



THE INFLUENCE OF DROUGHT ON HOUSEHOLD FOOD SECURITY. A CASE STUDY IN KITENGELA-KAJIADO COUNTY KENYA

A Research Project Submitted to Van Hall Larensteins University of Applied Sciences in partial fulfilment of an MSc degree in Management of Development, Specialization in Food and Nutrition Security

By

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Acknowledgements and Dedication

I acknowledge the almighty God for helping me to reach this far.

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List of Abbreviation

ASAL	Arid and Semi-Arid Lands
COP	Conference of Parties
CSO	Civil Society Organization
DFID	Department of International Development
EAC	East Africa Countries
FAO	Food and Agricultural Organization
FGD	Focus Group Discussion
GDP	Gross Domestic Product
IPC	Integrated Food Security Phase Classification
KBC	Kenya Broadcasting Cooperation
KII	Key Informants Interviews
km ²	Kilometre Square
NARC	National Alliance Rainbow Coalition
PCL	Purpose Climate Lab
QGIS	Quantum Geographical Information System
SACCO	Savings and Credit Cooperative Organisation
SLF	Sustainable Livelihood Framework
SPSS	Statistical Package for Social Sciences
SSI	Semi-Structured Interview
UN	United Nations

Abstract

Food insecurity remains a critical challenge, especially for developing countries like Kenya. While factors such as high poverty rate, rural-urban migration, pandemics including Covid-19, desert locusts, etcetera remain part of immediate causes, shocks resulting from climate change, such as drought, continue severely affect food security. Drought significantly affects the four pillars of security (*availability, accessibility, utilisation, and stability*) at different scales. With the general objective of understanding the influence of drought on households' food security, this study addresses two specific objectives (i) To analyse the effects of droughts on household food security and (ii) To establish the role of livelihood assets in coping with drought-induced food insecurity. The study used semi-structured interviews and focus groups discussion on examining livelihood assets across low- and middle-income households. In addition, key informants' interviews with respondents from the Ministry of Agriculture helped the researcher to explore the role of transforming structures and processes on food security in Kenya, with a particular focus on Kitengela, Kajiado county.

From the data collected, drought affects households' assets differently across low- and middle-income households where the research was conducted. For instance, the drought weakens the social capital fabric by destabilizing the existing social groups where households migrate outside the affected region to meet their livelihood outcomes. This often happens across low-income households than middle-income ones. In transforming structure and processes, the study found that poor policy planning and implementation have contributed to increasing households' food insecurity. Often the policies have failed to mainstream long-term coping mechanisms to help households cope with drought, which leads to food insecurity.

Therefore, this study recommends the following: first building on household assets to develop coping strategy for drought-induced food insecurity. Second, the study also recommends policy reforms to ensure policies not only address the immediate food security needs but should also go beyond to create long-term coping strategies.

Chapter 1: Introduction

This master thesis research is a partial fulfilment for attaining a Master of Science Degree in Management of Development with a speciality in Food and Nutrition Security at Van Hall Larenstein, University of Applied Sciences. The research was commissioned by Purpose Climate Lab, a Kenyan-based non-governmental organisation, and it was conducted from July to September 2022 in Kajiado county, Kenya.

1.1 Background Information

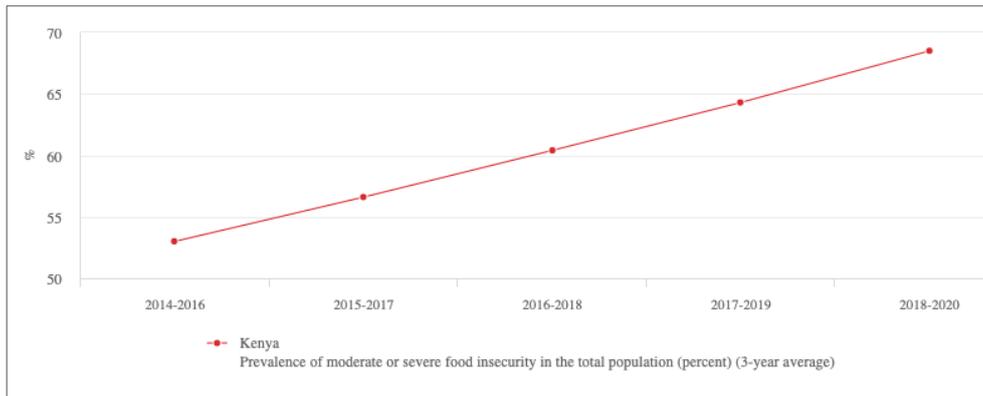
Globally, across most emerging economies, food insecurity continues to be witnessed on a large scale. Scholars such as Rosegrant and Cline (2003) have argued that food security will remain a global challenge for 50 years and beyond if no proper measures are taken. Rosegrant and Cline emphasise the need to meet the current population's food needs without compromising nature's ability to produce for the future generation.

Across sub-Saharan Africa, food insecurity has become one of the most pressing issues despite other challenges, including outbreaks of diseases such as Ebola and malaria that threatened human lives in the yesteryears. As a matter of concern, an increasing body of scientific literature has sought to explain why food insecurity is still a predominant issue across Africa, despite evidence that there is enough food to feed everyone on the planet (UN, 2019). Mwakikagile (2009) maintains that the major contributory factor causing food insecurity in Africa is that Africa produces what it doesn't consume and consumes what it does not produce. Mwakikagile presents an argument that suggests Africa consumes more food imports, and the local food production often has failed to meet the population's food demands.

Kenya is among the countries in Africa confronted with food insecurity despite the significant progress in boosting GDP growth over time. The World Bank (2021) data reveal that even though the country has continued to show commitment to GDP growth per capita, the ripple effects of the growth are yet to be realised by most of the population. The much-known data reveal that over one-third of the population still lives under the international poverty line (World Bank, 2018) and (World Food Program, 2022).

The IPC (2022) report indicates that over 3.1 million Kenyans across Arid and Semi-Arid Lands (ASAL) are food insecure. The 2022 food insecurity statistics reveal an increment from the previous year, where only 1.4 million people had no access to sufficient food. The FAO (2020) report further estimates that approximately 12 million Kenyans have faced food insecurity between 2019 and 2022. Access to adequate, nutritious, and reliable food remains a challenge to many Kenyans, especially women and children, who are the most vulnerable groups. When all facets of food security are considered, achieving food security in Kenya remains elusive in ASAL and non-ASAL regions. There is no single known cause of food insecurity in Kenya, but many factors contribute. Much of the known factors causing food security to vary from climate change, the outbreak of pandemics (*Covid-19*), urbanisation, high population growth rate, and variability in global food markets. Table 1 below shows the food insecurity trend in Kenya for the past six years (Lawlis et al., 2018).

Table 1: Food Insecurity Prevalence in Kenya



Source: FAO-Stat 2021

The vertical dimension in Table 1 presents strong evidence to support the argument presented by (IPC, 2022). For instance, from 2014-2016, approximately 53% of the population was food insecure. The number has, however, risen over the years until the present moment, when about 68% of the people remain food insecure.

1.1.1 Food Security and Climate Changes

The global phenomenon of climate change continues to adversely impact food production in Kenya, leading to food insecurity. The country has witnessed prolonged drought seasons across many regions, which has affected food security at the national and local levels (Laibuni et al., 2011). The main cause of climate change in Kenya is still an open area for further scientific research (Recha et al., 2017); however, the much-known human elements contributing to climate change include improper management of natural resources, such as forests, soil, rivers, and land (Mwendwa and Giliba, 2012). Over the past decades, Kenya has heavily invested in infrastructural development with no regard to how it influences climate change. For instance, the recent expressway road that cost the government KSH 7.1 billion saw a section of traditional Nairobi parks, such as Uhuru Park and Luna Park, hived off, affecting the environment negatively (Daily Nation, 2021)

Parks play a significant role in climate adaptation. As Schottland (2019) maintains, parks are essential in offsetting carbon footprints by serving as carbon sinks. Heavy accumulation of carbon in the atmosphere repels into global. Global warming causes climate change (National Geographic Society, 2022). According to the National Geographic Society (2022 p. 10), "Global warming is defined as "[...] the long-term warming of the planet's overall temperature". Drought is, therefore, a result of global warming (Mwendwa and Giliba, 2012) and (Al et al., 2008). Drought affects food security by lowering agricultural production (IPC 2022), causing high demands for food and low supply. Besides, droughts affect the economic well-being of people as hunger often results in undernutrition, which disempowers people from remaining economically active to gain income that would enable them to access food. Undernutrition is a condition where human bodies get insufficient food nutrients below the required dietary intake (FAO, 2020)

1.1.2 Food Security and other factors

As explained below, food insecurity is also caused by other factors beyond climate change.

Covid-19 pandemic: The current Covid-19 pandemic has significantly impacted food insecurity. Despite its direct impact on people's health, control measures such as self-isolation, lockdowns, and curfews affected people's livelihoods, putting a strain on food accessibility (Dasgupta and Robinson, 2022). In addition, the Covid-19 outbreak disrupted the global economies, with millions of dollars of investments redirected to research to manage the pandemic. However, the agricultural sector remained underinvested, and this affected food availability. (Dasgupta and Robinson, 2022).

Urbanization and population growth rate: The heightened urbanization resulting from devolution continues to hamper food production. The increase in rural-urban migration, with most migrants aged between 18-35 years, deprives the rural agricultural labour force, and this has caused a decline in food production over time (Blekking et al., 2022). Accordingly, Kenya's population growth rate has been upward since its independence (World Bank, 2018). As the population increases, the demand for food increases, and the supply reduces due to shrinking factors of production, such as land. The Institute for Security Studies (2018) observes that the food consumption rate is outpacing food production in Kenya, which needs to be addressed to have a healthy population.

Russia-Ukraine Conflict: The Russia-Ukraine conflict has disrupted the global food market (Ben Hassen and El Bilali, 2022). Data from the International Food Policy Research Institute reveal that since the war between Ukraine and Russia began, over 23 countries have imposed export restrictions on food. The current restrictions affect about 17.3% of total calories traded globally, up from 5.6% before the war (International Food Policy Research Institute, 2022)

1.2 The Commissioner ¹

Purpose Climate Lab (PCL), the commissioner for this research, works to support communities to achieve their livelihood outcomes by building on their strengths (available resources) to help them cope with prevailing climate change vulnerabilities such as drought-induced food insecurity.

The United Nations Climate Change Conference 2022, famously referred to as COP27 (Conference of Parties), is set to happen in Egypt in November 2022. Among the agendas for the conference will be a justification of how Civil Society Organizations and governments across developing countries, with a strong emphasis on Africa, will utilize the \$ 100 billion climate change finance grant pledged during the COP26 conference in Glasgow to help climate change vulnerable population cope with climate change shocks such as drought, flooding, rising sea level etcetera.

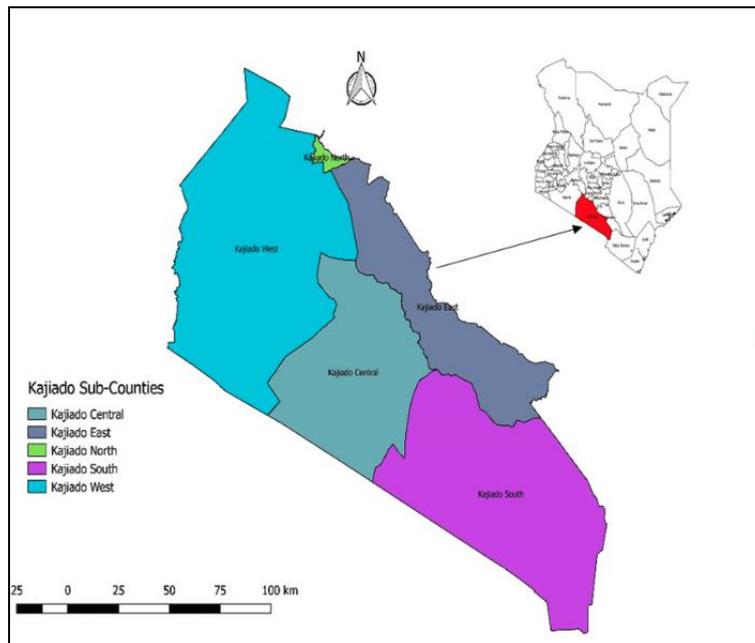
Purpose Climate Lab through Africa Climate Change Foundation is set to benefit from the pledged grant. Consequently, the PCL has commissioned the researcher to research how livelihood assets can influence households to cope with drought-induced food insecurity. The study also explores the influence of transforming structures and processes on food security in Kenya, with a particular focus on Kitengela. The choice of Kitengela was guided by the commissioner's long experience of project work within the area.

1.3 Study Area Profile

Kitengela is an emerging urban area in Kajiado, resulting from devolution (The Kenya Constitution, 2010). It is among the five constituencies (sub-counties) located in Kajiado East. Overall, Kajiado county has five constituencies, each with five wards. The county (Kajiado) borders Narok county to the west, Nakuru county, Machakos county, Nairobi County to the east, and Tanzania to the south. According to the 2019 census (Government of Kenya), the region has an approximate population of 1,117,840, with an average of 51 people per km² and an average of 3.5 people per household (KNBS, 2022). Figure 1 below shows the general map of Kajiado county. Section 3.2 provides a clear picture of Kitengela.

¹ More About Purpose Climate Lab Refer - <https://www.purpose.com/about/purpose-labs/>

Figure 1: Kajiado County Map



Source : Source: Source Joshua Orungo 2019

1.3.1 Kitengela; Emerging Urban Region

Urbanization is a process by which a society evolves from a rural or peri-urban state to an essentially urban environment (Mabea, 2013). Kitengela was traditionally considered a peri-urban region due to its nearness to Nairobi, the Kenyan capital city. According to Mortoja et al. (2020, p.13), A peri-urban region is defined as “[...] spaces, between an urban region and rural region where the changes in different land uses are incessantly occurring”. Until 2010, Kitengela fell within the Mortoja et al. definition of peri urban. However, after 2010, the country underwent devolution to decentralize the central government into devolved units. (County government). Devolution is a significant driver boosting urbanization in Kenya, evident from Kitengela. Harris (2018) maintains that the region (Kitengela) has all the attributes of a self-emergent urban area that has evolved spontaneously due to reforms in administrative strictures (from a centralized system to a devolved system).

Even though emerging, Kitengela has already taken the shape of a typical urban region with segmentation; the poor, the middle class, and the upper class (Maina et al., 2021). This research was conducted in low- and middle-income households as they are the most vulnerable groups to drought-induced food insecurity (Pan et al., 2018)

1.4 Food Security in Kitengela

In recent decades, Kajiado, which hosts Kitengela has been clustered among the food-insecure region in Kenya. According to the latest report by IPC (2022), 55% of the population in Kenya are minimal food insecure, 40% are stressed, and 10% are experiencing a food crisis. The most recently published scientific literature has linked the region's current food insecurity to recent phenomena beyond climate change, such as Covid-19 and desert locusts, among other disasters (Dasgupta and Robinson, 2022). However, much of the secondary data analysed pre-Covid suggests the country (Kenya) has been battling food insecurity for decades. Compared to other emerging urban regions around Kenya's capital city, including Kiambu, Thika and Machakos, Kajiado remains the most food insecure, and there is strong evidence that suggests the current situation is a result of drought (Singh and Khanna, 2021)

Food security remains a critical challenge in Kitengela, and it will be more severe in the coming decades if the current intervention by the humanitarians remains the same (Integrated Food Security Phase Classification,

2021) Much of the current literature, including Olabiy (2022), Helal (2016) and Laibuni et al. (2011), pays attention to different causes of food insecurity, including climate change and high population growth rate, among others. However, studies conducted by Mabea (2013), Khalili et al. (2021), and the World Health Organization (2022) maintain that, while addressing drought-induced food insecurity, policymakers (government) and humanitarian groups often focus on short-term interventions such as food relief, conditional and non-conditional cash transfers food subsidies etcetera. While these interventions are critical during emergencies (FAO 2021), they remain untannable and cannot help households to cope with food insecurity independently with minimal reliance on external support (Recha et al., 2017). Drought-induced food insecurity requires multifaceted intervention that addresses emergency and long-term needs (IPC 2022).

While the above interventions are critical, especially during food insecurity emergencies, they do not provide a mechanism to help households cope with food insecurity crises with less reliance on external aid and for a longer time (Dasgupta and Robinson, 2022). Data from the Kenya National Bureau of Statistics (2020), Kenya Institute for Public Policy Research and Analysis (2007) and Kenya County Climate Risk Profile Series (2017) suggest that Kitengela has a diversity of livelihood assets. These assets can be critical in enabling households to cope independently with drought-induced vulnerabilities with minimal external aid.

1.5 Problem Statement

Increased drought exposure due to climate change has heavily contributed to food insecurity in Kitengela. Drought is a significant threat to food security now, and it will become even more critical in the coming decades if no proper intervention is implemented. Local government and humanitarian organizations working with households confronted by food insecurity continue to rely on short-term which are untannable and cannot help households to cope with food insecurity independently with minimal reliance on external support. Food insecurity resulting from shocks such as drought requires diversified intervention that addresses emergency and long-term needs.

