Foreign Models and Discordant Outcomes in Nairobi's Food System

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ABSTRACT

This dissertation critically examines the transformation of Nairobi's food system within the context of rapid urbanization, retail liberalization, and the growing influence of supermarket economies. Drawing on extensive data from household surveys, policy analysis, and documentation research, it investigates the application of the supermarket revolution model and food desert concept within the specific socio-economic and cultural dynamics of Nairobi. The findings reveal significant discordance between theoretical models developed in Global North contexts and the lived realities of Nairobi's food system, which remains deeply intertwined with informal food economies. Despite the proliferation of supermarkets, informal food vendors continue to play a critical role in ensuring food security for low-income residents. Moreover, the study highlights the nuanced interplay of governance, inequality, and market dynamics, calling into question the efficacy of conventional models for addressing urban food security in the Global South.

The findings reveal the limitations of Global North-centric models in capturing the complexities of Nairobi's food landscape. The supermarket revolution model, which assumes linear retail formalization and enhanced food security, fails to account for the resilience of informal food economies. Informal vendors remain central to food security for low-income residents, offering accessible and culturally appropriate options. Conversely, supermarkets cater primarily to middle- and upper-income groups, with minimal impact on the food access challenges faced by lower-income households. The study also critiques the food desert concept, traditionally based on supermarket proximity, as inadequate for Nairobi's context. Diverse food sources—including kiosks, street vendors, and informal markets—play a vital role in meeting residents' food needs. Supermarkets contribute to the nutrition transition by promoting processed foods rather than addressing malnutrition or inequality. The persistence of informal food economies challenges assumptions of their displacement by formal retail development, demonstrating their enduring importance.

Governance emerges as a central theme, highlighting the tension between formal retail growth and the livelihoods of informal food vendors. The study critiques the exploitative practices of multinational retailers in local supply chains and the policy focus on formalization at the expense of inclusivity. Contributing to the fields of Southern urbanism, food systems, and global governance, this research challenges Eurocentric models and emphasizes the need for context-specific approaches in the Global South. It applies systems thinking to provide a nuanced understanding of Nairobi's food system, underscoring the dynamic interplay between formal and informal systems. The dissertation concludes with a call for a paradigm shift in urban food security research and policymaking. Moving beyond simplistic, one-size-fits-all models, it advocates for inclusive strategies that prioritize local realities, equity, and resilience, providing a pathway for more sustainable and equitable urban food systems in the Global South.

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LIST OF ACRONYMS

FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
HCP	Hungry Cities Partnership
HDDS	Household Dietary Diversity Score
HFIAP	Household Food Insecure Access Prevalence Scale
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
LPI	Lived Poverty Index
MSMEs	Micro, Small, and Medium Enterprises
NAADS	National Agricultural Advisory Services
NSE	Nairobi Securities Exchange
SADC	Southern African Development Community
SPSS	Statistical Package for the Social Sciences
TNCs	Transnational Corporations
UN DESA	United Nations Department of Economic and Social Affairs
UNEP	United Nations Environment Programme
WFP	World Food Programme
WTO	World Trade Organization

Chapter 1:
Introduction

1. An Enduring Need for Urban Food Security Research

There has long been recognition that urban food security remains a critical research gap within the broader discourse on food security. Despite this recognition, the field remains under researched. In 1995, Atkinson recognised that “little research has been done on urban food systems as a whole”, noting that existing studies primarily focused on nutritional epidemiology or assessments of specific interventions (pg. 151). By 2011, the inability of food systems to meet the demands of urban residents in sub-Saharan Africa was described as a growing development issue for the 21st century, yet "within contemporary global food security discourse, the urban is all but invisible" (Crush and Frayne, p. 539). While attention to cities and their food systems has since increased and research has expanded into new areas, “the field of urban food security is still very much an emerging one” (Frayne et al. 2022, p. 19).

Literature on urban food security has undergone a gradual exploration of the complex and interconnected issues affecting food access, availability, and utilization in urban environments. This interest in better understanding cities as sites of food insecurity originated from a recognition that urbanization was fundamentally changing food systems. Urbanization has heightened the importance of food security in cities by intensifying demand, exposing vulnerabilities in supply chains, and exacerbating socio-economic disparities. In one of the earlier recognitions of this emerging global trend, Haddad et al. found that “the locus of poverty and undernutrition does seem to be changing from rural to urban areas” and argued that demographic trends will force governments and civil society to rethink their approach to

urban poverty, food insecurity, and under nutrition" (1999, pg. 9). At the end of the 20th century, the few studies that were available provided an important starting point for a new wave of urban food research (Haddad et al. 1999).

