparts in the non-designated markets such as Korogocho and Dandora had no formal allocation of stalls and were free to extend their business hours till much later in the evening. Food traders opted for the non-designated markets in order to reach more customers without being harassed by officials. The trader could display their produce at a place and time where they felt they could reach more customers.

The cost of running a stall in a designated market was higher than the cost of operating non-designated market. A stall required one to buy or lease from the county government or from people who already bought the stall, there was the requirement of trade license renewed annually. In addition, one required to pay for water and electricity. On the other hand, in the non-designated markets, the county government allowed a single day permit, and at some point, fees and levies were waived, so it was totally free to display and sell produce. This gave a majority an easy entry into the informal food trading, 72% of traders were operating from non-designated markets.

Controlling the quality of produce sold in the markets was also a big challenge especially when some traders only procure single day permits during market days when they arrived with their produce. This meant that checking their products before they were sold was impossible. There was therefore the possibility of poor-quality products in the market.

Maintaining law and order was another challenge in proliferated markets. KII respondents in the study complained that the lack of a proper police force makes it difficult for them to maintain order in their markets as well as compliance to agreed rules and regulations. They were usually left to rely on the goodwill of the traders or sheer anger of other traders in the market. Two of the respondents said they conducted a weekly inspection of the fresh food markets on the grounds of eradicating defective products and only one involved law enforcers in the inspection. The Key Informant from Dandora area IV Market association stated:

'We don't regulate informal food markets we just ensure the entire market is clean regardless of what is sold in each part' – Dandora area IV market Association Secretary, KII)

4.3.4.6 Other Challenges of regulating the informal food markets in Nairobi, Kenya

The respondents felt that the multi-agency approach to market regulation posed various challenges due to their lack of cooperation or bureaucracy. Government agencies mandated to perform some tasks in aide of smooth running of the markets such as garbage collection services and provision of water at times failed on their duties and responded negatively when queried. There were also delays in issuing of licenses and sometimes market approvals.

Two of the respondents were not aware of any guidance given to the farmers by the markets. So, the regulation of the interface between the supplier and traders in terms of produce quality, packaging and transportation of produce was not clear.

4.4 The opportunities for enhancement of informal food markets through effective management and regulation in informal food markets in Nairobi, Kenya

This sub-section addressed research question four on the opportunities that exist for possible interventions to enhance operations, behavior and regulation of informal food markets in maintaining food safety and quality. These were found to be Informal food traders' formal group

organization (section 4.4.1), Willing Participation by food business operators (4.4.2), and Respondents future prospects and their recommendations (4.4.3).

4.4.1 Informal food traders' formal group organization in informal food markets in Nairobi, Kenya

There was clear evidence of market organization from this study. Over half of the informal foods traders involved in this study said they belonged to at least one group (*chama*) or a formal organization within their market that helped with pooling funds to support each other.

The main reason for joining a group was stated as a means of raising capital to support their businesses by most of the traders. One trader from Kariobangi stated:

'I belong to a chama with only six people and the one being given the money is supposed to use it to boost the business'- Vegetable seller, Kariobangi market FGD

The groups also provided welfare funds for their individual members which was another incentive for members joining these groups.

It is important to note that improving the performance of the food market for these traders was not a top priority of the *chamas*, as was the reasons stated above of raising capital for the individual businesses. The only evidence we found of a group making deliberate efforts of enforcing rules to resolve market issues was a section of maize roasters whose membership ensured strict adherence to price and competition. None of the *chamas* or organizations had a focus on food safety or ensuring the products were safe for human consumption.

Besides income and welfare of their members, the other priority for these groups was setting 'market' boundaries and preventing unfair competition brought about by traders who were unregistered to trade in the market.

The composition of these groups in terms of income levels and gender was mixed. The only exception was a single women's welfare group in Korogocho that provided table banking to members. The membership of this group was also open to non-traders provided they were women.

Discussions from the FGDs showed that informal food traders lacked knowledge of the status of their market associations and were unaware of the rules if any, for membership to these groups. Traders in Umoja market in one of the discussions disclosed that they lacked deliberate unity needed to push for the interests of their small businesses. These same sentiments were echoed by another set in Korogocho who said that there was unwillingness to draft and enforce rules that would improve food safety procedures and practices. One trader from Korogocho market stated:

'There has never been anyone who has ever come up with this idea. People just pretend to be very busy in their homes until they have no time for all these'- Vegetable seller, Korogoch market FGD

Nonetheless, despite this lack of clear goals towards a more formal engagement, these traders said that it was especially important for them to belong to a group.

4.4.2 Willing Participation by food business operators in informal food markets in Nairobi, Kenya

This study exposed gaps in waste management in the markets. Essentially, the law required county governments to provide waste management services to markets. However, due to inefficiencies in garbage collection by the authorities, different markets had devised ways of managing their waste to either complement or completely replace county waste collection.

In the designated markets such as Umoja and Kariobangi, garbage collection was done by the county government of Nairobi or their hired contractors. In the non-designated markets of

Dandora and Kariobangi, garbage was collected by contractors hired by the traders' association. In Dandora market however, garbage collection was a challenge given that the traders lacked an efficient traders' association. The county government waste collectors were also absent. As a result the market was littered and smelly.

4.4.3 Respondents' future prospects and recommendations for informal food markets in Nairobi, Kenya

The respondents had different views regarding their future. Majority spoke of expanding to bigger premises and relocating to better planned markets like the Nairobi central business district (CBD), as a trader from Umoja puts it:

'I would love to have a permanent structure where I can work so that I don't have to deal with the rain and dust during rainy and sunny days' – Fruit seller, Umoja market FGD.

Maintaining cleanliness remained a top agenda as future plans were being laid, a food vendor from Dandora reported:

'I would maintain cleanliness. And cook just a little amount that I am sure will not remain to avoid wastage and losses' – Ready-to-eat food seller, Dandora market FGD

Top of the list also as the vendors investigated the future was the storage and cold storage facilities. A trader from Kariobangi reiterated:

"I would buy a refrigerator to improve on my storage to help me preserve milk and meat."- Fresh meat and milk seller, Kariobangi market, FGD.

Into the future, FBOs in the markets were also looking into acquiring proper legislation such as public health permits and licenses. This would also serve to avoid parting with bribes and playing cat and mouse games with health inspectors.