Both government and humanitarian organization have failed to mainstream emergency food interventions, with existing livelihood assets, to create a long-term coping strategy for the vulnerable group. For instance, unconditional cash transfers from the government can be used by vulnerable households to complement human assets through skill development to enable households to increase their income flows to achieve food security.

Food insecurity is a critical problem in Kitengela. The issue will be more severe in the coming decades if the intervention approach continues to lapse, identifying and incorporating the available livelihood assets with the current food aid intervention which are crucial for long-term coping strategies.

1.6 Research Objectives

The main research objective of this study is to determine the effect of drought on household food security in Kitengela sub-county in Kajiado county over the period of 2017 to 2022. More specifically, the study addresses the following objectives.

- (i) To analyse the effects of droughts on household food security and
- (ii) To establish the role of livelihood assets in coping with drought-induced food insecurity
- (iii) To provide recommendations to the commissioner on food insecurity coping strategies using livelihoods assets

1.6.1 Research questions

The researcher has formulated the following questions to fulfil the objectives mentioned above. First, the central research questions ask.

How does **drought influence** food insecurity among low and middle-income households in the Kitengela sub-county?

To effectively answer the main question, the researcher has formulated three sub-questions.

- I. How do transforming structures and processes influence food security in Kitengela?
- II. How does drought affect households' assets to cope with food insecurity over time?
- III. What role do households' assets play in achieving food and nutrition security among the low- and middle-income households in Kitengela?

The following assumption guided this study.

1. *Complementarity of assets across households would create a long coping strategy to address food insecurity among vulnerable households*
2. *Mainstreaming households' assets with emergency food insecurity intervention anchored on structural and process would provide a long-term coping strategy to reduce vulnerabilities to food insecurity.*
3. *Improving human capital through skill development would increase income to achieve household food security.*

Chapter 2: Literature Review

This chapter defines the critical construct the researcher applied in this study and provides an overview of food and nutrition in Kenya, focusing on Kajiado. The section further unearths the interrelation between food security and climate shocks (drought) and has explained the concept of vulnerabilities related to household food insecurity. Moreover, this chapter presents different theories and concepts, some of which have been used in the methodology section (chapter 3)

2.1 Drought

Both (Mishra and Singh, 2010) and (Khalili et al., 2021) define drought as an environmental disaster brought about by climate change. It occurs across all zones (low and high rainfall zones). It is mainly related to the reduction in the amount of precipitation that accumulates over a long period, e.g., a season or a year. In this study, drought has been defined as a prolonged period of no rain, prolonged being contextualized six months and above.

The effect of drought on humans remains multifaceted and takes different forms. According to (Stanke et al., 2013), drought affects the availability of natural assets such as water which is critical to human health. Human health is a crucial facet of human assets (DFID, 1999), and when it is affected, their skills remain underutilized to meet the livelihood outcomes.

According to Carrico et al. (2019), drought also affects the existing social system of communities. They maintain that extreme drought causes human death due to hunger. Those who withstand hunger more often migrate to other areas as survival strategies, while others endure long-term health complications resulting from undernutrition. The argument by Nasrnia and Ashktorab (2021) maintains that social networks are critical to the well-being of people as they can facilitate access and sharing of resources within the network. Drought also affects human saving stocks, saving in cash and assets. For instance, a cross-sectional study by Bailey et al. (2019) suggests that households tend to exhaust saving stocks, both monetary and assets, to meet their livelihood outcomes during drought.

2.2 Food Security

Food security has gained prominence in academia and a humanitarian mission for decades. As a concept food security started to become a well-known concept in the mid-1970 when discussion on the global food crisis began to emerge (FAO, 2020). The major focus was on food supply; however, in 1983, FAO expanded the concept to include the accessibility element. Later, in 1986, the phrase 'all people at all times' was added. This evolution of terms led to the modern-day definition of food security, which has then been adapted by humanitarian organisations, institutions, and governments. Until the present date, food security is defined as '*[...] situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for active and healthy life* (FAO 2020 p.2). Therefore, the definition of food security for study falls within the confines of FAO.

2.3 Food Insecurity

Contrary to food security, food insecurity has received inconsiderable attention from the scientific literature. Most of the studies conducted in recent years only focus on explaining food insecurity outcomes without paying particular attention to the definition. Gundersen & Ziliak (2015, p.1) defines food insecurity as a *condition in which households lack access to adequate food because of limited money or other resources [...]* Accordingly, Seligman et al. (2010) define food insecurity as the inability to afford nutritionally adequate and safe food. For this study, food insecurity is defined as the inability of households or individuals to have access to physical and sufficient nutritious food over time.

2.4 Household Food Security

Households are the single basic unit the researcher used to measure food security. However, it is notable that food security can be measured at different levels; for instance, the FAO (2020) highlights different levels of

measuring food security starting from regional, national, local (district), family and household. The concept of 'households' continues to elicit a scholarly debate among different scholars. The researcher acknowledges the work done by various authors who have broadly defined households based on a different dimension. Wilk and Netting (1984, p.12), Keilman (2003, p.23), and England and Farkas (2017, p.33) define a household as "[...]one person living alone, or a group of people (not necessarily related) living at the same house, who share cooking facilities and share a living room, sitting room or dining area". They both maintained that; "a household can consist of a single family, more than one family or no families in the case of a group of unrelated people". The definition by Wilk and Netting (1984, p.12), Keilman (2003, p.23) and England and Farkas (2017, p.33) is what the researcher has used to define household.

In Kitengela, the existing secondary data (Mabea, 2013) and (KNBS, 2022) explain the different levels of households based on different elements as explained below.

Upper-income households reside in areas with heightened security, well-paved roads, and strict zoning regulations. They are inhabited mainly by the high-income bracket due to the high monthly rental cost. The average monthly rent within this cluster ranges from \$ 2,000 to \$ 3,500 (Alago et al., 2019)

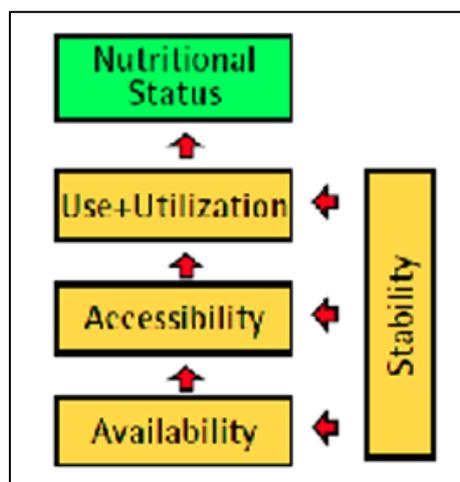
Middle Income Households: Households within this bracket reside in areas characterised by a high-density population with minimal physical planning (zoning). This cluster's population demographics comprise young people between 20-34 years old. The monthly rent ranges between \$ 200 to \$ 500 (Alago et al., 2019)

Lower Income households: Households within this bracket reside in areas characterised by a high-density population with no physical planning. Most of the household members comprise of father, mother, and children and, on some occasions, single parenthood. The cost of rent varies from \$ 50 to \$ 150 depending on the available social amenities (Alago et al., 2019)

2.4.1 Food Security Dimension

As stated in section 2.2, the definition of food security has been backed by four dimensions that came up during the 1996 world food summit in Rome, Italy. Over the years, the four (*Availability, Accessibility, Utilisation and Stability*) have gained global prominence, especially within humanitarian and public and private sectors. The next section explores the four dimensions of food security as used in this study based on the framework in figure 2 below.

Figure 2: Food Security Framework



Source FAO 2020

2.4.1.2 Food Availability

According to FAO (2006, p.1), food availability means '*The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports [including food aid]*' Clapp et al. (2022) traces the development of the term since 1974 when the first food conference was held. The focus at that time was to ensure the existence of food for consumption at levels where households could locate the needed food without striving. According to them, the definition reflected the growing global food crisis that saw a decline in certain food commodities. Drought directly affects food availability by reducing farm yields due to less water and soil moisture necessary for crop growth (Hussain et al., 2022). The cross-sectional analysis conducted by Cruz et al. (2021) to determine the influence of drought on agricultural produce (*food availability*) established that, more often, during drought, farmers consider reducing their cropping hectareage to crop-only drought-tolerant crops. Cruz et al. maintain that while drought-tolerant cropping is an effective strategy for farmers, it fails to meet the food demands of consumers.

2.4.1.3 Food Accessibility

The latest definition of food accessibility, according to FAO (2006), explains that food is accessible when individuals /households have adequate resources to acquire adequate foods that meet their dietary needs. However, a broader perspective on food accessibility has been developed by Lawlis et al. (2018), who argue that food accessibility is the ability of an individual, household, or population to have sufficient economic and physical resources to enable them to consume nutritious diets. '*[...] it includes the capacity to buy and transport food, the knowledge, and skills to make appropriate choices and time and mobility to shop for and prepare food*' (Lawlis et al. 2018, p.1). Drought causes a sharp decline in food production, leading to heightened food demands. With demands high and supply low, the prices of essential nutrition food tend to rise beyond the population's access. For instance, recently, in Kenya, the low maize yields consequent from the current drought saw the prices of Unga (*maize flour*) double. Most households, especially low- and middle-income households, could not afford it (Daily Nation, 2022)

2.4.1.4 Food Utilization

The most frequent definition of food utilization is derived from two terms (safe and nutritious), which gained prominence after the 1996 World Food Summit. The most recent definition of food utilization state that '*Utilization of food through adequate diet, clean water, sanitation, and health care to reach a state of nutritional well-being where all physiological needs are met [...]*' FAO (2020 P.1). Food utilization unlike other pillars, focuses on how the human body utilizes the available food after consumption. Napoli (2011) points out that the availability and accessibility of food are not self-sufficient for healthy lives. The food consumed should fulfil the body's dietary needs to achieve a healthy life. World Bank (2018) reveals that drought increases food prices due to low production and high market demands. As a result, households with low purchasing power are vulnerable to undernutrition. Some commonly known health problems associated with undernutrition include stunting (Wenhold and Faber, 2007). Stunting is defined as "[...] impaired growth and development that children experience from poor nutrition" (World Health Organization, 2022, p.3)(McNamara, 2021)

2.4.1.5 Food Stability

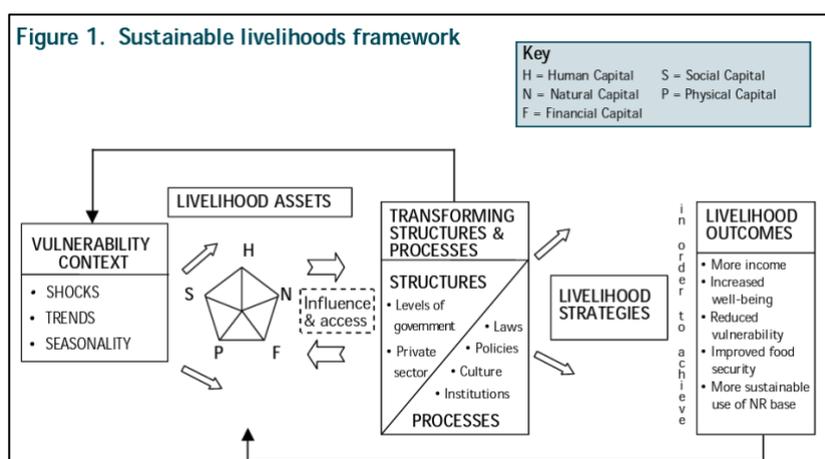
This study has adopted the 1996 World Food Summit definition of food stability echoed in different policy documents, including Food and Agricultural Organization and World Food Program. The summit described food stability across three dimensions centred on accessibility, availability, and use /utilization (World Food Summit 1996). The data reported here appear to support the assumption that, to achieve food security, every person should have guaranteed access to sufficient adequate and nutritious food that meets their dietary needs all the time (FAO, 2020). This study hypothesises that since drought affects the three pillars of security (accessibility, availability, and Utilization), its impact on food stability cannot be underscored. Therefore, drought affects food instability indirectly by negatively affecting the three pillars mentioned here.

2.5 Sustainable Livelihoods Framework (SLF)

Over the recent decades, the concept of sustainable livelihoods has gained prominence, especially in the field of social sciences, notwithstanding the development and policy reform sectors (DFID, 1999). A generally accepted definition of SLF was developed by DFID (1999 p.1), and it has been broken into parts. The first part defines livelihoods as ‘capabilities, assets (including both material and social resources) and activities required for a means of living. The second part defines sustainability by linking it to livelihoods. ‘A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future while not undermining the natural resource base.

As Knutsson (2006) maintain, SLF is one of the transdisciplinary tools produced, disseminated, and applied in a broad spectrum of research policy and practice. While appreciating the framework Serrat (2017) explains that the SLF approach helps the policymakers and development experts to understand the livelihoods of the poor by analyzing both the enabling and disabling factors to livelihoods opportunity and showing their correlation. Knutsson widely appreciated definition of Sustainable Livelihoods Approaches states that ‘[...] a way of thinking about the objectives, scope, and priorities for development activities. It is based on evolving thinking about how the poor and vulnerable lives and the importance of policies and institutions (2017, p.2). This study applies the general definition of SLF according to DFID (1999). Figure 3 below shows the sustainable Livelihoods Framework as developed by DFID

Figure 3: Sustainable Livelihoods Framework



Source: DFID 1999

2.5.1 The Vulnerability Context

Various definitions of vulnerability context have been developed in the field of development. Serrat (2017) define vulnerability as the state of well-being of a person, household, and community in the face of a shifting external environment. DFID (1999) define the vulnerability context more abstractly by stating that the term simply means the external environment in which people exist. Both DFID (1999) and Serrat (2017) acknowledge that people’s livelihoods and their assets are often affected by multifaceted vulnerability components, including trends, Stocks and Seasonality. Table 2 below shows the indicators of vulnerability context according to DFID.

Table 2: Vulnerability Context Indicators

Trends	Shocks	Seasonality
<ul style="list-style-type: none">• Population trends• Resource trends (including conflict)• National/international economic trends• Trends in governance (including politics)• Technological trends	<ul style="list-style-type: none">• Human health shocks• Natural shocks• Economic shocks• Conflict• Crop/livestock health shocks	<ul style="list-style-type: none">• Of prices• Of production• Of health• Of employment opportunities

Source: DFID 1999

The degree of exposure to vulnerability arising from each shock varies, and further, the amount of assets endowed within households remains critical to coping with vulnerabilities (Serrat 2017). While DFID's vulnerability context indicators provide numerous types of shocks, as shown in table 2, this study focussed on drought, a natural climate change-induced shock within the study area. (Khalili et al., 2021)

2.5.2 Livelihoods Assets

The sustainable livelihoods framework helps organize the factors that enable or disable livelihood opportunities and shows how they relate to one another. However, a more generalized perception held by scholars and developmental experts such as Jackson (2021) and Nasrnia & Ashktorab (2021) argues that different households have different access to livelihood assets, which the sustainable livelihood approach aims to strengthen.

Human Assets: Human assets represent good human health combined with good skills, knowledge, and the ability to perform specific tasks (Goldin, 2016). An individual's skills should enable him/her to pursue different livelihood strategies in each household. Therefore, DFID (1999) considers human assets a fundamental building block for achieving livelihood outcomes.

Social Assets: Social assets remain a contested term in the development field. Some scholars, including Nasrnia & Ashktorab (2021), have defined it as a resource that enables or helps people achieve their livelihood goals. In the context of the SLF framework, DFID (1999), social assets can be developed by creating specific networks within a community, being a member of a more formalized group, establishing trusted relationships with individuals, and so on. In the SLF framework, it is assumed that network and connectedness increase people's trust and ability to work together and improve their access to resources. On the other hand, membership in more formal groups requires adherence to commonly agreed or generally accepted rules, norms, and sanctions (DFID, 1999); trusting relationships can facilitate cooperation and avoid unnecessary transaction costs among the poor. All these concepts are interconnected. For example, membership in groups and associations can extend people's influence into other institutions, while trust is likely to develop between people linked by some form of kinship (DFID, 1999).

Natural Assets: The DFID (1999) define natural assets as a stock of natural resources that provides services useful to those who derive all or part of their livelihood from resource-based activities. It refers to environmental goods such as land and common property or free natural resources such as forests, water, or rangeland (Farrington et al., 2002, p. 20). Within the SLF framework, natural assets and vulnerability are often linked since many of the shocks that destroy the livelihoods of the poor occur through natural processes, e.g., drought, floods, fires, and earthquakes, among others (DFID, 1999).

Physical Assets: According to DFID (1999), physical assets include the basic infrastructure made up of changes in the physical environment that provide people with essential services to meet their basic needs. In this respect, capital goods are people's tools and devices to work fmore productively, given a well-established

infrastructure. In addition, DFID (1999) identified infrastructure components as essential to sustainable livelihoods: affordable transportation, affordable energy, safe shelter and buildings, adequate and clean water supplies, and access to information or communications.