This new wave of research eventually expanded in distinct and still evolving directions. In a bibliometric analysis of urban food security discourse, Frayne et al. identify that research has gravitated towards two distinct focal points: (1) supply-side dynamics in cities, including urban agriculture, supermarket retail expansion, and the informal economy and (2) household food access, under the ambit of household poverty, public health, food price crises, and infrastructure (2022).

The first focal point relates to supply-side dynamics in cities. This significant body of literature has been concerned with the growing dominance of the supermarket retail model in urban food systems and ensuing development implications for entire food supply chains (Frayne et al. 2022). There has also been a growing interest in the contributions of the informal economy to urban food security, and questions about its future in the wake of retail transformation (Battersby and Marshak, 2017). Last, urban agriculture has been a significant area of exploration, with the underlying but disputed assumption that growing food in cities is a meaningful solution for urban food insecurity (Zezza and Tasciotti, 2010; Orsini et al. 2013).

The second focal point within urban food security discourse relates to household food access (Frayne et al. 2022). Taking diverse approaches to the study of the topic, household food access is often explored broadly in terms of sourcing strategies, food quality, diversity, and consistency in access. It is regularly explored in relation to household poverty, non-communicable diseases, and broader literature on the global nutrition transition.

These focal points have, at times, been incorrectly characterized as being distinct bodies of literature that are seldom considered together, including by Moustier et al. (2023). Rather, the emerging focal points of food supply and food access have coalesced around the evolution of the urban food desert concept, a popular yet contentious body of literature (Frayne et al. 2022). Urban food desert literature highlights the inequities of our urban food systems, exploring how food may be more difficult to access in some urban areas than in others. Originally measured in Euro-America by distance from a supermarket in cities, applications of the food desert concept have since expanded to include an array of measurements, including access to other retail types, transportation infrastructure, identity-based inequities, and food consumption behaviours (Beaulac et al. 2009). Political, economic, and social determinants that influence food access are now embedded in urban food desert literature broadly (Shannon, 2016)

These intersectional approaches to urban food security research have increasingly integrated themes from complex systems dynamics. Literature on food systems underscores the interconnectedness and complexity of the entire food supply chain, illustrating how it is embedded within wider socio-economic, political and environmental processes. Given the significant role cities play in contemporary food systems, systems thinking has usefully made the urban more visible in food security studies. This research emphasizes the multi-scalar interactions in the governance of food and broadens our understanding of resilience and risk in food systems. As food security conceptualizations incorporate ideas from complex adaptive systems, the field continues to innovate and identify new opportunities for meaningful intervention. By applying systems thinking, urban food security discourse has more effectively

explained the multifaceted and dynamic challenges of urban food systems and informed more effective and sustainable solutions.

Solutions-oriented research has become increasingly important. As the world urbanizes, urban food insecurity research has become a growing area of interest and concern. The rapid growth and evolution within urban environments have brought with them significant challenges, including poverty. Urban food security and food system research thus plays a crucial role in shaping food-secure cities. This growing interest is driven by the need to address issues of urban poverty, particularly in the Global South, where urbanization is driving livelihoods towards new but often uncertain sources of income. While urban food security discourse has undergone significant growth and developed a set of focal points over the course of its evolution, much of the research has emerged from Northern cities (Zhong et al., 2021), leaving many important interactions within urban food systems globally either underexplored or poorly explained. Addressing these gaps is essential for developing comprehensive, context relevant, and inclusive urban food security strategies.

2. Making Sense of Nairobi's Food System Transformation

This dissertation contributes to discourse on urban food security by critically analyzing common models and concepts used to describe neighbourhood food supply and household food security dynamics. Using the case study of Nairobi, Kenya, this research situates itself in emerging areas of urban food security studies, particularly the focal points of supply-side dynamics and household food access and explores how conclusions drawn in this still emerging body of research is mischaracterizing the rapid transformation happening in Nairobi's food system. To

contextualize the case study, this introductory chapter will explore trends of urbanization, national deregulation, and retail liberalization in Nairobi's food system and situate these changes within the literature on urban food systems.