'I would first obtain the Health permit letter, clean and store my utensils well ...' – Food kiosk operator, Korogocho market FGD

Other issues included getting more capital and ensuring a clean environment. There were two traders who were comfortable with the way things were and said they would change nothing.

The respondents gave several suggestions. Most of traders suggested the formation of an organization within their markets to provide for self-regulation. They also suggested a stronger partnership and an improved relationship with the county government to improve the conditions in these markets. The traders also called on both the national and county government as well as other partners to provide storage facilities that would help in reducing waste, improve hygiene and quality of the fresh produce.

In order to improve security, the respondents asked for the relevant authorities to install flood lights along major corridors and increase security officers. They also desired to have improved structures within the market.

Other recommendations by FBOs for improvement of work environment were as follows.

- 1. The Government to assist traders financially by giving them loans to help grow businesses.*
- 2. The Ministry of Health to lower the fee for health permits and make it easier for people from slums to obtain them as well as issue health permits without favoritism*
- 3. County government to improve security and in the food markets*
- 4. County government to renovate the market structures and provide requisite facilities like running water, lighting, clean washrooms*
- 5. Call for unity of traders to implement structures for uniform pricing for similar goods across all markets*

6. *The county government to provide cleaning services for markets, sewage lines along with roads, improve waste removal and maintenance of hygiene in the markets*
7. *Increase inspections by public health inspectors*

5 CHAPTER FIVE: DISCUSSION

5.1 Socio-demographic characteristic of food business operators and their influence on their behavior, perception and practices

The informal food markets were largely dominated by women as per this study with the average age of all vendors being 36.78 ± 10.18 years. This points to the involvement of both the young and the old in the informal market of fresh produce. The dominance of women in the sector was also marked with prioritization of the informal food vending as the main economic activity. Studies across various cities in the Western Africa, reported that informal trading businesses were majorly owned and run by women (Skinner, Caroline and Haysom, 2017). Another study that covered Rwanda, Senegal and South Africa reported that 74% of the food business operators were women (Mohlakoana et al., 2019). This study also established the major reason for the involvement of both the female and the male business operators was to earn a livelihood. Additionally, the market offered a ready venture and required less capital to venture in. Similar studies in Kenya that focused on the dairy value chain reported that the low capital and ease of entry into the sector encouraged the participation of most of the operators in these markets (Alonso et al., 2018). This has been shown to promote involvement of mainly the poor who view the venture as income generating opportunity to overcome the unemployment menace in the developing countries (Mohlakoana et al., 2019). Nuhu and Abdullahi (2018) established that informal business operators in Nigeria had more than double higher chances than other households to escape the poverty traps. This can be corroborated by the fast cash flow in the informal markets. The involvement in informal markets in the study area was also increased by the fact that the food sold by these business operators could still serve as meals in their households. Additionally, others earned good revenues from the enterprises and were able to

finance the education of their children. It has been established that the more an individual works to provide food to the households, the higher the chances of poverty reduction (Nuhu and Abdullahi, 2018). The business owners were the major participants in the day to day running of the business.

The daily customer base of the fresh food markets averaged at 39.59 ± 23.73 persons per day. Battersby et al. (2016) established that up to 55% of the households in low income areas had a weekly or more intakes of foods from the informal markets. The large customer base of these business operators is explained by the diverse foods offered and the changing patterns that includes those who prepare meals at different times of the day (Ahmed et al., 2015). The popularity of these ventures has been attributed to the convenience and affordability of their food (Petersen and Charman, 2018). Marumo and Mabuza (2018) in his study in the urban areas of South Africa reported that convenience and the opportunities to bargain in the informal food markets increased the chances of participation of the households. Additionally, higher dependency ratio in these households was found to increase their intake of foods from the informal markets giving credence to the assertion that foods in these sectors are affordable. In his study in South Africa, Skinner et al. (2017) reported that increasing poverty index was associated with increasing level of utilization of food from the informal markets.

In as much as the consumers are aware of the food safety risks the consumption of these produce may pose, affordability of the produce overrides their perception and precautionary actions. A comparative study done across various urban centers in Kenya reported that milk vended in the informal markets were 20-50% cheaper than that in the formal market; thus, the high preference among the urban dwellers (Omore et al., 2004). This preference is across various developing countries and for different food value chains. For instance, it has been established that the informal marketing of the dairy milk in Kenya, Uganda and Tanzania accounts for 80, 90 and 98%, respectively, of the total marketed quantities (Jabbar and Grace, 2012, Ahmed et al. 2015)

5.2 Problems and challenges in informal food market in Nairobi, Kenya

5.2.1 Market infrastructure in informal food markets in Nairobi, Kenya

Access to safe and nutritious food is a crucial element in food security (Sigrid et al., 2015) and informal food markets play an incredibly significant role in the last mile conveyance of food, and household economy in developing countries. Up to 85% of fresh food is conveyed through informal food markets. The food markets in Nairobi have outgrown provided facilities and have sprawled into non-designated market areas out of convenience, up to 72% of traders in our study operated in non-designated areas. However, the areas lacked requisite infrastructures and sanitary facilities, and were sometimes located in high risk areas. Korogocho and Dandora markets for example expanded in to riparian land on riverbanks and on top of city sewer lines. The ground in the markets is bare soil where vendors have to display their produce. Vagaries of weather like rain, hot sun, wind and even dust are constantly disrupting trade and causing product contamination. The markets infrastructure such as running water, roads, lighting (Warren, 2016) hygiene facilities are some of the improvements the markets could benefit from.

5.2.2 Hygiene and sanitation in informal food markets in Nairobi, Kenya

The study found that hygienic and proper handling of food, cooking food enough for the day, stocking fresh and good quality produce and cold storage of remaining food were some of the measures put in place by the business operators to ensure food safety. Similar findings were reported by Ahmed et al. (2015) who studies the informal markets in the informal settlements of Nairobi, Kenya. The traders purchased only stock of food that they could clear or ensure appropriate storage of the remains to avoid losses due to food spoilage. In as much as hygiene was observed by the operators, gaps existed in the storage of the foods as it was not prioritized. The low capital investment by the business operators in the informal markets, limited their

access to proper storage infrastructure that would otherwise prevent food spoilage cases (Ahmed et al., 2015).