Financial Assets: According to a definition provided by DFID (1999), financial assets are resources people use to achieve their livelihood goals. They include both flows and stocks, which can contribute to consumption and production at the same time. Often, financial assets are used to achieve livelihood outcomes, such as the availability of cash, which allows people to get access to food, education health which are part of the livelihood outcomes. DFID states that there are two main sources of financial assets. The first source is on-hand inventory, which includes savings. Savings are the preferred type of financial capital because they do not attach any liability to the resource. The second source is regular cash inflows, which include pensions or other transfers from the government, as well as remittances made by relatives or other entities

2.6 Food Insecurity and Climate Change Adaptation

A large and growing body of literature (Khalili et al., 2021), (Joshi, 2019) and (Nasrnia and Ashktorab, 2021), among others, have linked drought, which is a consequence of climate change, to the leading cause of food insecurity, especially within ASAL region in Kenya. Drought is a natural phenomenon (Twongyirwe et al., 2019), and it causes food insecurity in multifaceted ways (McNamara, 2021). Therefore, coping with drought outcomes such as food insecurity remains critical as a long-term intervention. Climate change adaptation is a contested term that has drawn scholarly attention over the recent decades. Table 3 summarises the cross-sectional definition of climate change adaptation that has evolved over the recent decades.

Table 3: Various Definition of Climate Change Adaptation

<i>Source</i>	<i>Definition</i>
Burton <i>et al.</i> (1998) Burton (1992)	Refers to all those responses to climate change that may be used to reduce vulnerability. Adaptation to climate is the process through which people reduce the adverse effects of climate on their health and well-being and take advantage of the opportunities that their climatic environment provides.
Downing <i>et al.</i> (1997) Füssel and Klein (2002)	Adaptation is synonymous with "downstream coping". All changes in a system, compared to a reference case, that reduce the adverse effects of climate change.
IPCC (2001)	Adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability.
Pielke (1998)	Refers to adjustments in individual, group and institutional behaviour in order to reduce society's vulnerabilities to climate.
Rennie and Singh (1996)	Adaptive strategies are ways in which local individuals, households and communities have changed their mix of productive activities, and modified their community rules and institutions in response to vulnerabilities, in order to meet their livelihood needs.
Scheraga and Grambsch (1998)	Adaptive actions are those responses or actions taken to enhance resilience of vulnerable systems, thereby reducing damages to human and natural systems from climate change and variability.
Smit (1993)	Involves adjustments to enhance the viability of social and economic activities and to reduce their vulnerability to climate, including its current variability and extreme events as well as longer term climate change.
Stakhiv (1993)	Means any adjustment, whether passive, reactive or anticipatory, that is proposed as a means for ameliorating the anticipated adverse consequences associated with climate change.

Source: Schipper (2007)

The researcher maintains that all definition of climate change adaptation that has evolved, including the ones in table 3, remains scientifically valid and can be applied directly or indirectly depending on the subject. For this study, however, the researcher defines climate change in reference to Scheraga and Grambsch (1998 p.9), who states that "*climate change adaptation are responses or actions taken to cope with vulnerabilities thereby reducing damage to human and natural systems from climate change and variability*". Climate adaptation, therefore, implies the responses taken by household's cope with droughts-induced food insecurity.

2.6.1 Drought and Food Security

The impact of drought on households varies depending on the level of available assets. Twongyirwe et al. (2019) explain that drought is one of the most critical climate hazards, threatening food security in all four dimensions. Their findings are backed by Khalili et al. (2021), who have attempted to study the effects of drought on food availability. It was found that drought, through its impact on natural assets, affects food production significantly. In Kajiado, drought occurs every year, and the consequence of food availability remains eminent. Prolonged droughts such as the one witnessed in 2012 (IPC, 2022) across ASAL regions in Kenya can significantly impact household assets, which are crucial to achieving food security

2.6.2 Effects of droughts on households' livelihoods Assets and Food Security

There is sufficient scientific evidence that proves that drought has an influence on livelihood assets and ripples food security. The effects of drought on natural assets such as lands, forests, and rivers, to mention but a few, affect the food production ecosystem directly or indirectly. In an emerging urban region such as Kitengela, food production is mainly limited; however, household access food through markets. Droughts affect soil quality by draining moisture and reducing the soil nutrient for agricultural production (Joshi, 2019). It can also cause trigger a low food supply as most of the farms' tools, such as cutlass and hoes, can only be effective in supporting farm production when there is no drought. A decline in food production consequent to drought will trigger low supply but high demand and price. Households with limited assets, especially financial assets (DFID 1990), will likely be delineated from access to food, leading to food insecurity.

Accordingly, studies conducted by different scholars continue to emerge with evidence on the interlink between drought and food security within the context of livelihoods. For instance, Sandström (2022), while exploring the link between drought and food security in East Africa, established that shocks such as drought negatively impact the communities' social fabric. Often when it occurs, people look for alternative survival tactics, including migration. This displacement usually affects the existing social assets base. According to DFID (1999), social assets are critical to enabling people to achieve their livelihood goals, including food security.

A considerable amount of literature has been published on the effects of droughts on livelihood assets, with empirical evidence drawn from within Africa and beyond. The finding by Joshi (2019) reveals that drought leads to a decline in production and a market decline. Within communities that depend on the trade of agricultural commodities, this would affect the income flow. Joshi hypothesizes that a decline in household income flow will affect investment in human development, including health and education. When households cannot work due to ill health or lack of skills, they become more vulnerable to food security (Joshi, 2019).

During droughts, households tend to exhaust their financial stocks to meet the rising household needs. When these resources are finished, most households are likely to suffer mental illness that will affect their ability to achieve livelihood outcomes, including food security. Several authors agree with this argument, especially those in the field of Health sciences. For instance, Despard et al. (2022), while investigating the impact of covid-19 on mental health, found that households that depleted their financial assets amid covid pandemic were much more vulnerable to mental illness

2.4.3 Coping Strategies

According to a definition provided by Dyer and McGuinness (1996), a coping strategy is a process where people bounce back from inevitable shocks in their lives. Folke (2016) maintains that strategy is *'[...] having the capacity to persist in the face of change to continue to develop with the ever-changing environment'* (2016, p.3). Folke contends that coping strategy is about how periods of gradual change interact with abrupt changes and how households, communities, and cultures adapt or transform into new development pathways in the face of dynamic changes. This study has relied on the definition provided by Dyer and McGuinness (1996) and Folke (2016). In addition, the study has explored how households use their assets to cope with drought-induced food insecurity.

2.4.4 Measuring Food Security

Identifying valid and reliable indicators is crucial before analysing the causal relationship between food security and its potential factors or determinants. Even though food insecurity stems from inadequate access to resources, Bickel et al. (2000) maintain that traditional income and poverty measures do not provide clear information about the severity of food insecurity. In their argument, they maintain that many low-income households still appear to be food secure while non-poor households appear to be food insecure.

Measuring food security, especially in the emerging urban region, requires examining the different levels of indicators to avoid bias. While income might be a strong indicator of food security, several authors (Dasgupta and Robinson, 2022), (Melvin, 2020) and (Mazrui and Patel, 1974) critique it, as no interlink relates the amount of income and the expenditure on food items either directly for household consumption or production on the farm. Table 4 shows household indicators used to measure livelihoods asset in this study. The indicators are not holistic, and the interpretation of the finding from the study should be taken with much caution.

Table 4: Households Asset Indicator Metrics

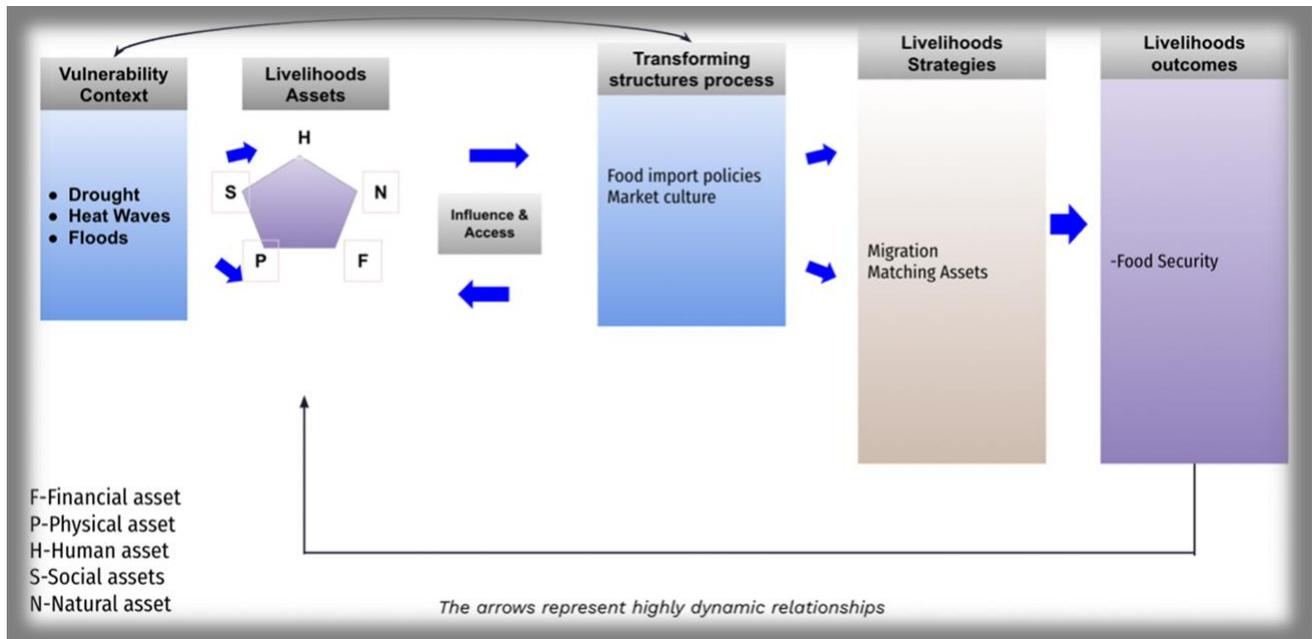
Assets	Indicator	Measurement
Human Assets	Households Education level	Skills/knowledge
	Households Health	Ability to work (casual/skilled)
Social Assets	Household network and connectedness	Connection to acquire resources (money, Food, etc.)
	Household membership in formalised groups	
	Presence of Trust and reciprocity among households	
Natural Assets	Presence of a Kitchen Garden (land) for farming Presence of clean natural water	Household ability to produce food
Physical Assets	Availability of infrastructure	Household access and use of public well-paved marram or tarmac roads.
	Availability of school /College	Households' ability to get quality training to promote human capital.
	Availability of communication equipment TV radios	Households acquire information (drought early warning)
	Availability of stocks (savings, Availability of regular cash flows (pensions,) excluding salary	Household ability to purchase food

Source Author 2022

2.4.5 The conceptual Framework Diagram

Figure 4 below shows the conceptual framework used in this study

Figure 4: The Conceptual Framework



Source: Author 2022

The vulnerability context: The vulnerability context co-exists within the external environment where people live. Therefore, it greatly influences how people access and utilize their livelihood assets to achieve their livelihood outcomes. The three main components under the vulnerability context include.

- **Shock:** Within the precinct of sustainable livelihoods, shock directly impacts the livelihood's assets. Shocks interfere with people's way of life by destroying assets and forcing them to develop appropriate coping strategies.
- **Trends:** Trends are events that influence household assets; however, unlike shocks, trends are predictable and may or may not subject households to vulnerability (DFID, 1999).
- **Seasonality:** The sustainable livelihoods framework presents seasonality as a time series in which changes occur.

This study has examined drought as a shock within the vulnerability context. Kitengela has, over the past decades, been confronted with other shocks, such as flooding and heat waves. However, in the recent past, this has not been the case (National Geographic Society, 2022). The researcher, therefore, purposively selected drought as a climate shock indicator. The study of the interplay between drought and food security is a topic yet to gain much attention from scholars, especially within an urban context

Transforming Structures and Processes: Transforming structures and processes have been used within the conceptual framework to refer to policies that impact people's lives, from the public and private sector to local culture (DFID.,1999). For example, transforming structures and processes can influence access to food amongst households by enabling or disabling access to livelihood assets.

Livelihoods strategies: Livelihoods strategies are measures households take when confronted with vulnerabilities, such as shock, to achieve livelihood outcomes (DFID 1999). Coping strategies might involve people moving away from the shocks (migration) or disposing of part of their assets.

Independent Variable: Transforming structures and process and vulnerability context are independent variables since the households have no control over them. They exist naturally (drought shock) or are shaped by external bodies (policies) over which the households have little or no influence.

Dependent Variable: Livelihood assets and outcomes are dependent variables since other external forces shape them. For instance, policies and regulatory frameworks might enable or disenable access to specific livelihood assets, which will, in return, determine access to specific livelihood outcomes

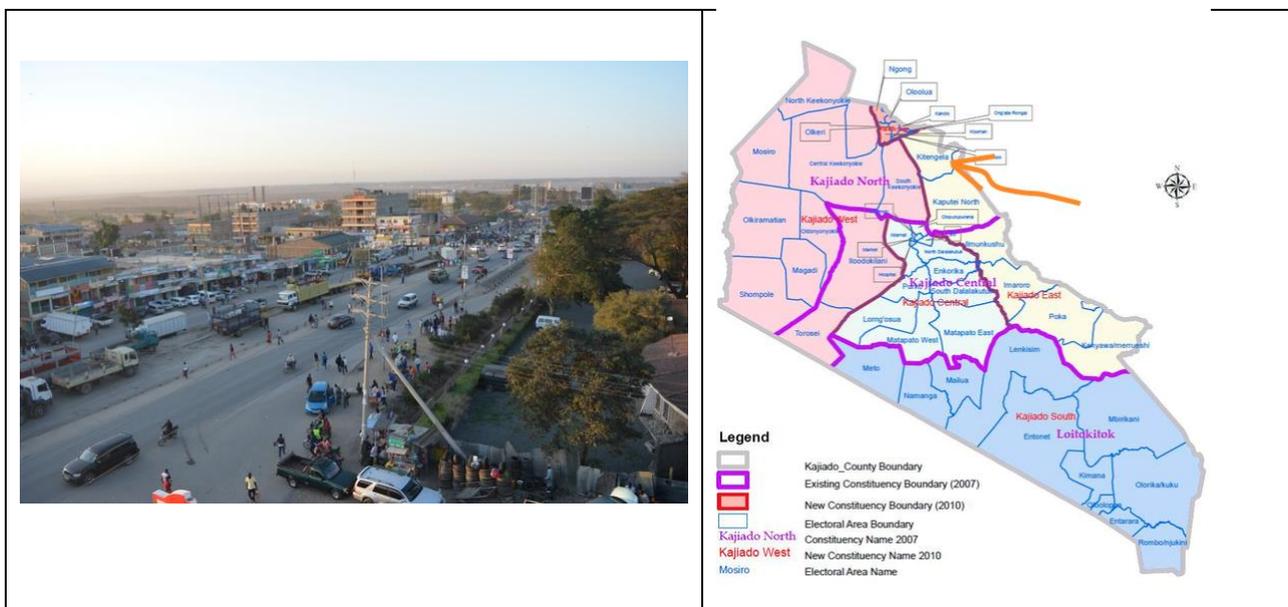
Chapter 3: Research Methodology

This chapter discusses the research methodology and data collection methods. It also presents the overview of research boundaries and data analysis methods and concludes with research limitations

3.1 Study Boundary

This study was conducted within the administrative boundaries of Kitengela, a ward within the Kajiado East sub-county. It covers an area of approximately 390 km² (GOK, 2001) within the Kajiado District and is part of a larger rangeland ecosystem called Athi-Kaputiei Plains. The study area corresponds to the Isinya Division (one of seven administrative divisions of the Kajiado District). Kitengela is unique in that it supports a large and distant migratory community of wildlife from the neighbouring communities of Kajiado North, South and central. Figure 5 below shows the map of Kitengela

Figure 5: Kitengela | Study Area



Source: Author & Ryan Raam 2013

3.2 Study Strategy and Approach.

The study was conducted using a qualitative research design, and the strategy was a case study. According to Van Thiel (2014), a case study is an empirical investigation that examines complex issues within a natural setting to increase understanding, especially when the context is not obvious. The study approach involved conducting Semi-Structured interviews with selected household members from lower and middle-income neighbourhoods. The findings were triangulated with data collated from focus group discussions from two community groups, notwithstanding the results from key informants' interviews from the Ministry of Agriculture. Section 3.2.2 provides a detailed overview of the sampling method applied in this study.

3.2.1 Sample Size Selection

While selecting the sample area, the researcher used purposive random sampling as there were already divisions of households. First, the divisions by the national government zoning (Govt Kenya). Second, population self-disintegration within neighbours based on the standard of living (low middle and high-income status). Tongco (2007 p.23) defines purposive random sampling as; *“The process of identifying a population of interest and developing a systematic way of selecting cases that are not based on advanced knowledge of how*

the outcomes would appear.” For the households survey that was conducted as part of the research compendium, the researcher worked with two enumerators provided by the commissioner; to support data collection across households in ten² small villages; clustered into lower- and middle-income neighbourhoods. Households within the villages were randomly selected through coordinate generation using QGIS software.