2.1 Urbanization

Urbanization has transformed food systems worldwide and significantly impacted food security, especially in urban areas. Over half of the world's population resides in urban areas and projections indicate that another 2.5 billion people will live in urban settings by 2050, with over 90% of this increase occurring in Africa and Asia (UN DESA, 2018). Historically, the world's largest urban settlements were found in more developed regions, but today, large cities are concentrated in the Global South (UN DESA, 2018). There are, of course, regional and inter-country differences in the rate and level of urbanization. In Africa, the most urbanized region is Eastern Africa, which became more than 50% urbanized between 1990 and 2000. By 2030, the proportion of people living in towns and cities will exceed 60% in this region. This urban population swell strains regional food systems and exacerbates existing inequalities, causing the most marginalized households to experience negative consequences first.

Nairobi, Kenya mirrors this trend, experiencing exponential growth from 290,000 residents in 1960 to an estimated 5.26 million by 2030 (KNBS, 2023). Urbanization in Nairobi has significantly impacted economic development, infrastructure, social dynamics, and urban planning and governance. Urbanization has driven growth by creating employment opportunities across many sectors, including those intersecting with the city's food system. Nairobi also operates as a business and investment hub within East Africa, attracting

multinational corporations and spurring job creation in both formal and informal areas of the economy. Increasing population density at the neighbourhood level has also facilitated an enabling environment for supermarket investment within the city. With significant implications for investment and formalization within the entire food system, this coinciding trend is discussed in more detail in the following section.

The city has traditionally been perceived as having less food insecurity than rural areas in Kenya (Owuor, 2018). However, an abundance of food in the city does not ensure that everyone has equitable access to it, nor does it ensure that these foods are nutritious, safe, diverse, and affordable. The rapid urban growth has led to increased vulnerability to new forms of malnutrition, precarious work, and pressures on food markets and their supply chain networks. Thus, for the purposes of this research, the city serves as a pertinent case study to explore how urban food systems are transforming due to urbanization trends and what the implications are for neighbourhood and household food insecurity.

2.2 National Deregulation of Food Economies

The globalization of urban food retailing environments was partly facilitated by a decades long reconstitution of the state system to support a unified global market. Inflation rates in the 1970s accelerated in most countries, accompanied by low interest rates in the second half of the decade. With many agrarian countries increasingly dependent on grain imports during the 1950s and 1960s as a result of the growth of the United States food aid programs, the price increase of the early 1970s added pressure to their balance of payments and domestic programs (FAO, 1988; Schubert, 1986). This encouraged expanded borrowing by many

developing countries and marshalled a new period of instability and perpetual fear of the possibility of food shortages (FAO, 1988). The fall of the Bretton Woods institutions coupled with the world famine of 1972-1975 offered an historical moment of crisis and instability that created opportunity for the World Bank, the International Monetary Fund (IMF), the General Agreement on Tariffs and Trade (GATT), and the nation-states influencing them to force an institutional transition in market rule.

Cooperation between developing countries, the World Bank, and the IMF on national economic policies became a more prominent feature of the international scene in the 1980s (Osunsade and Gleason, 1992; Osunsade, 1993). One of the most fundamental shifts in the development strategy for Africa was to view agriculture as the engine of growth—an important source of export revenues and the primary means to reduce poverty. The World Bank and IMF placed priority on improving the incentives and the infrastructure services for farmers.. The two organizations coordinated their activities more closely in drawing up and supporting programmes concerned with macro-economic policies, including structural and sectoral adjustments. Sector adjustment loans of the World Bank were frequently made for agricultural purposes and the two organizations encouraged the reduction of policy distortions adverse to free-market agriculture.

Agricultural commodities formally escaped multilateral trade negotiations at the GATT through the 1960s right up until the Uruguay Round of 1986-1994. This round however, in coordination with World Bank and IMF structural adjustment programs, signaled a clear restructuring of power and influence in food systems globally from a state centered regime towards free markets and corporate dominance. GATT, as well as its successor in 1995, the

World Trade Organization (WTO), have been successful in achieving this mandate. The average tariff levels for the major GATT participants were about 22% in 1947 but were 5% after the Uruguay Round in 1999 (Bown and Irwin, 2015). Participation in GATT negotiations during this time period expanded significantly as well. The Uruguay Round of negotiations began in 1986 and it was the most ambitious round to date. The hope was to expand the competence of GATT to important new areas such as services, capital, intellectual property, and agriculture; 123 countries took part in this round. The Uruguay Round was also the first set of multilateral trade negotiations in which developing countries had played an active role.