The regulators also viewed that the food in the markets were safe for they had a fast turnover. This may not be necessarily true for there are safety parameters such as aflatoxin in milk that are not reliant on storage practices (Ahlberg et al., 2019). A study done by Lindahl et al. (2018) found that the contamination of the raw milk in the informal market was as high as 250 mg/kg which is way above the set regulatory limit. It is therefore necessary that additional controls are instituted to address such emerging food safety challenges. Much attention has been paid to the role played by informal food markets in spread of foodborne illnesses, but little attention to the role played in support of livelihoods and nutrition (Tezira, 2015).

Garbage collection and cleaning of the market was done by the market associations. County garbage collection services were reported as inefficient. The study also found inadequacies where the maintenance of the sewerage system was reported as wanting, and there were rampant cases of sewer bursts. Such practices jeopardize food safety standard in the market (Vipham et al., 2018). With such instances of inefficiency, the value for money invested by food business operators in compliance with regulations was not realized. This acted to discourage efforts by the business operators to obtain licenses. The study also found that there were market strategies for cleaning, and no instances of market closure due to hygiene had been reported by the regulators. Market closures like the case of Bodija market in Nigeria for animal produce were usually effected as a corrective measure for deteriorated hygiene standards that posed risk to the market (Grace et al., 2019). In this latter case (Bodija), the technique failed, and the quality of meat deteriorated.

5.2.3 Food Handling practices in informal food markets in Nairobi, Kenya

The study found that freshness of the products, product appearance and taste and smell were the major quality checks on products by the business operators. Ayodele and Panama (2016) proved that food quality was among the predictors that influenced the sourcing of food from informal markets in Nigeria. Ahmed et al. (2015) reported that even with such observation of quality through organoleptic characteristics, the food business operators would still intentionally sell spoiled products to some of the unsuspecting customers to avoid losses. Other quality parameters demanded by consumers included packaged produce, produce washed in clean water and no signs of spoilage. Women were keener on quality checks than the men. In a systematic review of literature, Delia (2015) established that women had more prominent roles as risk managers in the preparation, processing, production, selling and consumption of food in the informal food markets of low and informal middle-income countries. In instituting food safety controls in the informal food market, it would be necessary to add gender aspects that will address the most involved segment of the population, the women.

5.2.4 Perceptions of food hazards and their mitigation in informal food markets in Nairobi, Kenya

Over half of the vendors in study area supposed that the environment did not pose any risk of contamination to their produce. Prevalent food safety risks in these markets included raw sewer bursts, garbage pile ups, flying insects, personnel hygiene and dust. This is contrary to what has been scientifically established in Zimbabwe where infestation of the environment with flies was associated with contamination of the fish with *Escherichia coli* in the informal food market (Songe et al., 2017). The perception among these business operators of low risk posed by environmental factors must have been influenced by inability to link customer complaints with the environmental pollution. The study revealed that there was low understanding of food safety and its effects in general. The fact that the customers kept coming back to the same environment

also implied that everything was all right. Appropriate infrastructure has been shown to improve the safety of food especially with improved sanitation and hygiene (Warren, 2016).

5.2.5 Consumer behavior in informal food markets in Nairobi, Kenya

The study also established that there were instances of customer complaints in over half of the business with those serving more customers receiving the most complaints. Such a scenario implies that the risks of food-borne illnesses are high due to the large number of individuals that are exposed. However, the complaints did not influence much change in the consumer behavior in terms of change of vendors. This is corroborated by consumer loyalty and perception that the vendors they purchase from use quality ingredients in the preparation of their foods (Agarwal and Guirat, 2017; Rajagopal, 2009). Such level of consumer loyalty has been reflected in a study by Marumo and Mabuza (2018) in South Africa as about two in every ten households indicated that they will not change the buying place even in the face of food scare. Another study in Burkina Faso established that even with consideration of quality, majority of the urban dwellers would prefer the informal markets for safe foods (Shafiwu et al., 2018). It is only in the informal settlements that there were recorded higher instances of changing of food business operator's resultant from consumer complaints. The informal settlements are known to host the largest pool of these food business operators due to the low socio-economic condition (Ahmed et al., 2015); this provides the consumer with lots of choices on where to buy from.

Delia (2015) advocates for consumer awareness as an effective strategy of improving the food safety scenario in the informal markets of the middle- and low-income countries. The willingness of the consumers to pay higher for safety is a gesture that cannot be ignored as the institution of food safety controls have detrimental impacts on food availability, for instance pasteurized milk was noted to be double the price that of raw milk (Grace, 2017). Considering that these informal

markets serve the urban poor, increase in pricing would have detrimental effect on availability of the food (Marumo and Mabuza, 2018).

5.2.6 Other challenges in informal food markets in Nairobi, Kenya

There was myriad of other challenges faced by the operators that included fluctuating prices by suppliers, supply of low quality produces, unfair competition, failure to pay by customers, losses resulting from food remains, burglary, poor lighting and expensive rental places. Unscrupulous businessmen also invade the markets thus promoting unfair and risky business practices. The challenges encountered in the informal markets are known to be product specific. Alonso et al. (2018) reported that within the informal markets of the dairy value chain, microbial spoilage and safety of the produce were the most prevalent challenges. The economic challenges cited by these food business operators further limit their ability to obtain business licenses.

A study in the informal markets in Nairobi reported that the dissatisfaction of the operators with the business environment they were operating in was prevalent, however, financial constraints made it quite difficult for them to move to better areas (Acepis, 2018). Lack of appropriate infrastructure and capacity in the informal market sectors limit value addition of the produce thereby limiting profitability of these ventures. This is because the vendors would majorly sell the produce raw or with limited processing. This is caused by the low capital investment among these operators thus less capacity to add value to products. Customer satisfaction and quick returns from the business were the additional benefits found derived from operating a fresh food business. The generated benefit of customer satisfaction promotes creation of loyal clientele by the food business operators.