3.2.2 Sampling Methods

Households Interviews. Through QGIS coordinates, the researcher used random sampling methods to select households within the predefined study boundary for interviews. Then, the selected households' structures were marked on the QGIS system to create a division between low- and middle-income households, which were the main division for this study. Overall, 15 households were marked, eight from lower-income households and seven from middle incomes households. As maintained by Van Thiel (2014), the choice of random sampling helped the researcher to overcome the possible bias, as all households within the study boundary had an equal chance to participate. Table 5 below shows the number of household respondents. All household interviews were conducted through semi-structured interviews. (SSI)

Table 5: List of Respondents | SSI

Respondents ID	Gender	Age Bracket	Function
R1SSI	Male	25-34	Household Member (Lower)
R2SSI	Male	25-34	Household Member (Lower)
R3SSI	Female	35-44	Household Member (Lower)
R4SSI	Female	35-44	Household Member (Lower)
R5SSI	Male	25-34	Household Member (Lower)
R6SSI	Female	25-34	Household Member (Lower)
R7SSI	Male	35-44	Household Member (Lower)
R8SSI	Female	25-34	Household Member (Lower)
R9SSI	Male	35-44	Household Member (Middle Income)
R10SSI	Female	35-44	Household Member (Middle Income)
R11SSI	Male	35-44	Household Member (Middle Income)
R12SSI	Male	35-44	Household Member (Middle Income)
R13SSI	Male	35-44	Household Member (Middle Income)
R14SSI	Male	25-34	Household Member (Middle Income)
R15SSI	Male	35-44	Household Member (Middle Income)

Source: Author 2022

Key Informants Interviews (KII): This investigated the influence of transforming structures and processes on food security by conducting key informants’ interviews with respondents from the Ministry of Agriculture. The selection of interviewees was through snowball sampling since the researcher had limited contact with key informants within the ministry. The study interviewed four key informants from various functions, including Policy and Planning, Partnership and Governance and Monitoring and Evaluation. While the interviews with local county government officers would have provided sufficient information, data from the secondary source revealed that agriculture is not a devolved function; hence all policies are made by the national government (GOK 2010). According to Van Thiel (2014), the basic definition of snowball sampling maintain that it is a process in which the research participants are asked to assist the researcher in identifying other potential subjects to be interviewed. Table 6 below shows the list of interviews for key informants

² The lower-income villages comprised China, Milamani and Police Sacco. Royal Gates, Muigai Prestige, New World Gardens, The middle-income village comprises Safaricom 1 & 2 estates, EPZ estate, Fountain View, Riverside, Upper Valley, Kenpipe Gardens and Acacia.

Table 6: List of Key Informants Interviews

Respondents ID	Gender	Age Bracket	Function
R1KI	Male	35-44	Staff Member Ministry of Agriculture (Policy & Planning)
R2KI	Female	25-34	Staff Members Ministry of Agriculture (Partnership & Governance)
R3KI	Male	25-34	Staff Ministry of Agriculture (Office Secretary)
R4KI	Male	45-54	Staff Member Ministry of Agriculture (Monitoring & Evaluation)

Source: Author 2022

Focus Group Discussion (FGD): According to de Zeeuw and Wilbers (2004), focus group interviews are conducted among people with certain things in common. This study relied upon the community commonalities across low- and middle-income households to conduct two focus group interviews. The first group comprised seven members from middle-income households who belonged to zero waste SACCO. In contrast, the second group was from the lower-income households who belonged to the merry-go-round³ and comprised eleven members. The selection of these groups was based on convenience sampling as it was the most convenient method compared with others, such as stratified sampling. Arguments such as the one maintained by Jager et al. (2017) suggest that one of the main weaknesses of convenience sampling is that the sample lacks clear generalizability. This weakness, however, did not affect the quality of data collected as other methods were applied, and the findings were triangulated to increase validity and reliability. Table 7 below shows the list of focus group discussion participants, while figure 6 shows FGD with some members of middle-income households.

Table 7: List of Participants | FGD

Respondents ID	Gender	Age Bracket	Function
R16FGD	Female	25-34	Household Member (Lower)
R17FGD	Male	35-44	Household Member (Lower)
R18FGD	Female	35-44	Household Member (Lower)
R19FGD	Male	35-44	Household Member (Lower)
R20FGD	Male	35-44	Household Member (Lower)
R21FGD	Male	55-64	Household Member (Lower)
R22FGD	Male	35-44	Household Member (Lower)
R23FGD	Female	35-44	Household Member (Lower)
R24FGD	Male	25-34	Household Member (Lower)
R25FGD	Male	35-44	Household Member (Lower)
R26FGD	Male	45-54	Household Member (Lower)
R27FGD	Male	45-54	Household Member (Middle Income)
R28FGD	Male	55-64	Household Member (Middle Income)
R29FGD	Male	35-44	Household Member (Middle Income)
R30FGD	Male	35-44	Household Member (Middle Income)
R31FGD	Male	35-44	Household Member (Middle Income)
R32FGD	Male	35-44	Household Member (Middle Income)
R33FGD	Male	35-44	Household Member (Middle Income)

Source: Author 2022

³ A “merry-go-round” is a small social organization where members contribute a small sum of money on a regular basis, often every week. Each time money is collected, the full sum is paid out to one of the members. The members take turns receiving the pay-out so that after one full cycle, every member of the group has had a turn. By participating, members are essentially putting money away until it comes back to them as a larger sum

Figure 6: Focus Group Discussion



Source: Author 2022

Besides the FGD, KII and SSI, the study also applied the direct observation and review of secondary data sources to obtain data. For instance, data showing the impact of food and nutrition security over time was derived from the Integrated Food Security Phase Classification (IPC, 2022). In the same manner, the National Drought Management Authority (Kenya) provided the most recent data sets on the influence of droughts on food security within Kajiado county (Govt Kenya). Additionally, the researcher relied on unpublished reports from local and international non-governmental organizations working within the study area to get broad information about the research topic.

3.2.3 Pre-survey Analysis

The researcher conducted a pre-survey to test the research instrument to identify the critical aspect that needed further modification ahead of fieldwork. Respondents for the pilot study were selected randomly but within the research boundaries. While their inputs remain crucial to the researcher, they remain excluded in this study's final analysis.

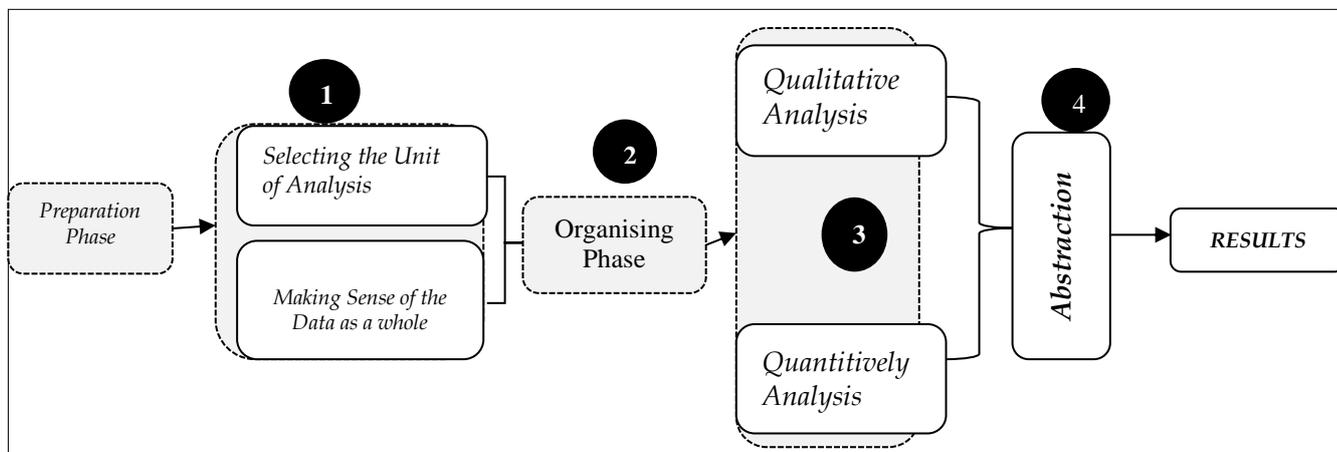
From the pre-survey, the researcher identified key sensitive areas that would have otherwise affected the data collection process. For instance, it was notable during the pre-survey that; most of the respondents were not comfortable sharing their exact ages. The researcher reworked to record age only in groups to ensure the exact age remained anonymous. Secondly, the pre-survey also revealed that respondents were not comfortable with intra-households-related questions. While the intra-household analysis would have been critical to understanding the role of each household member, the analysis in this paper remains void of the mentioned data sets.

3.2.4 Data Analysis

After data collection, the researcher adopted the following steps while analysing, as shown in figure 7. The first step was selecting appropriate units of analysis, which entailed audio transcriptions and categorization where field notes were compiled and clustered into codes with separate titles to make them more meaningful. Any missing data were identified at this stage, and appropriate follow-ups were made. The next step was clustering, where qualitative and quantitative data was organized in different sects for further analysis in step 3. After completion of the analysis, the fourth step was abstraction; relevant codes were generated from the

qualitative data, while graphs, pie charts and tables were obtained from the quantitative data through SPSS and partly excel.

Figure 7: Data Analysis Process



Source: Elo and Kyngäs (2008, p.110) "Edited"

3.2.5 Study Limitation

Accordingly, the findings of this study are subject to three critical limitations. First, the researcher encountered challenges conducting interviews late during the evening hours. For instance, an average of 10 respondents from middle- and middle-income households preferred being interviewed at 1930Hrs as they could not be available during the day. However, this was not considered due to the risk, especially for the research team. Prior to the commencement of the data collection, the researcher conducted a pre-survey to test the data collection instruments and get more familiar with the study area. During the pilot study, various issues emerged, which guided the researcher to take caution while collecting data. Among the major issue identified, security for non-residents was the most critical. It was evident that moving around the area past 1800Hrs was prone to vulnerability, such as pickpocketing, which the researcher endeavoured to avoid. The exclusion of 10 respondents reduced the sample size for SSI from 25 to 15.

Secondly, the study did not find any recent demographic secondary data on gender, which led to a gender gap between the number of male and female respondents for SSI and FGD. While such data could have easily been found on the Independent Electoral Commission Website (IEBC) through a review of the voter registration list, it was surprising to learn that the list was unreliable as it contained mixed-up names, including the deceased. IEBC acknowledged this error; however, the research had already advanced by the time it was being corrected.

Lastly, the data collection and analysis for focus group discussion and household interviews were done concurrently. While the researcher had planned to collect and analyse data from households (SSI) before conducting FGDs to cross-check the findings to achieve high validity, the pre-survey results proved this impossible. The researcher established that most households within the study boundary planned to travel to the countryside to vote. Even though the researcher remained aware of the election, it was beyond his knowledge to understand the respondent's voting region before the fieldwork. The researcher's main assumption was that all households/respondents within the study boundary would vote within their area, and there would be no travel to the countryside. Conducting household SSI and analyzing before proceeding to FGD for cross-checking would have resulted in a significant decline in the number of respondents.

The three critical constraints, however, did not affect the validity of findings as the study conducted triangulation of both primary and secondary data then deduced

Chapter 4: Research Findings

In this chapter, the research results are presented, statistically interpreted, and related to the literature and fieldwork results to answer the research questions posed in Chapter 1. In addition, it includes the description of five assets mentioned in the conceptual framework and how they exist across different households; that is, lower and middle income.

4.1 Respondents demographics

4.1.1 Gender and Age

The study engaged 37 respondents; 15 participated through SSI, 18 through FGDs and 4 through KI. Table 8 below the participants for each tool in percentages

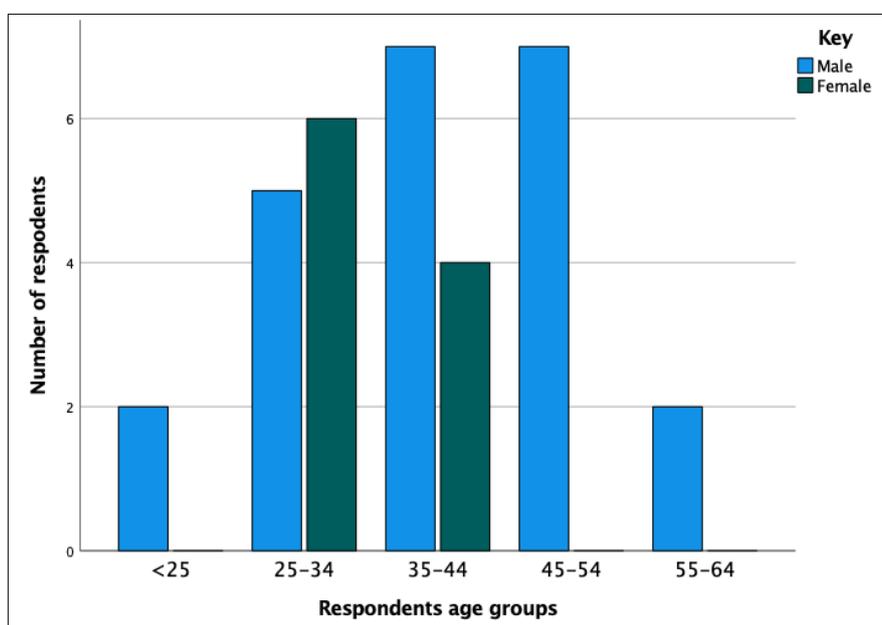
Table 8: Respondents' Gender Analysis

	SSI	FGD	KI
Male (%)	67	83	75
Females (%)	33	17	25
Cumulative Percentage (%)	100	100	100

Source: Author 2022

During the study, it was notable that the female respondent represented a smaller fraction than men. However, the researcher noted that most female participants were more proactive and willing to give in-depth information than their male counterparts. This helped the researcher achieve breadth and depth while collecting the data. Figure 8 below shows the participants' age groups. The average age of male respondents was 40 years, while females were 35 years.

Figure 8: Respondents' Age Group



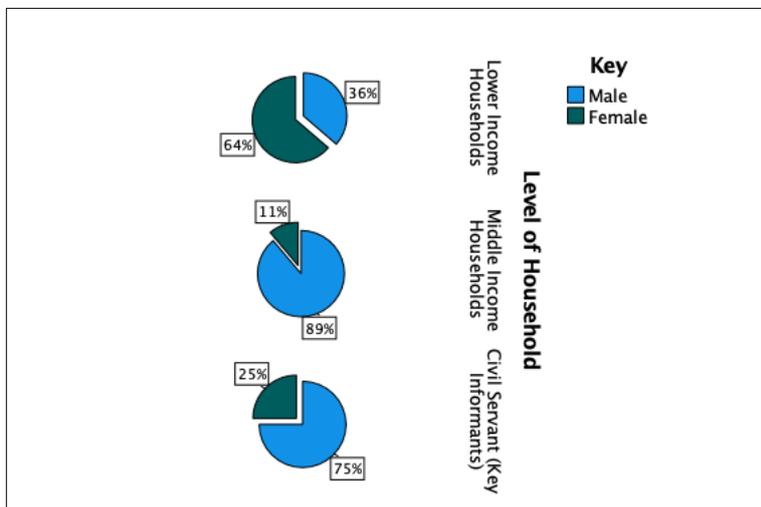
Source: Author 2022

4.1.2 Respondents' distribution across neighbourhoods

This study was conducted in two lower and middle-income neighbourhoods. In the lower-income neighbourhoods, 64 per cent of females and 36 per cent of males participated in the research. On the contrary, a disparity between males and females was predominant in the study across the middle-income class. Overall,

the researcher engaged 89 per cent of males and 11 per cent of females. The data from the literature review manifest that middle-income neighbourhoods in Kitengela are more preferred by recent graduates starting up a career with stable income flow. The study, through observation, found that; males were more dominant in this middle-income neighbourhood than females. Figure 9 below shows a summary of the respondents' distribution.

Figure 9: Respondents' Distribution Across neighbourhoods



Source Author 2022

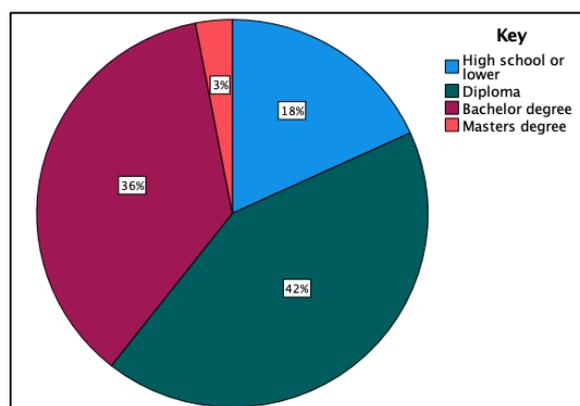
4.2 Livelihoods Assets Analysis in Kitengela

The study analysed livelihood assets through different methods. In reference to a discussion in chapter 2, section 2.4.4, livelihoods assets indicators have been broken down as follows; (i) Human assets; household skillset, individual ability to work (ii) Social Assets; households' social network, trust and reciprocity (iii) Natural capital; households ability to produce food, (iv) Physical Assets; household's access to public utilities (roads, schools, food markets), household access to information (iv) Financial Assets; household access to pensions, and savings.

4.2.1 Human Assets Analysis

The findings from the data collected suggest that most households have human Assets. To measure a household's skillset, the researcher asked respondents their level of education, and 81 per cent noted to have a college diploma and above both in lower- and middle-income neighbourhood. It was notable, however, across lower income neighbourhoods, majority of the respondents have studied only up to diploma level. While professional training enables the individual to work, other interplays, such as human health, play a part. However, through observation and review of secondary data, this study did not find any sign of health-related conditions within the study boundary besides Covid-19, in which the majority were vaccinated. Figure 10 below shows households' level of education.