Agriculture was essentially exempt from previous agreements as it was given special status in the areas of import quotas and export subsidies, with only mild caveats. However, by the time of the Uruguay round, many countries considered the exception of agriculture to be sufficiently inappropriate, so they refused to sign a new deal without some movement on agricultural products. At the time, 14 countries came to be known as the 'Cairns Group' and included mostly small and medium-sized agricultural exporters such as New Zealand, Brazil, Australia, Indonesia, and Canada. The Agreement on Agriculture of the Uruguay Round continues to be the most substantial trade liberalization agreement in agricultural products in the history of trade negotiations. The goals of the agreement were to improve market access for agricultural products, reduce domestic support of agriculture in the form of price-distorting subsidies and quotas, and eliminate over time export subsidies on agricultural products (McMichael, 2009). While this agreement did not by any means eliminate distortions entirely, it did set a precedent for putting agriculture on the liberalization agenda, particularly in the Global South.

The Uruguay Round of GATT portrayed a dialectic between the desire to maintain national sovereignty in the governance of food systems, and the move to secure the authority of states to reduce trade restraints. The institutional relations enforcing this process of liberalization offered ‘non-discrimination’ and ‘reciprocity’ to individual states who participated in the deregulation of agriculture. However, this came at an expense: "Any nation that decides to impose limits on the rights of foreign companies, for environmental or social reasons, can be retaliated against for creating a 'restraint on trade"' (Schaeffer, 1990, 14). For agriculture, this new regime meant national agricultural deregulation through the dismantling of farm subsidy programs that encouraged overproduction and destabilized world markets while also intensifying the internationalization of production, including the denationalization of the state.

The Uruguay Round therefore had two significant effects in the restructuring of global food systems: (1) a formal enforcement of multilateral sanctions on states to participate in a liberal commercial regime and (2) a reconstitution of the state system to support a unified global market (McMichael, 2009). In short, the GATT negotiations represent an unprecedented move to institutionalize market rule on a world scale. While there continues to be debate and resistance to this trend towards the deregulation of food economies, the foundation set during the Uruguay Round emerged from the restructuring that followed the demise of the Bretton Woods system. This foundation involved new patterns of accumulation that intensified the contradictory relations between national and international food security. One of the major shifts in global food systems that has ensued as a result is the proliferation of transnational corporate food retailing.

In 1993, Kenya undertook significant trade liberalization efforts and became a member of the WTO by 1995 (UNECA, 2013). During this period, the country saw the steepest tariff reductions in East Africa, decreasing from 39.2% in 1986 to 12.1% by 2010 (World Bank, 2011). das Nair (2020) highlights that these changes coincided with the modernization of procurement systems, including centralized distribution and improved efficiency in logistics and inventory management, leading to reduced product costs. Consequently, trade liberalization in East Africa not only created opportunities for supermarket chains to establish themselves but also allowed them to adapt procurement systems to their competitive advantage.

2.3 Retail Liberalization

The global food retail share of supermarkets increased sharply in the 80s and 90s (Reardon et al., 2004, 2005; Reardon and Hopkins, 2006; Traill, 2006; Reardon et al., 2007). As Peyton et al. (2015) argue, supermarkets diffused into developing countries as a result of liberalised economic policies for multinational corporations. By promoting free trade between countries, these policies opened a plethora of opportunities for food retailing expansion. The emergence of supermarkets reflects both an increasingly globalised mode of commerce and neoliberalisation policies which attempt to profit from this global interconnectedness. Reardon et al. (2003, p. 1142) note, “the overall image is of waves of diffusion rolling along,” reaching regions at differing times depending on factors such as income, urbanisation, and levels of infrastructure development.

As Reardon has documented, the first wave of consolidation and expansion of food retailing involved the countries that were earlier in starting their post-World War II

urbanization and industrialization process—in particular, the larger South American countries, East Asia outside China, South Africa, and northern Central Europe (Reardon, Timmer and Minten, 2012). The start of this food processing transformation occurred with foreign direct investment (FDI) liberalization and privatization in the mid-1980s to early 1990s, and retail transformation which took off in the early 1990s (Reardon, Timmer and Minten, 2012).

The second wave tended to involve the countries that had their growth and urbanization spurts later and had strong internal pressure to limit FDI; these limits were often more for retail FDI than for processing FDI. In Mexico, Central America, Southeast Asia, and southern Central Europe, processing transformation therefore took off in the 1980s, but retail transformation did not start until the late-1990s (Reardon, Timmer and Minten, 2012).