5.3 Legislation, regulations, and challenges of their enforcement in informal food markets in Nairobi, Kenya

5.3.1 Licensing as a tool for regulating informal food markets

The study found that less than half of the food operators had no prior information on licensing before joining the business. This, to a large extent, defined the informal sector of the food marketing. Majority of those involved in the informal markets are from the low socio-economic classes and opt for it due to low costs and capital involved in starting a business. Apaassongo et al. (2016) established that licensing was not a priority among the food business operators in Kumasi, Ghana. In his study, he also established that mandatory requirements for licensing would be the least effective way of promoting compliance and regulation of the sector. In their view Roesel and Grace (2014) advocated for business operator training and capacity building as one of the effective strategies towards improving safety of animal origin fresh foods in the informal markets. The low licensing of the fresh food business was also as a result of the perception among the operators that the process is complicated. Prior emancipation on licensing increased the chances of one being licensed. Over half of the operators had no prior emancipation on licensing thus contributing to the low levels of compliance to regulatory requirements. The findings in this study disagrees with those reported by Apaassongo (2016) who found that prior information of licensing and regulation was found to be of no consequence to licensing in the same setting. The perception of the operators on licensing was also poor where immoral practices such as bribery were found to be enough to acquire a license.

The study found that male gender, residence, salaried employment and duration in the fresh food business were predictors of non-compliance with licensing requirements. Non-compliance with the set licensing and regulatory mechanisms has generally made instituting food safety control in the informal sector exceedingly difficult (Vipham et al., 2018). The criteria for full licensing in

the informal food market included obtaining a business and food hygiene certificates. Timely license renewal was also not properly effected with about half of those licensed not meeting this criteria. The cost implications that come with the regular renewal of the licenses were deterrent factors for most food business operators. In a similar qualitative survey study, Alonso et al. (2018) established that most of the food business operators perceived that the cost of running licensed business was too high and thereby did not engage in it. Additionally, actors in the informal food markets are used to less effective safety and health checks thus do not pay much regard to compliance with the regulations (Delia, 2015).

5.3.2 Regulatory agencies in informal food markets in Nairobi, Kenya

The traders reported that Ministry of Health and County Government were the key stakeholders that regulated the informal food markets. The Ministry and County Government were involved in market inspection and cleaning of the markets, respectively. The food safety regulatory mechanism in Kenya has usually been blamed for overlapping of function of different regulatory bodies (Oloo, 2010) and lack of collaboration among the different regulators in the food value chain. This overlap of regulatory functions ends up forcing food business operators to undergo several licensing procedures that are not only costly but also frustrating and eventually promoting unlicensed trading (Alonso et al., 2018). The interfaces between market supplier and market trader value chain actors was not coordinated for assurance of food safety and traceability. While AFA required the bulker/wholesalers to be licensed and further carried out inspections along transportation, the market inspectors had no way of verifying that the market suppliers were licensed and that their produce was certified as safe.

Self-regulation was also a key feature in these markets where the chairman of a market association promoted the interest of the business operators. Licensing did not automatically improve food safety conditions as licensed business operators had higher chances of operating in

unclean trading environment and use inappropriate food display facilities. Furthermore, food safety aspects such as bacterial contamination and pesticide residual levels cannot be discerned by the organoleptic checks on food. Environmental hygiene and food handling equipment like the display mat were risk factors of contamination of food. Thereby, there needs to be additional food safety controls to ensure that the food sold in these informal markets are safe (Delia, 2015).

The aspects of self-regulation did not focus on worker hygiene which has the impact of improving hygienic handling of the food in the market. Actions in place by the regulatory agencies included market inspection and fee charged to join market organizations. These have limited impact in improving food safety standards if any. In a similar study in Malawi, it was reported that the neglect of the informal food markets while instituting food safety programs significantly contributed to the burden of food borne illnesses (Morse et al., 2018). Additionally, Alonso et al. (2018) food business operators in Kenya of milk perceive that licensing of their businesses would expose them to frequent inspections, thus increasing their chances of being penalized for any non-compliance of the set regulations.

5.3.3 Food safety awareness in informal food markets in Nairobi, Kenya

The study revealed 60.7% of the FBOs had simply basic education, and devoid of any other awareness training, food safety remained an elusive concept. The study revealed that 77.4% had no cognizance of food safety. In addition, these vendors had poor access to proper sanitary conditions, clean water, hand wash basins, clean toilets, and even clean clothing both in the marketplace and in their households. Capacity building and training of food business operators in the informal markets are some of the essential accompanying measures of licensing and regulation that can improve food safety in these markets (Grace, 2017).

5.3.4 Proliferation of non-designated informal food markets in Nairobi, Kenya

Urban population explosion outstretched initial city plans and estimated growth in Nairobi. Food markets that could serve the population in the 1990's can no longer suffice. Urban population in Africa has been growing rapidly, from an estimated 203 million in 1990 to 401 million in 2010 (UN Habitat 2014) at a growth rate of 39%, and is expected to reach a growth rate of 50% by 2030s (UN Habitat, 2014). The rapid increase in demand for accessible food and need for proper food markets infrastructure has escaped many a policy maker and has been left out of city plans.

Emergence of informal food markets in non-designated areas started off with a fair share of challenges for lack of prerequisites infrastructure and continues to sprawl. Though the food laws and regulations exist, it is not practicable to enforce them, and it is even harder to shut down the markets as this would jeopardize food security for the city dwellers. The local governments can work to reduce conflict between the traders and authorities (Warren, 2016) and foster partnerships to upgrade and enhance trade in informal food markets. Planning for food supply chain in a city is as crucial as planning for any other requirement.

5.4 Opportunities for enhancing informal food markets in Nairobi, Kenya

5.4.1 Self-organization of informal food markets in Nairobi, Kenya

The markets had local operator groups (*Chamas*) whose focus was more to assert their control of the market rather than effect quality control. This is because it has been established that the business operators in these markets are usually of the same socio-economic class (Ahmed et al., 2015; Owuor et al., 2017). A similar organization was found to exist among food business operators in the informal settlement in Nairobi and with the same focus as established in this study of improving the profitability of their venture; there is however less focus on quality enhancement (Owuor et al., 2017). From this study, it was established that the absence of such an organization led poorer operating conditions in the markets. Dandora market where a market

association was lacking reported poor organization for cleaning up the markets, which poses additional risks to the safety of food vended in the market.

The study found that non-restriction of operating hours and urge to satisfy customers as the major drivers for the expansion of the informal food markets and emergence of food businesses in non-designated areas. Ahmed et al. (2015) found that the operating hours of the informal markets in the informal settlements of the urban areas in Kenya were so flexible and are usually to the convenience of the business operator and clients. This lack of standard operating time complicates further the regulation of these markets.