Figure 10: Household-level of Education



Source: Author 2022

Even with professional training to work, most respondents still struggle to use their knowledge. For instance, R1SSI noted that.,

[...] as you might know, even if I look for another job, the story will be the same since if you do not have a network; you have limited chances of getting a professional job here, especially in my career line.” |

Another respondent also noted; despite being skilled in civil engineering, his company has reduced him to a casual labourer, just like any other employee with no skills.

"I'm a trained civil engineer from [...] university, I got employed in 2018 with [...] company, and since I joined the company, I have never had the opportunity to practice the skills I was trained in [...] since I know nobody in the company to recommend me" R4SSI

When the researcher asked whether looking for another job was an option, the respondent noted,

[...] as you might know, even if I look for another job, the story will be the same since if you do not have a network, you have limited chances of getting a professional job here, especially in my career line.” R4SSI

The general findings across the two FGDs revealed that, during drought, the cost-of-living changes radically due to the decline in the supply of goods, especially farm goods. While most participants with professional jobs maintain their income, they still strain to meet the rising cost of living during drought seasons. For instance, R30FGD note that.

"[...] last year during drought, we pleaded with our employer to increase our wages or give us more off days to enable us to get side 'hustles' [...]. Our income was insufficient to meet daily needs, including food; while he heard our plea, we felt sorry for our colleagues working with no college diploma. Their salaries were never increased, even with a single penny

R18 FGD noted during the FGD session that, during drought, the supply of milk and other food items, including vegetable fruits, while the demand increases. Consequently, most people working as casual labourers in hotels and market stalls lost their jobs.

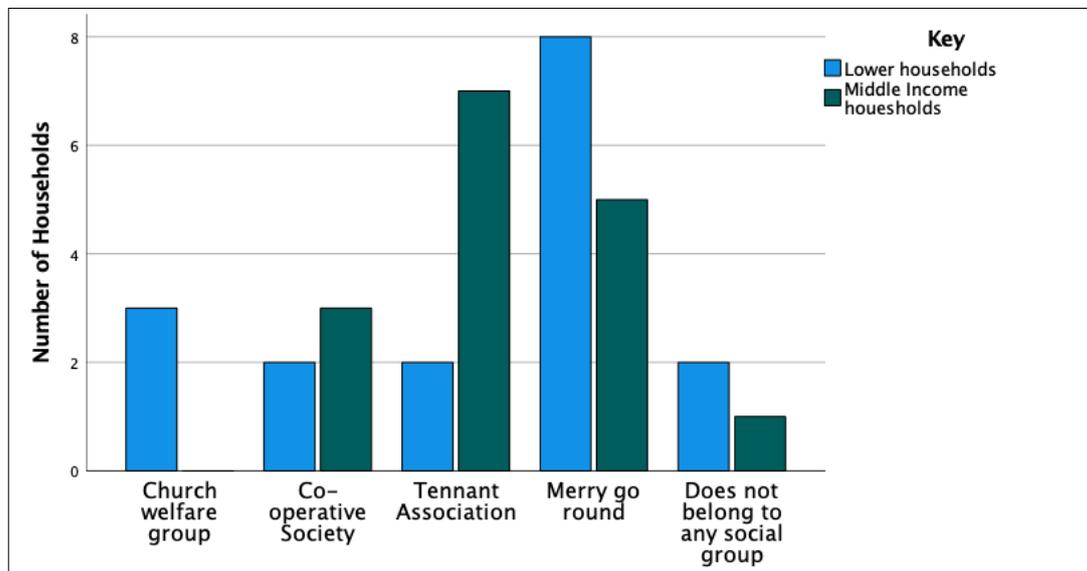
"[....]. During the period you described to us, my wife, who was working as a tea vendor, lost her job as there were enough supplies of milk to make quality tea; we struggled as a family to access basic needs, including food".

4.2.2 Social Assets Analysis

The data collected reveal that lower- and middle-income households have good access to social assets. The researcher established that the social capital across the study area is self-organized, some through formal legal processes, while others are not. The existing social groups include church welfare groups, merry-go-round⁴, Tennant Association, and cooperative groups. Figure 11 below shows the various social asset groups accessed by different household levels. Most of the respondents from lower-income households predominantly belong to the merry-go-round group, which aims to increase members' access to monetary resources to meet their livelihood needs. According to R23FGD, the merry-go-round has helped them (him and his family) pay school fees for the daughter and currently, the family is investing in small-scale farming in their rural home to give them access to farm food when drought hits. R26FGD also filed a response like this.

"[...] One thing I like about being a member of a cooperative society is any time I need a small loan, I can easily get one with limited collateral security demands, unlike a bank."

Figure 11: Social assets Among Households



Source: Author 2022

The Tenant Association, to which most of the respondents from middle-income households belong, has its significance. For instance, the R10SSI noted that.

"In our neighbourhood, often we encounter problems with service supply, for instance, during the period which you explained, we had no running water for several weeks, and the landlords were doing nothing. So, the association helped us to increase our bargaining power to the landlord to have the service restored."

Similar responses were noted among other respondents who indicated that tenants' association also helps them to lobby for rent holiday, especially during crises like the recent Covid-19. Rent holiday, as used in this context, implies months when the landlord subsidizes the rent to cushion tenants from moving out. However, as evident from figure 11, only a fraction of low-income households belongs to tenant associations. When

⁴ A "merry-go-round" is a small social organization where members contribute a small sum of money on a regular basis, often every week. Each time money is collected, the full sum is paid out to one of the members

respondents in this cluster were asked why they do not prefer tenant associations, most of them stated that their landlords are afraid of such associations.

"When they (landlord) realize, tenants are regrouping to form such an association, they get an eviction notice". R7SSI

Another respondent stated

*"Our landlord knows the services they provide are below standards, and they are afraid if we unite and form an association [...] we will increase our bargaining power to sue them."
R9SSI*

The findings on cooperative societies revealed that local non-governmental organizations drive most of the SACCOs initiatives. Across the two neighbourhoods, household members are slowly joining these cooperatives as a strategy to meet other livelihood needs. For instance, R13SSI noted that

"[...] After joining Kite Motors Cooperative Society, I got a non-collateral loan which helped me buy a motorbike to do Boda Boda⁵. I now use it to meet my household need, [...], no bank was willing to offer me a loan without collateral security."

A small fraction of the respondents who do not belong to any social group had various reasons. For instance, the low-income households who do not belong to any social groups stated that they were still new in the area and thus unaware of the groups. From the middle household, respondents who do not belong to any social group stated that they opted not to belong to any group as they have attained retirement age, and soon, they will be moving out to start life upcountry.

The study found that, during drought, social assets, especially in low-income households where a majority have no formal jobs, are greatly affected. It was evident from the data collected that drought weakens social assets in various ways. For instance, during drought, merry-go-round and church welfare groups become dysfunctional as most members travel up - the country due to the heightened cost of living. The general finding from SSI suggests that many people are not comfortable staying around during drought due to the high price of food, inadequate access to resources such as water, and even menial jobs become limited. Other social assets, such as cooperative societies, become dormant and unable to function since there is a low-profit turnover to share dividends. It is interesting to note that, however, the tenant's association which most middle households belong, becomes more proactive during drought. The study established that during drought, the tenant's association becomes more effective in the lobby for rent holidays and, to some extent, provision of other resources such as water which is one of the challenges brought about by drought.

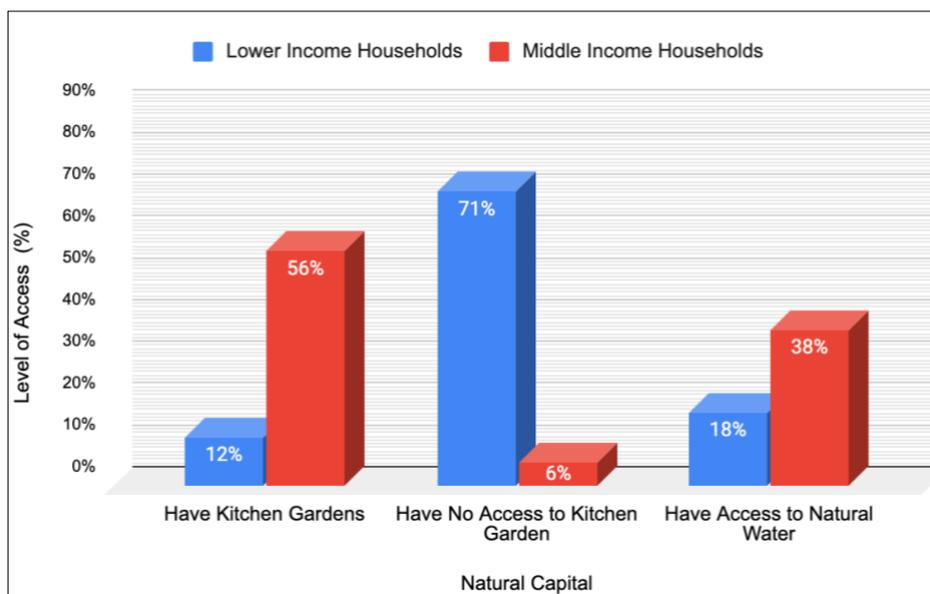
4.2.3 Natural Assets Analysis

In this study, natural assets have been defined as stocks of natural resources that provide services useful to those who derive all or part of their livelihood from resource-based activities. The study has examined the households' access to kitchen gardens and natural water as critical indicators of natural assets.

Contrary to expectation, this study did not find a significant correlation between the availability of boreholes within households and access to natural water. For instance, the majority of the respondent noted that, while there is the presence of a borehole within her neighbourhood, access to water from the borehole remains a challenge as most of them are shallow and get dry during drought seasons

⁵ *Boda bodas* are bicycles and motorbike taxi that transport people at considerably fair fare prices.

Figure 12: Level of households Access to Natural Assets



Source: Author 2022

Figure 12 above shows the intercorrelation between middle- and lower-income households and their access to natural assets. The analysis of the results shows that middle-income households have more access to natural assets than lower-income households. For instance, kitchen garden, which this study used as one of the natural asset indicators, only 6 per cent of lower-income households have access to it compared to 71 per cent in the middle households. The study found many factors among the low-income households contribute to this; respondent R5SSI stated that.

"[...] I'd prefer to remain in my current house without a backyard garden but with lower rent."

Another respondent noted that, despite the high rent for a house with an annexed garden, other dangers of wild animals, such as snakes, remain a disabling factor. She stated.

"Before moving to my current house, I lived on the other side of the street in a house with a nice 4x4M garden. One day, I woke up and found a snake crawling behind my coach [...] I was so frustrated, and I decided to move to my current house that has no garden" (R33FGD)

A small percentage (29 per cent) of middle-income households without access to a Kitchen Garden cited various reasons; the most interesting was one from the R10SSI; she said,

"[...] we realized a high demand for local chicken breed amongst our neighbourhoods, and since our garden was not bringing any income, we negotiated with the landlord to have it converted "nyumba ya Kuku"⁶."

⁶ Nyumba ya Kuku is Swahili word that mean Chicken Yard

Figure 13: Kitchen Yard



Source: R10SSI

Across all the respondents, a common phenomenon was observed in the use of the kitchen garden, with a majority reporting that they use it for gardening vegetables and a small fraction using it as flower gardens. The researcher observed how 'low-cost garden technology' had been utilized to create high-impact outcomes. Through observation, the study established the presence of sack gardens mainly across low incomes neighbourhoods and corn-shaped gardens among middle-income households, as shown in figure 14 below

Figure 14: Sack and Cone Gardens



Source: Author 2022

This study also used the respondents' access to natural water as an indicator of natural assets. Natural water, as used in this study, implies either rain-harvested water stored in a tank or boreholes that the interviewees can access. While the county government of Kajiado is supposed to supply water to the households, the study found that the county is yet to complete the infrastructure to enable access to county water by households within the study area

As seen in figure 11, 18 per cent of lower-income households have access to natural water compared to 38 per cent of low-income households. The observation findings across the low-income neighbourhood revealed that, even though there are boreholes across most households, most are dysfunctional.

"While you can see plenty of boreholes across our neighbourhood, they are all for show-offs. Often the landlords use them to secure funds from NGOs, but they never get finished [...]" R13SSI

There were no other sources of natural water across the low-income neighbourhood; most respondents noted that they struggle to get clean water during drought. In addition, the triangulation of findings from SSI, FGDs and secondary sources found that during the drought, the price of 20L jerricans skyrocketed to as high as \$ 0,75 (KES 90), double the average price of \$ 0,42 (KES 50).

4.2.4 Physical Assets Analysis

This study investigated households' access to Physical assets and how and influence food security. From the literature reviews, *physical assets* have been defined as the basic infrastructure made up of changes in the physical environment that provide people with essential services to meet their basic needs. While there are different indicators of physical assets mentioned in the literature review, the study only used access and use infrastructure (roads), public utilities (schools, hospitals) and communication assets (radios and televisions).

To measure access to information by respondents, the researcher asked whether they owned television sets or radio and whether they found weather information updates helpful. Most respondents mentioned; that they pay little regard to the weather forecast news regardless of where they are coming from. One respondent noted

[...] there indeed comes weather news at the end of the prime-time broadcast, and sometimes we read it in newspapers, but we find it not interesting to follow[...]" R15SSI

Similarly, another respondent maintained.

[...] the only channel that broadcasts weather news is Kenya Broadcasting Cooperation (KBC), which we often do not watch as it does not provide real-time news like other channels such [...]; perhaps we could be more interested to learn from social media, but often social is full of commercial adverts and nothing about weather [...]" R14SSI

The study also sought to inquire about access to infrastructure by asking the respondents how easy it easy for them to access public markets and other social amenities like schools. Interestingly the study found divergent feedback from lower- and middle-income households. First, data from lower-income households revealed that access to markets and schools remains troublesome as most public means of transport do not reach their neighbourhoods. One interviewer noted.

"[...] we feel disconnected from the main market the fact that we have to walk a distance before getting public means of travel due to poor road in our neighbourhoods" R26FGD

Most members from lower-income households also mentioned that while they have access to a learning institution, including primary and secondary schools, the institutions have limited resources to facilitate learning. For example, one respondent noted the following.

"I take my children to [...] public primary school because I do not have the means to take them to private schools where they can get exposed to better learning facilities. I am not certain my children are getting the proper education; there are no desks, and the classrooms are open disserted [...]" R17SSI

Two third of the respondents from middle-income households also said that they have better access to learning institutions which, for times, have produced top students in the national examination. It was noted that a majority of the interviewees expressed that the cost of school fees across the neighbourhoods remains untannable, especially for those with no stable income during drought. One interview said

"[...] from next year (2023), I will transfer my little girl to a new school, the school fees in her current institution continue to skyrocket, and I might not sustain it based on the current situation where prices of commodities have skyrocketed due to decline in supply" R25FGD

This feedback was echoed by other respondents, including R26FGD, R29FGD and R30FGD. Contrary to low-income households, a common view among households from middle-income households was that they have good access to the road network and can easily access the market.

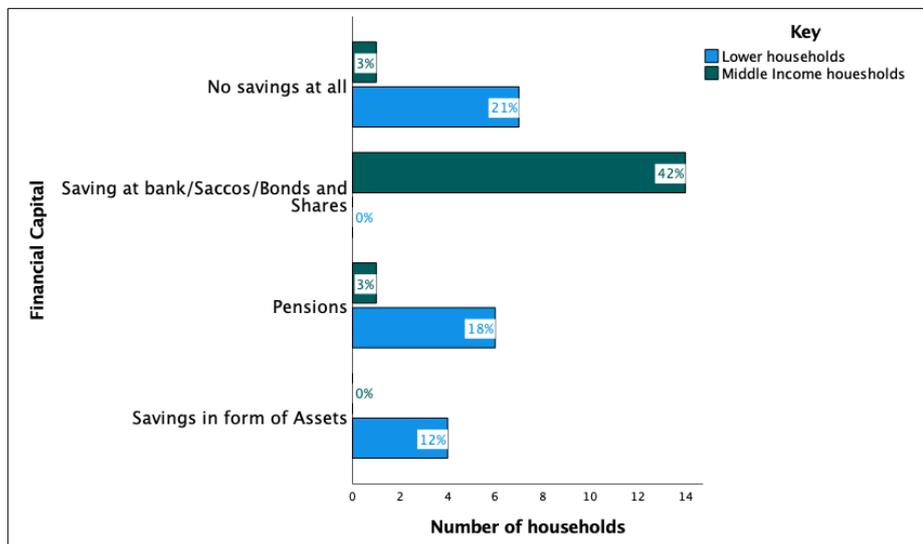
"[...] one of the reasons I moved to this place is that I can easily access the market, and it is easy to board a matatu or 'boda boda'. They are always on standby" R2SSI

4.2.5 Financial Assets Analysis

This study defines financial assets as resources people use to achieve their livelihood needs, including flows and stocks, which can simultaneously contribute to consumption and production. The researcher used different indicators to measure household access to financial assets, including access to pensions and savings, either in the form of assets or cash. While the study excluded other measures, such as access to bond shares, during data collection, some respondents revealed they had saved in bonds and shares, which was then considered part of the indicators.