The third wave involved countries that had their growth and urbanization increases in the 1990s and 2000s and/or had lagged liberalization into the 1990s. This was the case of Russia, China, India, and Vietnam, among others. The processing transformation then occurred before the retail transformation, with the latter in the late 1990s and into the 2000s. The retail revolution took off in earnest only in the mid-2000s in India and Vietnam and then grew rapidly. In India, although FDI liberalization in retail had not yet occurred, the sales of modern retail's leading food-selling chains leapt from 200 million USD in 2001 to 5 billion USD in 2010, with a 49% annual sales growth for modern food retail (Reardon and Minten, 2011).

The fourth wave occurred in Southern and East African countries in the mid-2000s and was primarily driven by FDI from South African and Kenyan owned supermarkets (Weatherspoon and Reardon, 2003; Reardon et al., 2005; Reardon and Hopkins, 2006; Reardon et al., 2007; das Nair et al., 2018). This 'wave' of development in East Africa has provided

retailing options that resemble the Euro-American style supermarkets, and this has important implications for food systems and food security more broadly. For instance, scholars have explored the implications of the growth and spread of supermarket chains on the food security status and 'nutrition transition' of urban residents in African developing contexts (Asfaw, 2008; Crush and Frayne, 2011; Nickanor et. al., 2018; Peyton et al., 2015; Popkin et al., 2012; Tschirley, 2015), as well as the development pathway of domestic food supply chain systems (Barrientos, 2016; Boselie et al., 2003; Brown and Sander, 2007; Weatherspoon and Reardon, 2003). The extent to which traditional informal markets and independent retailers might be displaced or face increased competition has also been examined (Abrahams, 2010; Crush and Frayne, 2011; das Nair et al., 2016; Berdegué and Reardon, 2008).

The initial framing of supermarkets as a symbol of transition from traditional and informal modes of food production and retail to a modernizing food system has spurred lively debate. On one hand, some continue to argue that "the mirror image of the spread of supermarkets is the decline of the traditional retail sector in substantial part because of the competition with modern retailers" (Berdegue and Reardon, 2008, p. 149). A common criticism of the growing power and reach of supermarket economies is that they have significant negative impacts on food availability for the urban poor. This body of literature argues that supermarkets eradicate smaller stores and local markets aimed at the poor consumer and encourage greater dependence on large scale retail formats for food (Reardon and Hopkins, 2006; Minten and Reardon, 2008; Franz, 2010). This research questions this claim in the case of Nairobi, Kenya.

Kenya has experienced one of the most rapid increases in the number of supermarkets on the continent (Neven and Reardon, 2004; Tschirley, 2015). This trend emerged in the 1990s and has since been among the most rapidly expanding sectors of the economy (Republic of Kenya, 2011). By 2005, supermarkets controlled 20% of the urban market (Neven and Reardon, 2004). Similar to global trends, investment into Kenya's supermarket economy was stimulated by trade liberalization, an increase in FDI, higher incomes, and rapid urbanization (Reardon et al., 2003, 2007; Humphrey, 2007). Today, the Kenyan Government continues to stimulate this food system transformation in its development blueprint Vision 2030. The Vision aims at achieving urban food security by attracting investments in formal food retailing (Republic of Kenya, 2011). The approach is justified by the theory that economies of scale enable increased competition and innovation, allowing supermarkets to offer lower food prices at higher quality than traditional retailers (Reardon and Minten, 2011). In this sense, retail modernization is viewed as a market tool for combating food insecurity.

3. Research Case Study Selection

3.1 Relevance to Research Objectives

As the capital city of Kenya, Nairobi holds great significance in East Africa. The city is the economic capital of Kenya as well and a critical commercial hub in the region. It hosts a large number of multinational corporations and regional offices due to its well-developed infrastructure, connectivity, and political stability relative to other cities within the region. The city's economy is diverse, with significant contributions from financial, technology, manufacturing, and retailing sectors. The Nairobi Securities Exchange (NSE) is one of Africa's

largest stock exchanges and plays a vital role in the region's financial markets. It is also home to the country's and many of the region's governance institutions, as well as other international organizations. In this sense, Nairobi is a city where local dynamics intersect with global diplomacy and governance frameworks. The city is a revealing case study selection to explore this nexus of urbanization, trade liberalization, and food system transformation.