Cooked food was the most sold product in the market. The food included roasted maize, fried fish, 'chapati', boiled eggs, roast pieces of meat, boiled pulses, pastries, fried potato chips, tea and porridge among others. A study done in South Africa established that the food businesses accounted for 54.7% of the enterprises in the informal markets (Petersen and Charman, 2018). Another study done in the informal markets of the informal settlements of Kenya found that green groceries (42%) and cooked food (34%) were the most sold food products by the operators (Ahmed et al., 2015). Considering that there is a rising trend in the preference of ready to eat foods, this has contributed further to the dominance of the food business sectors in the informal markets. This has posed additional concerns of food borne illnesses for the food in the informal markets have been shown to be of compromised safety, however, the consumers disregard of this (Delia, 2015). The supplies of the food business operators were from the merchants with less reliance on supplies from their own farms. This brings quality concerns on the aspects of product traceability as with the limited investment by these operators; less focus is put on traceability systems.

5.4.2 Willing participation of traders in informal food markets in Nairobi, Kenya

The vendors focused on expanding their businesses and improving the infrastructure and quality of their services and products. Similar findings were reported by Knox et al. (2019) who reported that 90% of the necessity driven and survivalist food enterprises had the aspiration to grow when presented with an opportunity. This is contrary to the popular belief held by many researchers that informal food businesses are survivalist with little urge to grow (Berner et al., 2012). Williams (2008) posit that most necessity-driven informal enterprises shift to opportunity-driven, thereby are established and expansion of such enterprises are usually the goal. It has been established with such expansion, higher levels of licensing and compliance with regulatory mechanisms among these enterprises are achieved (Knox et al., 2019). In the current study, the food business operators were of the view that with improved infrastructure, security and market regulation, the quality of their services should be improved. Considering the geographic access these enterprises offer to the customers, they largely contribute to the food and nutrition security especially of the urban poor (Crush and Frayne, 2008). Improvement of the infrastructure in these places will promote hygiene and safe handling of the food and in extension the food and nutrition security situation.

6 CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.1 Conclusions

The study established that

1. The informal food market attracts many small traders because of its promise of quick returns at a small start-up capital. Majority of the food business operators prefer to operate from the non-designated food markets to avoid the high capital investment, restrictions and regulations that go with designated market. The proximity to buyers influenced proliferation of non-designated markets in the densely populated residential areas, and where designated market facilities do not exist.
2. Most of the traders in the informal food markets do not have background education or knowledge to enable them to go into the business and practice safe handling of food. They also do not have prior knowledge of regulatory requirement of food business or the understanding of food safety hazards. The food handling practices in the informal food markets that include accepting produce from any supplier ignorant of the source or quality, washing vegetables with water of uncertain quality, not washing hands regularly and/or effectively, displaying food in polluted environments, among others do compromise food safety.
3. Daily challenges of informal food markets include food spoilage, contamination of fresh produce, damage of produce during transportation and storage, environmental pollution from poor waste removal, lack of essential utilities like water and lighting, lack of personnel hygiene facilities, theft of produce, food poisoning complaints among others. These challenges arise primarily from poor market infrastructure and lack of county government services.

4. There is sufficient law and regulations established to control food value chains both at national and county government levels. However, implementation and enforcement of law and regulations requirements in the informal food markets is impeded by poor market infrastructures and utilities that are a pre-requisite to practice of food hygiene. Other impediments include long and bureaucratic procedures and high cost of obtaining licenses. There is also lack of collaboration among the various regulatory authorities and county governments to assure seamless compliance to standards and regulations from the farm to the market.
5. Opportunities exists for collaboration among the stakeholders to upgrade food control in the informal food markets. The food business operators form groups which can enforce self-regulation and contribute to market facilities and service improvements.

6.2 Recommendations

6.2.1 Short time recommendations (0-3 months)

1. The Ministry of Health should create awareness among food business operators in regard food safety hazards and best practices for food hygiene to preserve food safety, through information, education, communication, and training. Consumer awareness campaigns should also be done to collaborate behavior change among food vendors.
2. The regulating authorities along the food value chain should work out and institute collaborative methods to ensure seamless compliance to food standards and regulations from farm to the markets. Law and regulations should be applied uniformly across all market, whether formal or informal.

6.2.2 Medium term recommendations 6 months – 1 year)

1. The county governments should rehabilitate the existing markets, both designated and non-designated and provide requisite infrastructure, utilities and services required to comply with safe food handling practices.
2. The regulating authorities should provide a clear guideline of how fresh produce ought to be packaged, transported, stored, and preserved to reduce contamination and damage, as well as enable a form of traceability of produce from market back to the farm source. In addition, they should review the licensing procedures to make it easy and affordable for all food business operators to comply with.

6.2.3 Long term recommendations (1 – 3 years)

1. The county governments and city planners should continually develop, improve, and expand market facilities to cope with the demand of food supply for the growing populations taking due considerations of consumer expectations, and conveniences.

6.3 Suggestions for Future Research

1. It is especially important that the discoveries made in this research be not generalized to all markets in the country. Further research can be done with a larger sample size from markets located in different counties throughout Kenya.
2. A similar research could be done on the various processed edible products in the country to check if the required levels of safety are maintained across the various food value chains.

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8. APPENDICES

8.1 APPENDIX 1: RESEARCH CONSENT FORM

FOOD BUSINESS OPERATOR (FBOS)

University of Nairobi

Department of Food Science, Nutrition and Technology

Food Safety and Quality Assurance Program

Lois Ndiba is a student from the University of Nairobi under the MSc. in Food Safety and Quality Assurance program. She is conducting a study on “Food control in the informal food markets. The study is seeking to understand the problems, challenges and the opportunities of improving food safety management in the informal food markets.

The study involves answering of a few questions with the responses you give being filled in a questionnaire regarding your business. The information obtained through this study will strengthen the regulatory framework and food control in the fresh food market with the overall goal of food safety.

The information you will provide is confidential and in as much as a report of the same will be made, no names will be included. There is no way any information will be directly associated with you. I encourage you to participate in the study and your cooperation is highly appreciated.

Please sign below if you accept to be part of the study

Name of Interviewee.....

Signature of interviewee.....

Date.....

Name of Interviewer

In case of any problem,

Contact Lois Ndiba 0722402089

8.2 APPENDIX 2: FOOD BUSINESS OPERATOR (FBOS) QUESTIONNAIRE

Questionnaire Number..... Date.....

Respondent's Details

Name of interviewee.....