Figures 13 below show the distributions of access to financial assets across different household levels. It is apparent from the figure that only 30 per cent of low-income households have access to financial assets in the form of pensions and saving assets. This is low compared to the 42 per cent of middle-income households whose primary mode of access to financial assets is through savings (at banks, SACCOs and bonds). Only 3 per cent of interviewees from middle-income households lack access to financial assets. Figure 13 below shows illustration of findings on Financial Assets.

Figure 13: Financial Assets Distribution Across households



Source: Author 2022

The figure above shows that most middle-income households have access to financial assets through bank savings, bonds, and shares⁷. It was evident during interviews that most of the respondents from middle-

⁷ Shares are individual investment in government or private companies where they loan money (loan to the government / private companies) that earn interest with time.

income households have a predictable income flow from either menial jobs or formal jobs where they remit part of the income into saving accounts or buy treasury bonds⁸. For instance, one respondent noted.

“I work as a junior clerk at Bamburi cement; as you can see, I live in a small house paying little rent, which has helped me to save. I save to buy a plot and build a house for my family. It will help reduce the rental cost.” R14SSI

Also, figure 13 reveals that 21 per cent of the respondents in lower-income households have no access to financial assets. Most respondents cited the lack of adequate income to save or invest in other assets that can be liquified to cash. The minority who gave contrary responses mentioned that they were not well informed about saving, and none of them had worked with the government to get pensions. Part of the responses gathered include

“My monthly salary is KES [...] which almost 60 per cent goes on rent, and the rest I pay school fees to my little daughter. As you can see, I do not even have adequate money to buy food for my family. Often, I get food on credit [...]” R7SSI

Another respondent also stated

“[...] I can save part of my little income so that it can accrue interest; however, I do not even have a bank account. I wish banks could educate us on saving [...]” R24FGD.

The study sought to find out how drought affects financial capital by asking respondents; How do savings (in the bank/SACCO/ Assets) affect by drought? Most respondents noted that their savings are significantly affected by the increased cost of living during drought. For instance, R10SSI stated that.

“During the 2019 drought period, I sold all my chickens so that my children could continue with school. This was because my current income could not sustain paying the school fees for the two terms.”

The above response suggests that R10SSI had access to financial capital through savings in chicken stocks. An argument such as the one presented above is supported by the responses from R12SSI, who noted that,

“During drought, I sold off all the shares I had invested in [...]. Life was tough, and I could not support my family, my relatives, and my rural home.”

Table 9 below summarises the influence of drought on food security based on the study findings.

⁸ Securities that pay a fixed rate of interest every six months until the security matures, which is when Treasury pays the par value.

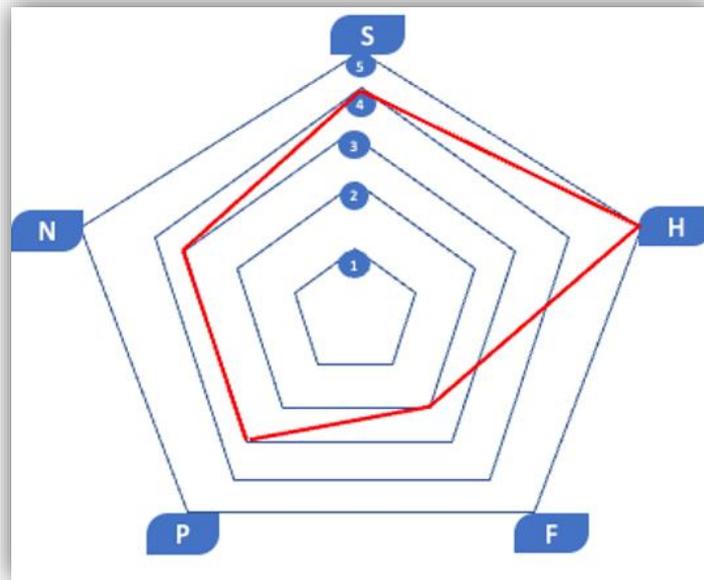
Table 9: Effects of Droughts on Livelihoods Assets (Summary)

Assets	As Defined in the study	Effects of Droughts (Paraphrased)	Quote	Reference
Human Assets	Good human health combined with good skills, knowledge, and the ability to perform specific tasks	High food prices due to low supply from the farm	"[...] last year during drought, we pleaded with our employer to increase our wages or give us more off days to enable us to get side 'hustles' [...]. Our income was insufficient to meet daily needs, including food;"	R30FGD
		Decline in households' income which causes limited access to food	"[...]. During the period which you have described to us, my wife, who was working as a tea vendor, lost her job as there were enough supplies of milk to make quality tea; we struggled as a family to access basic needs, including food".	R18FGD
Social Assets	Resources that enable or help people achieve their livelihood goals. In the context of the SLF framework, DFID	Weakens the social capital fabric by having some members migrate to look for alternative sources of livelihood	According to R23FGD, many people are not comfortable staying around during drought due to the high price of food, inadequate access to resources such as water, and even menial jobs become limited	R23FGD <i>(Condensed quote)</i>
Natura Assets	Stock of natural resources that provides services useful to those who derive all or part of their livelihood from resource-based activities	Cause strain on natural assets (water)	(i)...the tenants' association becomes more effective in the lobby for rent holidays and, to some extent, provision of other resources such as water which is one of the challenges brought about by drought (FGD Reference) (ii) drought affects the availability of natural assets such as water which is critical to human health. (Stanke et al., 2013),	Researcher triangulation
Physical Assets	The basic infrastructure made up of changes in the physical environment that provide people with essential services to meet their basic needs	Indirectly affect households by depleting the savings/income, and they cannot afford access to quality physical assets such as schools with good education facilities	"[...] from next year (2023), I will transfer my little girl to a new school, the school fees in her current institution continue to skyrocket, and I might not sustain it based on the current situation where prices of commodities have skyrocketed due to decline in supply" R25FGD	R25FGD, R26FGD, R29FGD and R30FGD
Financial Assets	Resources people use to achieve their livelihood goals. They include both flows and stocks, which can contribute to consumption and production at the same time	High cost of living affects saving stocks	"During the 2019 drought period, I sold all my chickens so that my children could continue with school. This was because my current income could not sustain paying the school fees for the two terms." R10SSI "During drought, I sold off all the shares I had invested in [...]. Life was tough, and I could not support my family, my relatives, and my rural home." (R12SSI)	R10SSI, R12SSI

Source: Author 2022

Figure 15 below shows livelihood assets distribution across lower- and middle-income neighbourhoods within the study area. Human assets are the most predominant assets, while financial assets are the least (see the red line). (H- Human Assets, F-Financial Assets, P-Physical Assets, N-Natural Assets, S-Social Assets)

Figure 15: Assets Distribution Across Households



Source: Author 2022

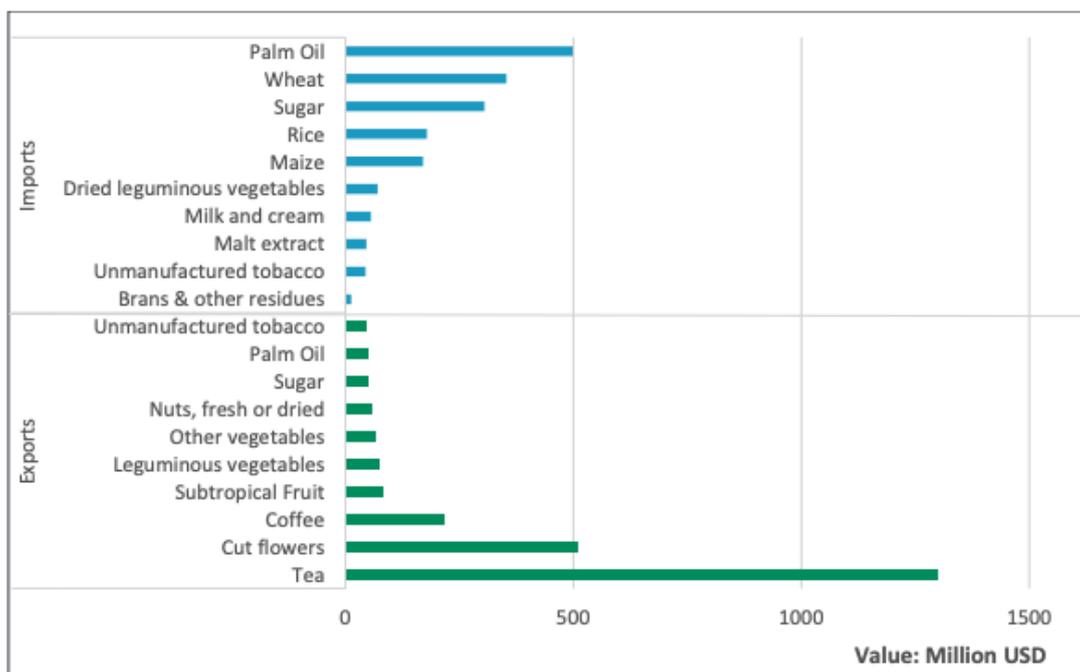
4.3 Transforming Structures and processes

Under this section, data was gathered based on various factors revolving around policies, institutions, and social-cultural aspects and how they relate to food security. Examining these factors helped the researcher to establish how they influence access to food security.

4.3.1 Food Policies

The finding from KII informants and the results from secondary data sources established the existence of various policies on food security. The study found that, over the past decades, Kenya has never met its population's food demands. Often, the country has continued to experience a food deficit, which has been linked to various factors. They include a lack of government support for the smallholder farmer, drought, which often result in low agricultural produce, etcetera. As a result, the country has signed open food trade policies at regional and global levels to meet the existing staple food. Figure 16 below shows some of the major imports and exports in Kenya.

Figure 16: Major Imports and Exports of Agricultural Products in Kenya



Source: ITC Trade map 2018

The above statistics show major food imports and exports, which are a result of multilateral trade policy. It is evident maize, wheat, and rice are the main imports, while tea, coffee and flowers remain dominants in the exports. Importantly, data gathered from key informants revealed that the current policies and institutional partnership had seen the country import over 700,000 tons of maize from Uganda and Tanzania for the financial year 2020/2021.

One respondent noted.

“After being hit by Covid-19, the government cut the budget that normally goes to agriculture production. Consequently, we had a maize deficit, but because we are in a good bilateral agreement with our neighbours, we (the government) imported thousands of bags of maize [...]” R5KI

The current policies have also enabled the country to get other food imports from states such as Ukraine and Russia. Almost two third of the participant explained how the current war between Ukraine and Russia had affected the local food supply. As R3KII put it.

“[...] currently you can see there is the war on government as to why the price of wheat flour has gone high, what fails to linger into people’s mind is, we are not wheat sufficient country, most of our wheat comes from Ukraine, and since they entered into war, we are unable to get import supply which has drastically shifted the prices of the commodity.”

Turning now to how the import policies have affected food access locally, it was apparent across a majority of the respondents that the open food trade policy, especially for East Africa, continues to shrink the price of locally produced maize, and local farmers cannot get enough profit to scale up. One respondent noted;

“When we import maize, we release it to the market at the subsidized price. On the occasion where there are still existing small stocks from local farmers, we subvert the current market prices, causing them a loss” (R3KI)

4.3.2 Irrigation Policies

Through the 2030 vision plans, the Kenyan government has established a framework to put arid and semi-arid lands under irrigation to increase food production. This study sought to find how effective the implementation process has been since the initiative's launch. Based on the KI interviews and review of secondary data sources, the researcher noticed that ongoing irrigational programs exist in semi-arid regions such as Galana Kulalu⁹. Data from the secondary sources, which corresponded with KII feedback, suggest that Galana, a pioneer project, aims to offset the staple food deficit such as maize by 2030. However, a general view amongst the respondent cast doubt on the project, pointing out that it was initiated as a political scheme to advance the government's legacy. For instance, R4KI noted that

[...] while this project (Galana Irrigation) gave much hope to Kenyans, the truth behind it remains a political game to report the current government legacy. [...] look, it is now three years since the first pilot was done, nothing seems to be happening, the land is going bare again, there are irrigation machine that was there [...], you can see this happening at the virtue of the last days of the current government”

In other opinions raised by the respondent, it was apparent the government did not involve the community members in initiating these activities. An analysis of the data collected revealed that most of the decisions about policy implementation are made in board rooms without the involvement of local stakeholders. One respondent cited that.

“While most of the irrigation schemes are meant to bring good to the community, its implementation remains top-down, and the local people are left to wonder on what to do, majority of them (local people) forming movement to oppose the project, it not sustainable” R2KI

4.3.3 Farmer and Market Culture

This sub-section discusses how the market culture and farmer behavioural practices affect the food supply in correlation with food accessibility at a local level. Data gathered from key informants revealed that while there is a continued effort by the government to provide subsidies on farm inputs to increase food production, more often, the subsidy never reaches the target beneficiaries. As a result, smallholder farmers continue encountering hiked agricultural input prices, negatively affecting their production capacity.

By asking the respondents about the measures taken by the government to cushion local farmers from bad market prices, the study found out that the major challenge lies between the middlemen who have no regard for poor farmers. One interviewee said.

“In 2019, just before covid, the government injected 1 billion Kenya shillings into the importation of fertilizers that would ripple to increased food production locally. However, when the imports arrived at our ports, few businesspeople took advantage and supplied the fertilizer to local retail shops at an unsubsidized price. This affected the local food supply as the country was in the middle pandemic, and most farmers had no stable income to buy inputs.” R3KI.

The study further investigated whether the government was aware of this scheme and whether any action was being taken against such malpractices. While responding to this, R2KI noted that.

⁹ More about Galana, refer- <https://bit.ly/3xo30wD>

"[...] it is true the government might be aware of this, but the main challenge is corruption. Such businesspeople cannot face legal action as they collaborate with "untouchables" within the government. A culture of impunity within our system will take time to erode."

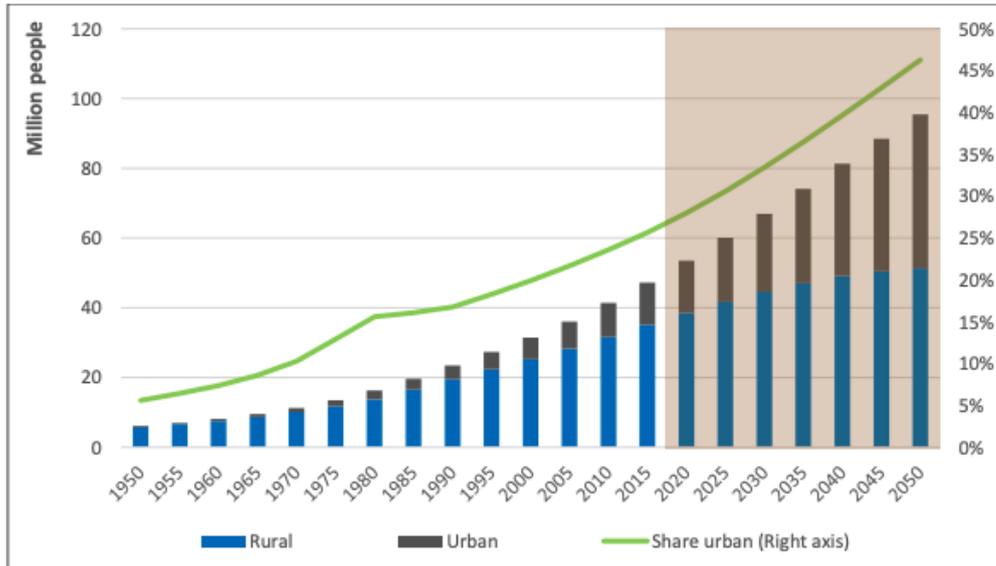
Besides, the study also established that sometimes when the subsidized inputs reach the last mile distributor, a fraction of them can still decide to set their prices against recommended price to make more profit. This, in return, affects food availability and accessibility, especially at the local level, which is tied to urban areas. R3KI noted.

"Last year, we conducted a country-wide market survey to establish the price of fertilizer across the 47-seven counties. It surprised us that Diammonium Ammonium Sulphate fertilizer (DAP) retails at different prices across the country despite being a subsidized commodity."

4.3.4 Urban Agriculture

The secondary data examined in this study revealed that urban agriculture is yet to become a centre of focus both at the national and county level. The study sought to establish how food production at an urban level can be one of the solutions to food insecurity in Kenya. By putting forward the question, how is the Ministry of Agriculture working with county governments to improve food security through urban agriculture? The researcher gained insights into how the Ministry of Agriculture collaborates with other stakeholders to promote urban food production. The preliminary responses from the key informants' interviews revealed that, while urban agriculture might not be a new term in Kenya, much is yet to be achieved, especially in new upcoming urban regions that started to exist after devolution in 2010. The study found that rural-to-urban migrations are one of the challenges exacerbating urban farming, especially in low and middle-income settlements.

Figure 17: Population growth and urbanization projection in Kenya



Source : (Source : UN Population and Urbanisation prospects, 2018)

Figure 17 above shows the Urban population growth trends in Kenya. The population growth across cities in Kenya is taking a veridical trajectory, a phenomenon that has both positive and negative impacts, especially in the food sector. The KII interviews revealed that the government, through the ministry of agriculture, is aware of the growing urban population, and there are plans to address the issue.