Nairobi's food system offers a useful case study when testing generalized frameworks developed in academic settings that seek to explain and predict global, regional, and local food system development pathways and dynamics. The city's food system operates as a key trading hub for agricultural products sourced from both within Kenya and neighbouring countries. The city's demand for food drives production and distribution networks that extend into rural areas, influencing farming practices, crop choices, and market access for producers across the region. The city is a major transportation and logistics hub that facilitates the integration of regional food supply chains as well. This integration allows for efficient movement of food products from production areas to urban markets, benefiting both producers and consumers throughout East Africa. Any innovation and transformation occurring within Nairobi's food system has implications outside of its borders, offering early indications of food system development pathways for the region more broadly.

With significant urban growth and dynamic interactions occurring between formal and informal markets, Nairobi is a useful case study to critically analyze common concepts and models attempting to describe urban food system transformation in the Global South.

3.2 Research Questions

Given that this dissertation is presented in multiple manuscript format, the research questions should be understood as three distinct sets that are thematically related to one another.

3.2.1 A Supermarket Revolution

The first chapter in this dissertation questions the supermarket revolution hypothesis and model within Nairobi, Kenya. Specifically, this article questions four urban propositions related to supermarket growth within the city:

- Proposition #1: Intense competition, consolidation, and multinationalisation in the supermarket sector will accelerate the spread of supermarket chains seeking to improve their competitive positioning.
- Proposition #2: Supermarkets will go well beyond the initial upper- and middle-class clientele in many countries to reach the mass market. They will charge lower prices and offer more diverse products and higher quality than traditional retailers, allowing them to win consumer market share.
- Proposition #3: As supermarkets spread and their market share grows, the market share of traditional retailers declines. This decline happens at different rates over product categories.
- Proposition #4: The scope and effectiveness for policy and strategic effort to pursue public good objectives in a market-driven process in limited.

3.2.2 Food Deserts in Nairobi

The second chapter positions itself within the body of literature of 'food deserts' and in the small but growing body of literature debating its utility when applied to cities in the Global South. The prevalence of malnourishment and food insecurity in cities in the Global South is often higher than in North America and the UK. Further, the higher prevalence of informality, a larger per capita number of micro-enterprises in the food system, extent of supermarket diffusion and market consolidation, and different phasing of the global nutrition transition all make for distinct characteristics of food systems in cities in the Global South. The key question therefore is twofold; could the concept of the 'food desert' be reformulated to fit the realities of urban food systems in the Global South? And even if it can, should it?

In light of growing criticism in Northern cities around 'food deserts' and recognition of its appropriation by corporate interests to shape favourable policies not grounded in evidence, application of the concept in the Global South should be carefully considered. This research considers the utility of applying the food desert concept to the food system of Nairobi, Kenya by posing three distinct questions.

Table 1: Food Desert Models and Research Questions

Research Objectives	Research Questions
Objective 1: Test the Original Concept of Food Deserts	1.1 Is there a relationship between household supermarket access and household food security?
	1.2 Is there a relationship between household poverty and supermarket access?
Objective 2: Test Emerging Concepts of Food Deserts (Food Deserts Plus)	2.1 Is there a relationship between household access to all food retail sources and household food security?
	2.2 Is there a link between the type food products purchased and the sources of those food products at the household level?

	2.3 Is there a link between fruit and vegetable purchase/consumption and household food security?
	2.4 Is the number of household food retail sources related to household food security?
Objective 3: Test Crush and Battersby's (2017) definition of food deserts (Food Deserts in the Global South)	3.1 Is there a relationship between access to all food sources (market and otherwise) and household income, household dietary diversity, food access/food price challenges?

The first question explores whether the original concept of the food desert adequately fits within the research context. The second question does the same, but with emerging concepts of food deserts that incorporate new components and relationships within the food system. The third question tests a definition of food deserts that was defined specifically for cities in the Global South.

3.2.3 A Declining Informal Food Economy

The third chapter applies systems theory and the concept of a 'food system' to further explore informal economic activity in Nairobi. The article explores claims made in academic literature about informal food economies in the context of rapid retail development in a food system. Prominent research argues that the expansion of supermarkets can lead to a decline in informal economic activity through competition, exclusion and displacement (Neven and Reardon, 2004). The prevailing assumption is that supermarkets will change consumer preferences and out compete informal vendors and spur the formalization of procurement systems.