Gender: 1-Male[] 2-Female []

County:..... Sub-County:.....

Residence.....

SECTION A: SOCIO-DEMOGRAPHIC AND ECONOMIC INFORMATION

1. Ageyrs

2. Marital Status.

1-Married [] 2-Divorce [] 3-Separated [] 4-Single []

3. Education level.

1-Primary [] 2-Secondary [] 3-University and other tertiary institutions []

4-None [] 4- Others (specify)

4. Religion

1-Christian [] 2-Muslim [] 3-Traditionist [] 4-Any other (specify)

5. Is the dealing in fresh food market your main means of livelihood?

1-Yes [] 2-No []

6. Other sources of livelihood

1-Salaried employment [] 2- Rentals [] 3-Farming []

4-None [] 5-Others (specify)

7. Period as a dealer fresh food market.....yrs

8. What is the average income per day from this enterprise of fresh food market?

Ksh _____

9. What is your approximate customer base?

SECTION B: FOOD HANDLING IN THE INFORMAL MARKETS

10. What fresh foods do you deal in?

1-Fruits [] 2-Vegetables [] 3-Both Fruits and Vegetable []

4- Meats [] 5-Cooked foods [] 6 – Prepared salads [] 7. Any other, specify.....

11. Are you the one who is involved in the daily operations of the business?

1-Yes [] 2-No []

12. How many people have you employed in your business?

13. Do you or any of your employees have any orientation or training in food safety?

1-Yes [] 2-No []

14. Where do you get your fresh foods from?

1-My farm [] 2-Designated farms [] 3-Merchants []

4-Any other [] Specify

15. Are you aware of the agricultural production practices that are involved in the production of the fresh produce you sell?

1-Yes [] 2-No []

16. What measures do you take to protect these products from contamination during handling?

.....

.....

.....

.....

17. When making an order for fresh supplies of your fruits and vegetable supply, how would you rate the following?

Product attribute	1=Not important	2=Somewhat important	3=Important	4=Very important	5=Extremely important
Product grade					
Product price					
Product appearance					
Product					

freshness					
Product smell/taste					
Knowledge of supplier					
Knowledge of source					

18. Has there ever been a food safety incident in the fresh food market you operate in?

1-Yes [] 2-No []

a. What was the response of your customer base?

1-Avoided the product [] 2-Changed traders []

3-No change in behavior []

19. How would you rate customers demand for safe products in the informal food markets?

1-Poor [] 2-Medium [] 3-Good [] 4-Very good []

20. What are the quality demands of most of the consumers on the fresh foods you sell to them? (*You can mark more than one response*)

1-Covered properly [] 2-Washed with clean water [] 3-No signs of spoilage []

4-None

21. Where do you display your products?

1-Concrete [] 2-Soil/ground [] 3-Constructed platforms [] 4-Sacks []

5-Any other specify.....

a. How frequent are they cleaned

1-Daily [] 2- Once a week [] 3- Once a month [] 4- not at all []

22. Where do you store your products awaiting sale tomorrow?

1-Sacks [] 2-Wooden crates 3-Carton boxes 4-Any other specify.....

23. Would you say that any concerns on safety of these products raised nationally would affect your business and the customer base?

1-Yes [] 2-No []

24. Do you ever consume the products you sell?

1-Yes [] 2-No []

a. How often?

1-Daily [] 2-More than once a week [] 3-Weekly [] 4-Never []

25. What other preparatory processes do you do to the fresh produce before sale?

(More than one response can be selected)

1-Washing [] 2-Shredding [] 3-Packaging [] 4-None []

5-Any other, specify.....

26. What do you use for packaging of your products?

1-Plastic bags [] 2-Kraft wrapping [] 3- Newspapers []

4- Any other specify,

a. What is your source of these materials?

.....

27. The environment and activities around this place do you see them as a risk to the safety in this market?

1-Yes [] 2-No []

a. If Yes, Which ones do you find to pose the greatest risk?

.....
.....
.....
.....

b. Which remedies do you suggest to reduce such risk posed by these activities?

.....
.....
.....
.....

SECTION C: HYGIENE OF FRESH FOOD MARKETS

28. How frequent is the cleaning of this market done?

.....

a. Who is responsible for that?

1-County Government [] 2-Contracted firm []

3-Any other, specify.....

b. Do the business operators ever take part in this?

1-Yes [] 2-No []

29. How frequent do you clean your business premise/space?

1-Daily [] 2-Not daily []

30. Are there proper waste collection and disposal services in the market?

1-Yes [] 2-No []

31. How would you rate waste management in this market?

1-Poor [] 2-Medium [] 3-Good [] 4-Very good []

32. Are there toilets accessible to you during your working hours in the markets

1- Yes [] 2. No [] If No proceed to the next question

a. Who is responsible for their maintenance

1-County Government [] 2-Private individual [] 3- other (Specify)

b. How would you rate there cleanliness

1-Very Clean [] 3-Clean [] 4- Dirty [] 4-Very dirty []

33. Do you have access to clean water at the market place?

1-Yes [] 2- No []

34. What is the source of the water

1- County Government [] 2- Water vendors [] 3- I bring my own [] 4 – Other

(specify)

SECTION D: REGULATION OF FRESH FOOD MARKET

35. Have you obtained a business permit or any sort of licensing?

1-Yes [] 2-No []

a. If Yes, Who issues it?

.....
.....

b. How often should the license be renewed as per the regulations?

.....

c. Do you adhere to the timeline?

1-Yes [] 2-No []

If No,

Reason.....

.....
.....
.....

If Yes, why is this important to you as a business operator

.....
.....
.....
.....

36. Are there any set regulations by the government in this market?

1-Yes [] 2-No []

If yes, which ones are they and who implements them?

.....
.....
.....

.....
.....
.....

37. Do you know of any government regulations with regard to fresh foods?

1-Yes [] 2-No []

If Yes, Mention a few

.....
.....
.....

38. Do you know any regulations with regard to worker health and hygiene with regard to fresh foods?

1-Yes [] 2-No []

a. If Yes, how do you observe them?

.....
.....
.....

39. Are there any inspections by any governmental regulatory body that are done to the informal food market that you may or may not be part of?

1-Yes [] 2-No []

a. Please specify

.....

.....
.....
.....

b. How frequent are they?

.....

40. Are there any forms of organizations within this market that are responsible for any sort of self-regulation?

1-Yes [] 2-No []

If Yes, how is it done?