"The ministry is developing a partnership to work with respective county government to develop a strategy on how to build capacity for urban dwellers to start engaging in urban agriculture. We

have zoned Nairobi into sections of lower-income, middle-income, and upper-income neighbourhoods. We intend to help the county identify priority needs for every urban dweller to ensure they remain engaged even as we roll out the plan" R4KI

To know the rationale behind the idea, the study sought clarity on how urban agriculture will effectively address food security. In response, R2KI noted.

"Urban agriculture remains critical in supplying households with small quantities but highly nutritious foods. Often, these foods are affected by factors such as drought. The goal is to have households (urban) that can meet their nutritional needs with minimal cost possible."

Table 10 below summarises the influence of policies on food security in Kenya. It has been developed based on primary and secondary data used in this study.

Table 10: Policies on Food Security in Kenya

Transforming Structures and Process	Target Interventions	Positive Attributes	Negative Attributes	Food Security Dimension
Multilateral food trade policy	Balance food deficit through imports	Balance food deficit to increase local food availability >R5KI	<i>Imports without regulation affect the local food markets. R3KI</i>	Food Availability
Irrigation Schemes in arid and Semi-arid regions	Increase local food production to meet the population demands	Offsetting stable food deficit by boosting production across the marginalized region (ASAL) > Data triangulation [Secondary and Primary Sources]	<i>Often the policy framework has lapses in implementation which have resulted in a political show game >R4KI</i>	Food Availability
Food Subsidies	Enhancing food accessibility by covering part of the consumer cost directly to consumable foods or indirectly through production cost	-	<i>Corruption remains the main challenge as the majority of consumers do not enjoy the government subsidies > R2KI</i> <i>Food subsidies without a mainstream people's livelihoods assets create a dependency syndrome > (van Daalen et al., 2022)</i>	Food Availability & Accessibility
Urban Agriculture	Increase food availability (fresh food) at the households' level within an urban context	Increase households' access to nutritious food >R2KI	<i>Urban agriculture is greatly affected by rural-urban migration that exerts pressure on existing natural resources (lands) > Secondary data</i>	Accessibility and Availability

Source: Author 2022

Chapter 5. Discussions of Findings

This chapter discusses in detail the finding presented in Chapter 5. It takes into perspective different elements starting from the demographic analysis of the respondents, their assets, and how they enable or disable access to food security. Further, this chapter discusses how structural processes and institutions intertwine with food accessibility on a broad spectrum.

5.1 Respondents Choice of neighbourhood

The researcher's observation suggests that more females reside within low-income neighbourhoods than males. While the study had fewer female respondents than males, the secondary data analysis from the Kenya National Bureau of Statistics (2019) construes the researcher's observation. As explained in chapter 2 of this study, the difference between low- and middle-income neighbourhoods is that most middle-income group households have stable/predictable income flows. Surveys such as the one by Kagome (2022) show that females have less access to the formal labour market in Kenya than males. Table 11 below shows a comparison in the registration of enterprises between males and females. Business enterprises are one of the forms of employment for at least 51 per cent of Kenyans (World Bank, 2018)

Table 11: Micro Small and Medium Enterprise Basic Report

	Licensed	Unlicensed
Male Only	48	31
Female only	32	61
Male-Male partners	3	0.4
Female-Female partners	1	1
Male-Female partners	17	6
Total	100	100

Source: Kagume 2022 p. 6

Table 11 above corroborates the finding in the previous chapter. It is quite revealing the unique gender dynamics witnessed in the registration business, which is a form of self-employment. Females have a high number of unlicensed businesses, with a few registered businesses compared to men. Based on the data findings, the study hypothesises that income flow for women is low compared to men, and most of them cannot sustain living in middle-income neighbourhoods, evident from the findings. Further research is recommended to unravel the employment gaps between men and women in Kenya

5.2 Livelihoods Assets

This study has examined the interplay between household food security and climate shock using the *drought* as a climate vulnerability indicator. The generalisability of the finding discussed in chapter 4 suggests that livelihood assets play a critical role in achieving food security among households, especially in drought-induced food insecurity. Most households within the study boundary have good access to human assets, while financial assets remain the least accessed. While all five assets are critical enablers for households to achieve their livelihood outcomes, the analysis of data collected suggests that financial and social assets are the most crucial assets to achieve households' food security. This interpretation, however, should be taken with caution as it is found based on the critical analysis of the qualitative data collected from the respondents. Therefore, further quantitative research of assets is recommended before deducing.

5.2.1 Human Assets

Human assets are critical to households' access to food security. This study found that households with more access to human assets cope well with drought-induced food insecurity (R30FGD). The analysis of responses

such as the one posted by R30FGD *suggests* that a lack of professional skills, which are elements of Human Assets, are a critical challenge in coping with drought-induced food insecurity. Households who fail to advance their knowledge and skills remain professionally uncompetitive and cannot lobby for better wages, notwithstanding their inability to cope with the shifting labour market's needs.

Studies such as the one by Iftikhar and Mahmood (2017) have shown that higher stocks of human assets can lead to better incomes in labour markets and higher productivity and innovation among households to meet the emerging livelihoods needs, including food security. Moreover, Handayani et al. (2020) point out that despite other factors, including gender, age and years of experience, bettering human assets through training opens windows of better opportunities that can raise the income level to meet livelihood outcomes, including food security and general wellbeing. Furthermore, FAO's (2020) report suggests that investment in human skills development will result in better use of natural resources to increase food availability. This argument confirms to the study assumption three *'Improving human capital through skill development would increase income to achieve household food security'*.

5.2.2 Social and Financial Assets

Saving at the bank was the most profound financial asset, especially among middle-income households. In contrast, on social assets, indicators such as tenant associations and merry-go-rounds were the main assets for both low- and middle-income households. In this study, financial assets, especially across middle-income households, have been bestowed in savings in cooperative societies/ banks or bonds.

The findings in chapter 4 reveal that drought affects social capital by breaking the existing network where members of network groups opt to migrate as a strategy to meet their livelihoods goals. On the contrary, drought depletes financial asset stocks, disabling people from achieving livelihood outcomes, including food security. According to DFID (1999), the complementarity of livelihood assets is one of the ways households can use to cope with shocks such as droughts that result in food insecurity. Tittonell (2014) also argues that asset diversification remains critical in coping with shocks that limit households from meeting livelihood outcomes such as food security. This study assumes that the major impediment limiting households from coping with food insecurity caused by drought is the lack of capacity to compliment the available assets. This assumption has been confirmed by both Tittonell (2014) and DFID (1999),

5.2.3 Physical and Natural assets

In this study, physical assets were a measure against households' access to infrastructural services and public utilities, including schools' markets. On the other hand, access to natural assets was measured by establishing households' access to kitchen gardens and natural water.

The findings suggest a balance of access to physical and natural assets within the study boundary (figure 15). Much caution, however, should be considered while interpreting this data as the researcher did not factor in all indicators of both assets, and the sample size tested was small for generalisability. This study established that members of low-income households have limited access to affordable transport systems compared to middle-income households. There is no doubt that poor road networks affect food accessibility, especially in times of shocks such as drought.

Access to information was also part of the indicators used in this study to measure and determine access to physical assets. Although most respondents have physical access to physical assets such as radios and television, the study did not record any positive correlation with access to weather forecast news, which is a critical element in planning for coping strategies ahead of drought. In addition, access to public utilities such as schools and market hospitals was limited, especially among low-income households compared to middle-income households. From the finding, members from lower-income neighbourhoods have poor access to schools and hospitals and often feel secluded from most of the basic amenities critical for their well-being.

Accordingly, natural assets indicators were measured by determining the households' access to the kitchen garden's water. From the data gathered, middle-income households have more access to natural assets than lower-income households.

Both the Sustainable Livelihoods guidance sheet (DFID, 1999) and Serrat (DFID, 1999) (2017) acknowledge the existence of interdependencies among livelihood assets. Their argument suggests that access to one asset might be influenced by the other, but the correlation is not linear. For instance, access to well-equipped school buildings and health centres (physical assets) could enhance human capital productivity, resulting in increased income flows to achieve livelihood outcomes (DFID, 1999).

On the other hand, the recent finding by Arya et al. (2018) and Njuguna (Njuguna, 2013) have both credited the role of the kitchen garden in food availability, stating that the kitchen garden, if well maintained, can be a critical source of nutritious food, especially fruits and vegetables. Therefore, a lack of access to natural assets, such as kitchen gardens, could cause household food unavailability, as witnessed in lower-income households.

5.3 Transforming Structures and Processes

Within the sustainable livelihoods framework (DFID, 1999), transforming structure and processes are institution organization policies or legalization that shape livelihoods. Food policy was a critical element in food accessibility for urban regions within which this study falls and for the overall population.

5.3.1 Policy Dimensions and Food security.

Kenya has open trade policy to import and export food as a balance measure for the deficit in local production. Open trade policy, especially in line with the food industry, has its merits and demerits, as founded by Kenya Institute for Public Policy Research and Analysis (2007), which manifests in this study's findings. Table 12 below shows a cross-sectional analysis of policies on food and nutrition in Kenya

Table 12: Food Policy Dimensions in Kenya

Good Practice Indicator	Evidence of Policy Action	Weakness
Cash transfer programs	The Budget Statement for the Fiscal Year 2017/2018 indicated that there had been a doubling of food rations and cash transfers to families affected by perennial drought	Often the beneficiaries of cash transfer programs develop dependency syndromes which make the programs non-self-sustaining (van Daalen et al., 2022)
Protection of food insecurity vulnerable groups	The National Food and Nutrition Security Policy (2011) identifies the importance of protecting food insecurity vulnerable populations through mechanisms such as emergency food relief to minimize the severity across drought-prone areas	Recipients of food aid programs often have limited food choices; thus, the affected household has limited dietary diversity. The program, therefore, remains ineffective in addressing food insecurity (Adelle and Haywood, 2021)
Food Subsidies	The Budget Statement for the Fiscal Year 2017/2018 indicated that the national government disbursed a total of Kshs 7.3 billion, while county governments provided Kshs 2 billion to cater for a doubling of food rations to ensure the populations have adequate food rather than to promote healthy food specifically.	The policy does not focus on promoting healthy food; instead, the goal is to ensure adequate food. It remains, therefore, risky to rely on this policy dimension alone as it cannot address food and nutritional insecurity effectively (Author 2022)
Promoting food availability through food imports to	The National Trade Policy is formulated within the framework of the national long-term policy blueprint, the Kenya Vision 2030, which is the basis of the country's	Unstandardized imports have collapsed the local food market, discouraging production (Githaiga, 2021)

balance production deficit	entire policy formulation and implementation for multilateral food imports.	
Minimize Tax levies on healthy food	The Budget Statement for the Fiscal Year 2017/2018 proposed that ordinary bread and maize flour be VAT exempt (zero rated) to make these commodities (considered essential foods) affordable to poorer families, ensuring target populations have adequate food rather than promoting healthy eating/food choices.	The lack of checks and balances by government ministries has lapsed the intended goal of subsidies as most consumers continue to purchase subsidized commodities at unsubsidized prices (Githaiga, 2021)
Increase food productivity through irrigation schemes in arid and semi-arid lands	The vision 2030 document aims to increase the total acreage of land in the ASAL region to up to 404,800 hectares	Lack of local people's involvement has brought set back the implementation of the program, making it lack local people support, who are the key beneficiary (Adelle and Haywood, 2021)

Source Author 2022

5.4 Livelihoods Strategies

This study has established various strategies households apply to meet their livelihood outcomes during drought. Each livelihood strategy was found to have a bearing on specific livelihoods asset, as revealed in the sustainable livelihoods' framework. For instance, households with limited access to financial assets preferred transferring their children to less expensive schools to achieve other household needs, including food. Accordingly, it was notable that some households preferred moving back to their rural homes to cope with the cost of living during drought. As explained in this study, drought's effects run from lack of access to natural assets (water) to social assets, where the existing social networks break as people move to rural areas.

As Carrico et al. (2019) argued, social assets have recently received much interest as a critical factor for household well-being. The observation by Carrico et al. reflects this study's finding, which suggests that social assets are one of the critical assets among households. Lack of it requires that the household develop strategies to meet the livelihood needs. The study also found other coping strategies households apply to achieve livelihood outcomes. These include (i) Moving to low-cost rental houses to save money for other needs, (ii) taking a loan from SACCOs to invest in a business to gain profit to meet other prerequisite needs, (iii) Taking menial jobs to increase income flows to meet household needs (iv) investing in assets. DFID (1999) maintain that well-defined coping strategies remain crucial in enabling the household to become more adaptive to shocks such as drought

5.5 Reflection on the research journey

"There will come a time when you believe everything is finished; that will be the beginning" Louis L'Amour

In this section, I reflect on my research journey for this study. The first part starts with my short life story, which might reveal what motivated me to pursue my research topic. The second part reflects on the data collection and analysis with some excerpts from my research journal highlighted in blue.

My story

I grew up hoping one day I would be a lawyer since I liked how advocates, especially those practising within commonwealth states, conduct themselves. They have a culture of expressing themselves excellently and conscientious, which I aspired to do. The hope, however, hit a dead end after completing my O-level studies and realising my family couldn't afford paralegal fees at the university. So, I opted for an environmental sciences course, which I realised was a blind spot, as Johari Window could put it. Through these career shifts, I got myself admitted for a post-graduate degree in Management of Development at Van Hall Larenstein, specialising in Food and Nutrition Security. With professional experience in managing climate change-related projects, my motivation was to gain practical knowledge on the interplay between climate change and food security. Even though I had clarity about what I wanted to pursue, settling on the research topic was daunting. I dedicated time to studying scientific journals; I held chats with friends, including my mentor Dr Pleun who

helped to develop the topic. My supervisor, too, played a role in further refining the research topic to make it more scientific.

Reflection on the research journey.

On June 14, 2020, I presented my research proposal to my supervisor and the second assessor. I was a bit nervous the morning before the presentation, but I gained courage after reflecting on the various presentations I had done before. I pondered, *"After all, the worst that can happen is go or no go; you can manage this. It is not a prison sentence,"* I did the presentation, and fortunately, I got a 'go'; however, there were some comments to improve. This news excited me, and I noted it in my journal.

June 14, 2022,

I'm glad I've been allowed to go for field work, it might look like an obvious thing, but it must be frustrating to get a 'no-go'. It is never easy to handle bad news.

I landed in Kenya on June 21 and went straight to my family before embarking on fieldwork. I had developed the research instruments early, allowing me to spend one week testing them before collection. The exercise helped to refine the instrument to fit the local needs.

After piloting the instrument, I began collecting data on July 4th, 2022. While the processes seemed okay initially, some challenges emanated along the way. First, the respondent's last-minute change of plan after preparing for the interview. On July 6, one respondent cut off the discussion to rush to a political rally in the neighbourhood. Even though we resumed the interview the following day, I was frustrated and noted the following in my journal.

July 6, 2022

It saddened me to realize how some people are taken for a political ride. I wish they knew the interview we are having can be of great value to their lives than the campaign rallies they are attending.

I encountered more challenges, especially those coming as an effect of the ongoing general election campaign. For instance, one day, the chiefs' administrative police stopped me and requested that I prove I was a student and I was not distributing political handouts to influence voters. While I found this implausible, I managed to argue, and I was set to go. Other challenges came from key informants who indirectly suggested in-kind motivation to share information. While this painted a bad image, especially in academic research, I resolved to organize coffee and lunch meetings to collect data. This experience made me reflect on my role as a researcher. One of the things I reflected on was: Was I flexible enough to accommodate the changing phenomenon in the field? Did I inform the relevant authorities within the study before commencing the research? The answer to this question made me realize what I did right and wrong and thus could change. For instance, I learned as a researcher; I did not seek permission from the local chief before commencing the study, which almost got me into trouble. Secondly, I realized that I was flexible enough to accommodate respondent

Reflection on data finding and analysis

I observed that the best way to collect sufficient data was to engage respondents through critical storylines aligned with the interview question. These processes enabled me to collect in-depth data. Most of the findings co-related with the secondary data that had been peer-reviewed; however, there were new insights, especially on coping strategies. Every respondent had a different coping strategy; the strategies matched only on rare occasions.

The data analysis entailed a series of events. First, I organized all data using content analysis to cluster the qualitative and quantitative data. Since most interviewees didn't consent to audio recording, I compiled field notes and clustered them into codes with separate titles. This activity was tedious, and I noted the following in my journal.

August 3, 2022

It seems like a never-ending journey. After one step, another step awaits. I can't wait to put the final full stop.

After the analysis, I embarked on writing down the findings, a rigorous but rewarding journey that its rewards are long-lasting

Chapter 6. Conclusion and Recommendations

In this chapter, the researcher concludes by answering the main research question, which asked; *The main research question asked; How does drought influence food insecurity among the low and middle-income households in the Kitengela sub-county?* The question was broken into three sub-questions, as demonstrated in the subsequent section. Finally, the last part of this section contains recommendations founded on the research findings.

6.1 Conclusion

The present study was designed to determine the effect of drought on food security among low- and middle-income urban households in Kitengela sub-county Kenya. Drought is a natural phenomenon that results from climate change. Undoubtedly, its impact on household food security is immense and cannot be underscored. This is because it, directly and indirectly affects the households' ability to access and utilize livelihood assets, which ripples food insecurity. This finding shows that the vulnerability to food insecurity is greatly determined by the diversity of the livelihood assets available, which influence the coping strategies. Households with greater access to livelihood assets have more capacity to cope with shocks to sustain their livelihoods.

6.2 Research sub question

The first research sub-questions asked; ***What role do households' assets play in access to food and nutrition security among the low- and middle-income households in Kitengela?*** This study found that different households' assets play different roles in enabling households to achieve food security. It was established that some livelihood assets complement each other to achieve livelihood outcomes, including food security. For instance, the survey demonstrated that access to physical assets (*good school*) greatly influences access to human assets, strengthening household capacity to achieve food security. Accordingly, access to social assets significantly influences financial assets, which can help achieve food security. The study established that households with access to social assets that focus on economic empowerment could increase their income flows. This can be translated into financial assets by direct savings at banks or in assets. These assets play a critical role in enabling households to achieve food security

The second sub-question sought to find out; ***How does drought affect household assets to cope with food security over time?*** The findings in this study suggest that drought's impact on households occurs directly or indirectly. For instance, the study found that the influence of drought on natural assets limits the supply of goods and affects human assets. Raw materials such as animal feed derived from natural assets get depleted over time during drought, which negatively impacts human assets by reducing income-generating activities to make households vulnerable to food insecurity.

The study also found that, over time, drought can interfere with livelihood assets critical to households' access to food security. The finding suggests that drought tears the social assets network by having household members migrate to other areas as a strategy to achieve their livelihood outcomes. When members of social groups become apart, it weakens the asset to meet livelihood goals, including food security. Drought over time also impacts financial assets. As the current study suggests, it causes an overstretch of household savings to buy resources that have been overpriced due to limited supply. For instance, the study found that water access becomes scarce during drought and its price doubles.

The last question sought to understand; ***How transforming structures and processes influence food security in Kitengela over time.*** The finding in this study reveals that transforming structures and processes provide both enabling and disabling environments for household access to food security. For instance, the open

import trade policy remains crucial in offsetting the food deficit to allow households access to food. But, contrary, this does not fall short of challenges. For instance, the study found that open trade has led to importing goods that are already locally sufficient. This has negatively impacted the local market, especially for households that rely on small trade as a livelihood strategy. They will likely be affected by the influx of cheap imported food products that will see them suffer losses.

Accordingly, the study has revealed that pro-poor policy implementation on local food production through irrigation schemes has been critical to the failure of the local output of staple food to meet household demands. Moreover, most government irrigation plans for arid and semi-arid are often implemented through a top-down implementation model without local people's involvement. Lastly, partnerships between government and county government to boost urban agriculture remain crucial to achieving food security. This should, however, not negate the existing agriculture inputs subsidy plan, which, if well effected, can boost production in rural areas, and the ripple would be increased food supply in urban areas such as Kitengela

6.3 Recommendations

Given that the findings of this study have revealed the influence of drought on food security among low and middle incomes in Kitengela, the researcher recommends two recommendations to the commissioner and government (Ministry of Agriculture).

Recommendation to the commissioner

- i. **Build on existing household assets to develop a coping mechanism for drought-induced food insecurity.** Drought is an environmental disaster brought about by climate change. In this study, drought has been presented as the leading cause of food insecurity. However, within the confines of this study, addressing drought remains inexorable as climate change mitigation requires global attention. This study found that most households interviewed through SSI and FGD have access to at least two livelihood assets. Nevertheless, the critical constraint is the lack of capacity to complement the assets across households to better cope with drought. For instance, the study hypothesises that access to social assets can be complemented by financial assets to boost innovation through the skills development of individuals with social groups (social and human assets), which will ripple increased income flows among households to cope with droughts. The recommendation is guided by the theory of change those states.

If we **capacity-build households** to complement the **available household assets**, mainstreaming them with **existing emergency food aid programs**, we can **empower them** to cope with **drought** and **overcome food insecurity over time**

Annex 3 provides a practical illustration of this recommendation. This recommendation corresponds to this study's assumptions; (i) *Complementarity of assets across households would create a long coping strategy to address food insecurity among vulnerable households* (ii) *Improving human capital through skill development would increase income to achieve household food security.*

- ii. **Rally the government to reform food policies through insider advocacies.** The study found various policy guidelines to protect vulnerable households from extreme drought shocks leading to food insecurity. Part of the policies identified touches on different elements, including food relief, cash transfers, and subsidies. Nonetheless, these policies have manifested weaknesses which, if well-addressed, can be complemented with existing assets to provide long-term solutions to help households cope with perennial droughts resulting in food insecurity. Table 13 shows proposed reforms to existing policies on food security. This recommendation aligns with this study's second assumption (ii) *Mainstreaming households' assets with emergency food insecurity intervention anchored on structural and process would provide a long-term coping strategy to*

reduce vulnerabilities to food insecurity. Table 13 below shows specific recommendation to polices

Table 13: Policy Recommendation

Good Practice Indicator	Evidence of Policy Action	Weakness	Proposed Recommendation
Cash transfer programs	The Budget Statement for the Fiscal Year 2017/2018 indicated that there had been a doubling of food rations and cash transfers to families affected by perennial drought	Often the beneficiaries of cash transfer programs develop dependency syndromes which make the programs non-self-sustaining (van Daalen et al., 2022)	Mainstreaming the cash transfer programs with capacity development initiatives to enable affected households to achieve independence to cope with food insecurity
Protection of food insecurity vulnerable groups	The National Food and Nutrition Security Policy (2011) identifies the importance of protecting food insecurity vulnerable populations through mechanisms such as emergency food relief to minimize the severity across drought-prone areas	Recipients of food aid programs often have limited food choices; thus, the affected household has limited dietary diversity. The program, therefore, remains ineffective in addressing food insecurity (Adelle and Haywood, 2021)	-
Food Subsidies	The Budget Statement for the Fiscal Year 2017/2018 indicated that the national government disbursed a total of Kshs 7.3 billion, while county governments provided Kshs 2 billion to cater for a doubling of food rations to ensure the populations have adequate food rather than to promote healthy food specifically.	The policy does not focus on promoting healthy food; instead, the goal is to ensure adequate food. It remains, therefore, risky to rely on this policy dimension alone as it cannot address food and nutritional insecurity effectively (Author 2022)	Food subsidy programs should be tailored to target healthy food (quality). The subsidies should also go beyond the consumption needs to address production (subsidies on farm inputs) to strengthen local production and reduce over-dependency on imports for staple food
Promoting food availability through food imports to balance production deficit	The National Trade Policy is formulated within the framework of the national long-term policy blueprint, the Kenya Vision 2030, which is the basis of the country's entire policy formulation and implementation for multilateral food imports.	Unstandardized imports have collapsed the local food market, discouraging production (Githaiga, 2021)	Regulate the importation of food that can be locally produced by subsidizing farm inputs to strengthen local food production capacity to meet the food deficit. <i>e.g., wheat, sugar, rice, and maize can be locally produced</i>
Minimize Tax levies on healthy food	The Budget Statement for the Fiscal Year 2017/2018 proposed that ordinary bread and maize flour be VAT exempt (zero rated) to make these commodities (considered essential foods) affordable to poorer families, ensuring target populations have adequate food rather than promoting healthy eating/food choices.	The lack of checks and balances by government ministries has lapsed the intended goal of subsidies as most consumers continue to purchase subsidized commodities at unsubsidized prices (Githaiga, 2021)	Mainstreaming the policy to include food branding guidelines to ensure consumers are aware of subsidized food from unsubsidized ones to ensure that most of the affected population gets access to healthy food.
Increase food productivity through irrigation schemes in arid and semi-arid lands	The vision 2030 document aims to increase the total acreage of land in the ASAL region to up to 404,800 hectares	Lack of local people's involvement has brought set back the implementation of the program, making it lack local people support, who are the key beneficiary (Adelle and Haywood, 2021)	Creating a holistic platform to bring together stakeholders from local groups as well as experts to ensure local ownership

Source: Author 2022

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Annex

Annex 1: Households Interview Guide

Households Interviews

First, thank you for taking the time to talk to me today. My name is _____ I'm an MSc Student, studying Food and Nutrition Security at Van Hall Larenstein University of Applied Sciences, Netherlands. I am here to talk to you about how drought affects your access to food.

Let me give you an outline of what's going to happen. I am going to ask you a series of questions. I want to understand things from your perspective. It's important to highlight that this isn't a test. There are no right or wrong answers to any of the questions. I would like to ask you to be as honest as possible.

Do you have any questions or comments so far?

I'll take this conversation with the utmost confidentiality, and the information you provided will solely be used for academic purposes. Would it be OK for me to record this conversation with you? I have prepared a consent form for you to review and sign.

Measuring Households Assets

Do households' assets play a part in household food security among the low- and middle-income households in Kitengela?

Human Capital.

- I. Do you consider yourself a skilled human resource? If yes, why? If not, could you explain a little bit (*skilled human resource indicators, formal training, vocational training, non-formal training*)
- II. What is your main source of income? (*Employment- formal or informal, skilled/unskilled*) Would you prefer to have a different form of employment? (*If yes, why, if no, why; low payment, underworked, overworked, skills gap etc*)

Social Capital (Explain social capital in simple layman's language)

- I. Do you belong to any social group? (*Bible study group, cooperative Society, A Mary go-round group, any other not mentioned*)
 - i. If yes, why do you feel comfortable/uncomfortable being part of these groups?
 - ii. If not, are you willing to join any social group? Why would you want to be part of this group/s?
- II. In 2018, there was a massive drought in this region; during this time, some households could still afford meals, even in a small proportion. Local churches organized harambees to raise resources for those who lacked food to help the 'have not. *In a short statement, why would you be willing to contribute to this Harambee? If no, explain.*

Natural Capital (Question asked based on the observable natural capital)

- I. Why do you have a Kitchen? (*Flower gardening, food gardening, Playground for the kids*)
 - i. *If there is no kitchen garden, ask; would you prefer if your house had a small garden? What would you use it for?*
 - ii. *If the garden is used for other purposes other than food, Ask Why do prefer using your garden for x purposes?*

Physical Assets

- I. How easy is it for you or members of your households to access the market? *(Kitengela market and Naivas Supermarket)*
- II. How comfortable are you using the public transport system? *(Boda Boda, Matatus and buses)*
- III. Do you or your children have easy access to schools/colleges?
 - i. Do you believe the mentioned schools are well equipped to provide education/training *(Quality means well build classrooms and teacher /trainer facilities)*
- IV. Do you have a TV/Radio?
 - i. If yes, how often do you listen to/watch the news? And do you find the news helpful? *Ask one question at a time in the sequence*
 - ii. How helpful is the weather news to you?

Financial Capital (Explain human capital in broad layman's language before asking)

- i. Are you/ any of your household members currently on government pension schemes? *(Pension schemes imply retirement benefits, older people's monthly government stipend)*
 - i. *Would you consider these schemes helpful to you and your households? Could you explain why?*
- ii. Why do you think savings are critical in meeting your household's needs? *(Saving in the bank, in SACCO, Saving in assets > Livestock plots)*

IV. How does drought affect households' assets to cope with food insecurity over time?

The interviewer explains droughts in simple terms; A season when rains are scarce with no little or green cover.

Human Capital

- How is your work affected during drought season? (Do you earn the same daily/ monthly wage during and after the drought?)

Social Capital

- During the drought season, why do some people in your formal social groups migrate to other areas with a greener environment and how does this affect your group's well-being *(well-being -being able to function normally)* *(To be asked, only the previous response indicates the household belongs to social groups)*

Natural Capital

- How do you keep your kitchen garden productive/able to produce food (vegetables) during drought season? *(Only to be asked if the previous response indicates the presence of the kitchen garden;)*

Physical Capital

- Which mechanisms do you put in place to effectively use public roads during drought season to access the market? *(Kitengela Market/ Naivas Supermarket)*
- During drought, sometimes it becomes windy (sometimes), and the weather significantly changes. How does this affect /destroy the schools/ colleges around your neighbourhoods?

Financial Capital

- How do savings (in the bank/SACCO/ Assets) affect by drought? If yes, explain *(Only ask if the previous responses indicate the presence of savings)*

Annex 2: Key Informants Interview Guide

Ministry of Agriculture Livestock Fisheries and Cooperatives

First, thank you for taking the time to talk to me today. My name is _____. I'm an MSc Student studying Food and Nutrition Security at Van Hall Larenstein University, Netherlands. I am here to talk to you about how government policies and structure influence food security in our country Kenya

Let me give you an outline of what's going to happen. I am going to ask you a series of questions. I want to understand things from your perspective. It's important to highlight that this isn't a test. There are no right or wrong answers to any of the questions. I would like to ask you to be as honest as possible.

Do you have any questions or comments so far?

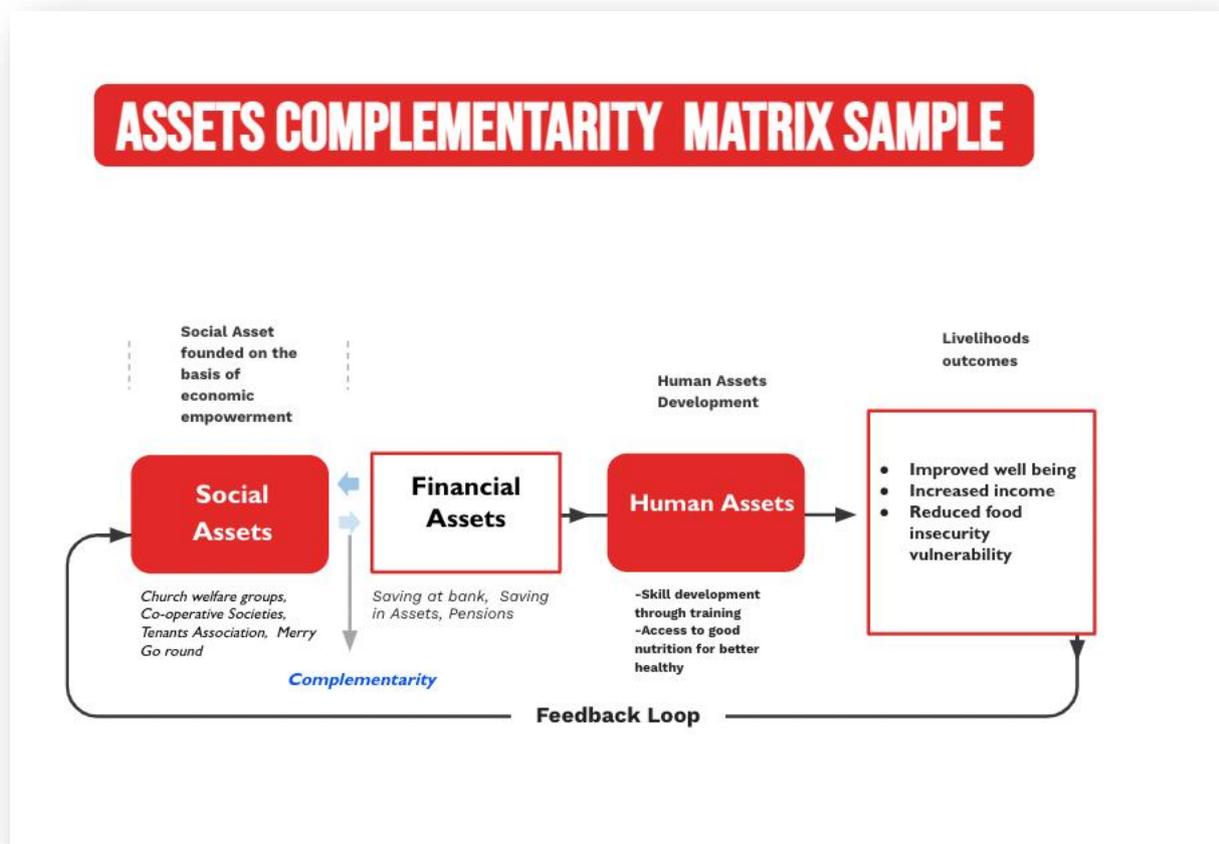
I'll treat this conversation with the utmost confidentiality, and the information you provide will solely be used for academic purposes. Would it be OK for me to record this conversation with you? I have prepared a consent form for you to review and sign.

V. How do institutions, processes, and policies influence food security in Kitengela over time?

1. How have the current food import policies shaped food prices in Kenya, especially the Arid and Semi-Arid Lands?
2. In your opinion, how sustainable is the government to establish smallholder irrigation schemes across arid areas to address food security?
3. On several occasions, farmers have hoarded their farm harvest to hike the prices outside the harvesting season. Are there measures being taken by the government to protect consumers (households) who only rely on food on the shelves?
4. Despite government subsidies, farmers continue to experience heightened prices of agricultural inputs (fertilizer and seeds). So what is the government doing to shield farmers from middlemen who hike the price of subsidized farm inputs?
5. Urban agriculture remains underinvested venture in Kenya despite emergent new urban regions due to devolution. How is the ministry working with county governments to promote urban agriculture?

Annex 3: Households Asset Complementarity Sample

Figure 18: Households Asset Complementarity Sample



Source: Author 2022