.....
.....
.....

If No, how is the market protected from unscrupulous traders with defective products?

.....
.....
.....

SECTION D E: LICENCING REQUIREMENTS

41. Has there been emancipation of traders in this market with regard to licensing requirements entailed in fresh food markets?

1-Yes [] 2-No []

a. If Yes, who did it?

.....

b. What is your view about it?

.....
.....
.....
.....

42. Would you view yourself as having adequate knowledge with regard to regulation of fresh food markets?

1-Yes [] 2-No []

Reason for you answer

.....
.....
.....

43. Do you think the costs involved in obtaining licensing for fresh food markets are affordable for most business operators in the fresh food markets?

1-Yes [] 2-No []

Reason for your answer

.....
.....
.....

44. What benefits would you relate as precipitating from such licensing?

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.....
.....

45. What opportunities do you think such licensing present to you?

.....
.....
.....

46. What are the possible demerits or disadvantages of such licensing?

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.....
.....

47. Who are the other players you have encountered in the licensing or obtaining business permits for the fresh food markets? (*Only for those with licensed premises*).

.....
.....
.....

a. How would you rate the whole process of licensing?

1-Poor [] 2-Medium [] 3-Good [] 4-Very Good []

b. Reason

.....
.....
.....

THANK YOU FOR PARTICIPATING

8.3 APPENDIX 3: FOOD SAFETY AND HYGIENE CHECK LIST

Vendor's Name: _____

Location: _____

1. Facilities

Is the vending place sheltered? YES [] NO []

Are pests and animals such as flies evident around the stall? YES [] NO []

Is the vending place clean? YES [] NO []

Are there sanitary facilities such as toilet and washing places? YES [] NO []

Are the sanitary facilities clean? YES [] NO []

Are there proper waste disposal facilities? YES [] NO []

If a yes, is it hygienically operated? YES [] NO []

Are there toilets in the market? YES [] NO []

2. Environment around the stall

Is the environment littered with waste and rubbish? YES [] NO []

3. Personal hygiene

Does the vendor have appropriate clothing for vending such as apron? YES [] NO []

Is the clothing of the vendor clean? YES [] NO []

4. Product handling

Does the vendor have proper display facilities for the products? YES [] NO []

Are the display facilities clean? YES [] NO []

Does the operator use clean water in washing the products? YES [] NO []

Does the operator package the sold products properly? YES [] NO []

Does the vendor have proper storage facilities for products? YES [] NO []

THANK YOU FOR PARTICIPATING

8.4 APPENDIX 4: FBOs FOCUS GROUP DISCUSSION QUESTIONNAIRES

Introduction

Lois Wairimu Ndiba is a student from the University of Nairobi under the MSc. in Food safety and Quality Assurance program. She is conducting a study on “Food control in the informal food markets in terms of legislation and regulatory framework in Kenya”. The objective of this study is to evaluate food control in the informal food markets in terms of legislation and regulatory framework in Kenya with the aim of influencing policy geared towards ensuring safety of fresh foods. Feel free to be part of this focus group discussion and share your views freely. Your participation is highly appreciated.

Questions

Food Safety of fresh foods

1. For how long have you been in the informal food market?
2. What was the main reason you chose this form of business and what made it easy for you to be part of the same? (*Probe for any possible assistance to do so from anybody*)
3. Is the market organized in any formal organization with the aim of improving its performance? (*If Yes*) How efficient has this worked? Has this been explored to improve regulation of the market?

(If No) What have been the key constraints? How then do you fend off unscrupulous traders that may spoil the market? Are there plans to do so and how far are they?

4. What are some of the considerations you put to ensure the safety of the produce you sell?
5. What would you consider as some of the greatest constraints to ensuring safety of the products? *(probe facilities and services)*
6. What other challenges do your businesses face?
7. What would you consider to be the advantages and disadvantages of the formal fresh food markets?

Regulation of Informal food markets

8. In case you would wish to obtain licensing, what are some of the procedures involved?
(probe on the difficulties involved and possible opportunities. Explore the possible constraints to taking such opportunities).
9. Considering less regulation of the informal markets, what could be done to improve the safety of the fresh food markets? What are some of the opportunities that currently exist that can be taken advantage of?
10. Which body would you say should be tasked with any possible responsibility of regulation and any possible improvements they can make?
11. Which body or organization do you feel has best served your interest in terms of protecting this market and improving the safety of food? Which body/organization do you feel hasn't performed its role in protecting the integrity of this market?
12. Do you operate your premises in the evening/night or the day? What would you view as the challenges of the premises operated in the evening/night in terms of product quality and safety?

Future plans

13. What are your future plans with regard to providing safe products to your customers?
14. Any other thing you would wish to say that may be of input to the objective of this study that has not been covered by the questions?

THANK YOU FOR PARTICIPATING

8.5 APPENDIX 5: FOCUS GROUP DISCUSSION LIST

Please fill this form for all the members in a FGD group.

No	Name	Age (yrs)	Gender	Occupation	Marital Status	Residence
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

8.6 APPENDIX 6: KEY INFORMANT INTERVIEW QUESTIONNAIRES

Questionnaire Number..... **Date**.....

Respondents' Details

Name

Organization.....

Capacity in the organization.....

Scope of your work:

.....
.....
.....

SECTION A: LICENSING REQUIREMENTS

1. Are all informal food markets and traders therein under you licensed?

1-Yes [] 2-No []

a. If No, proceed to 2.

b. If Yes, what are the requirements?

.....
.....
.....
.....

2. If No, what are the approximate proportions that are licensed?

.....

a. Compare the proportions for the informal and formal fresh food markets.

Informal.....

Formal.....

3. In your organization who plays the crucial role in the licensing of these traders and fresh food markets?

.....
.....
.....

4. Are licensing requirements same for all products or there are differences?

1-Yes [] 2-No []

a. Please mention a few.

.....
.....
.....
.....

5. What are the costs involved for one to obtain the license? (*Quantify in Kenya Shillings*)

.....
.....
.....

6. How many fresh food markets are under your jurisdiction?

.....

7. How would you rate the involvement of the public especially the consumers in ensuring food safety in the informal food market?

1-Poor [] 2-Medium [] 3-Good [] 4-Very good []

a. What is your reason for the above rating?

.....
.....
.....

SECTION B: REGULATORY FRAMEWORK

8. In rating the overall regulatory work of your body, would you see it as efficient?

1-Yes [] 2-No []

Reason.....
.....
.....

9. What would you say are the successes and challenges faced by the body in regulating informal food markets, if you may say a few?

Successes.....
.....
.....

Failures.....
.....
.....

10. Are there any other organizations in this country tasked with regulating this informal food markets and traders other than you?

1-Yes [] 2-No []

a. If Yes, how would you describe the success or failure of this arrangement?

.....
.....
.....

b. What are the challenges you have encountered in this arrangement?

.....
.....
.....

c. Considering that the fresh food market still has massive challenges in terms of food safety, how best can this arrangement be made to work?

.....
.....
.....

11. What measures does your agency have in place to ensure only licensed traders access the market?

.....
.....
.....
.....

a. Which of the above measures have been the most successful and which ones have been the least successful?

Most successful measure

.....
.....

Least successful

.....
.....

12. What challenges have you faced in instituting these measures?

1-Financial [] 2-Inadequate personnel [] 3-Clash of roles among regulatory bodies []

4-Difficulty in regulating informal markets [] 5-Other bodies don't play their role []

6-Any other, Specify.....

13. Do you conduct inspection of these fresh food markets?

1-Yes [] 2-No

a. How often?

1-Daily [] 2-Weekly [] 3-After every two weeks [] 4-Monthly

5-Rarely [] 6-Never [] 7-Any other, specify

b. On what grounds was the above decided?

.....
.....
.....

14. Do you involve other regulators and law enforcers in your inspection?

1-Yes [] 2-No []

a. Why?

.....
.....
.....

15. The food industry regulation in Kenya is a multi-agency, would you cite this as a strength or a challenge?

1-Strength [] 2-Challenge []

Please

Explain

.....
.....

16. How would you rate so far the performance of this regulatory framework having in mind the fresh produce market?

1-Poor [] 2-Medium [] 3-Good [] 4-Very good []

17. Which regulatory body do you feel bears the greatest burden of regulation or should be strengthened to increase its capacity in regulation of the informal food market?

.....
.....

a. How would you have this implemented?

.....
.....
.....

18. Are you aware whether the fresh produce markets give the participating farmers and traders any guidance and requirements for their involvement in the markets?

1-Yes [] 2-No []

a. If No, proceed to (d).

b. If Yes, are there any internal regulatory frameworks that do inspector services?

1-Yes [] 2-No []

c. Has this been successful?

1-Yes [] 2-No []

Reason.....
.....
.....

d. How would you rate the participation of individual traders and farmers in regulation?

1-Poor [] 2-Medium [] 3-Good [] 4-Very good []

e. What has been the reason for this?

.....
.....
.....

19. Is there a difference in the regulation of the informal food markets that operate in the evening or in the night?

1-Yes [] 2-No []

a. If Yes, What are the main differences?

.....
.....
.....

b. What are your greatest challenges in regulating these markets?

.....
.....
.....

c. Is there a way you have managed to solve any of these challenges?

.....
.....
.....

20. What would you cite as the greatest challenge for the fresh produce market regulation?

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.....
.....

21. What would you cite as the greatest opportunities for the regulation of the fresh produce market?

.....
.....
.....

SECTION C: FOOD SAFETY OF FRESH PRODUCE IN THE MARKETS

22. Would you consider all the produce in the fresh produce markets as safe for consumption?

1-Yes [] 2-No []

Reason.....
.....
.....

23. Have you ever had any food safety incident in any of the fresh produce market under you?

1-Yes [] 2-No []

a. How frequent does this occur?

.....

b. How did you address it?

.....
.....
.....

c. Are there formal documentation of such cases?

1-Yes [] 2-No []

d. Was there any public or consumer involvement?

1-Yes [] 2-No []

How?.....
.....
.....

24. Considering that food safety of fresh produces is always a concern, what would you recommend as the best way to improve this?

.....
.....
.....
.....

SECTION D: HYGIENE AND WASTE MANGEMENT SERVICES

25. Are there proper waste management strategies for markets under your jurisdiction?

1-Yes [] 2-[]

a. If No, proceed to (f).

b. If Yes, what proportion of these informal markets have a waste management strategy in place?

.....

c. How is this done (*Is it by a contracted firm or by the body itself*)? Is there a difference in how different wastes are handled?

.....
.....
.....
.....
.....
.....
.....

d. Please tell us possibly the strategies that have effectively worked.

.....
.....
.....
.....

e. Are there challenges you have encountered with any of the specific strategies? If any, please mention them. (*Proceed to (g)*)

.....
.....
.....
.....

f. Why haven't you instituted any strategies so far to deal with the waste in these markets?

.....
.....
.....

e. Is there a current consideration on the matters of waste management? (*Proceed to (g)*)

1-Yes [] 2-No []

If Yes please highlight

.....
.....
.....

g. What would you say about the legal strategy with regard to waste management in the informal food markets?

.....
.....
.....
.....

h. What is your view of contracted garbage collection services of the informal food markets?

.....
.....
.....

26. Are there proper sanitary facilities like toilets and washing places in all these markets under you?

1-Yes [] 2-No []

a. If Yes to what proportion have such?

.....

b. Do you view the current situation with the sanitary facilities as being enough to help achieve the food safety agenda?

1-Yes [] 2-No []

Reason.....

.....
.....
.....

c. What would you view as the legal input for the current situation in sanitation?

.....
.....
.....
.....

27. Who does the cleaning of these markets? Kindly state any differences in the handling of any of the markets?

.....
.....
.....

a. How frequent is the cleaning of these markets?

.....

b. Have you ever received an advisory from any regulatory body or government agency with regard to the safety of products and hygiene of any of these markets?

1-Yes [] 2-No []

c. How did you deal with the issues?

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d. Has the hygiene situation ever necessitated closure of any market?

1-Yes [] 2-No []

e. How would you relate the current capacity in the regulatory framework with regard to promoting proper hygiene in the fresh food markets?

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28. What are the future plans of the agency?

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29. Any other thing you would wish to say that was not covered in this interview but may be of great input to the objectives of this study?

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30. Of the law requirement for the control of informal food markets, how would you rate the success of their implementation

1- less than 20% [] 2-Less than 50% [] 3- 50% [] 4- Above 50% []

THANK YOU FOR PARTICIPATING