The application of systems theory in exploring Nairobi's food system is justified by its ability to provide an integrated perspective. Nairobi's food system is inherently complex,

involving intricate relationships between ecological, social, economic, and political components. Further, Nairobi's food system is not isolated; it is embedded within larger regional and global systems. Systems theory facilitates the examination of trans-scalar interactions and therefore highlights how different parts of the system interact and influence each other and aids in identifying unintended consequences, and non-linear dynamics that may not be evident through traditional monodisciplinary approaches.

4. Research Methodology

4.1 Positionality

As a Canadian researcher conducting research on Nairobi, Kenya, using documentation research methods coupled with pre-existing quantitative data, it is important to acknowledge and reflect on my positionality within the study. While I bring valuable perspectives, expertise, and methodological approaches to the research process, there are potential biases that may influence my interpretation of the data. My identity as an outsider to the context of Nairobi could impact the way I perceive and analyze the documents collected and data used within the study.

For many researchers, immersing oneself in the research environment is not only integral to data collection but also a transformative and enriching experience that fosters deeper curiosity, understanding and empathy. Conversely, the absence of such an opportunity evokes frustration, disappointment, and a sense of detachment from the research process. I grappled with a sense of loss throughout this research process. I continue to reconcile with the lost opportunity to build interpersonal connections, witness cultural nuances firsthand, and

navigate the complexities of Nairobi's research setting in real-time due to travel limitations caused by the COVID-19 pandemic.

Lamenting a certain experience and coming to terms with an alternative research approach was part of my research process. Acknowledging this distance, and validating feelings of disconnect and fading curiosity have been the single most difficult aspect of this experience. With that being said, new approaches brought with them new opportunities to explore research questions in novel and un-anticipated ways.

Given that specific research limitations (discussed in a following section) made direct engagement with local community impossible, it underscored the importance of approaching this research with heightened sensitivity and reflexivity. Reflexivity is the act of examining one's own assumptions, beliefs and judgements, and thinking critically about how this influences the research process. The practice of reflexivity confronts and questions who we are as a researchers and how this guides our work.

> *"Research is far from an apolitical and ahistorical activity; it occurs within a set of historical, political, and social relations of power. However, these power relations are encountered differently by those of us who are historically and politically positioned, and crucially, resist our construction as well as the construction of the subjects of our research as the "other" of the epistemologies." (Al-Hardan, 2014, pg. 63).*

This quote highlights how power dynamics are not neutral but are experienced and negotiated differently by researchers based on their historical positioning. Moreover, it underscores the importance of resisting the tendency to construct both oneself and the

subjects of research as “other” within dominant epistemologies, which often marginalize certain perspectives and reinforce hierarchies of knowledge.

I sought these power constructs within my own perspective, as well as the pre-existing documents and datasets I was reliant upon to conduct this research. In so doing, my research questions were critical in their approach and exposed the ways in which dominant knowledge in this area of research exposed a distanced, foreign, and imposed view of what was happening that ultimately falls short of an adequate description. My reflexivity throughout this research process ultimately informed the questions I asked and contributed to shaping the novel contribution this research makes to understanding Nairobi’s food system.

4.2 Data Sources and Modes of Analysis

This research combines quantitative research components from a city-wide survey conducted in Nairobi City County with document research. The Hungry Cities Partnership (HCP) conducts collaborative research, training and advocacy with the objective of providing innovative solutions to issues of urban food security. Specifically, this research partially relies on two datasets owned by HCP: (1) a household food security survey conducted in 2016 that covered a total of 1,434 households and (2) an informal food vendor survey conducted in 2019 that covered a total sample of 1,267 vendors.

Documentation research is additionally used to analyze existing information related to the study’s research question. This methodological approach categorizes and analyzes public records and personal documentation as primary sources for corroboration. Public records examined include government and private sector documents, strategic plans, and reports.

News articles were used as personal documents to account for Nairobi's rapidly evolving retailing landscape. Crucially, this study also reviews relevant academic literature to contextualize the research questions and methodological design.

5. Areas of Contribution

5.1 Southern Urbanism

Southern urbanism discourse encompasses the examination and discussion of urban development, planning and the characteristics of cities in the Global South that distinguish them from cities in the Global North. This body of literature scrutinizes the unique challenges and development pathways faced by cities in the Global South, such as rapid urbanization, informal settlements, inadequate infrastructure, and socio-economic disparities. Scholars in this field investigate how historical legacies, colonialism, globalization, and global political economy shape urban landscapes and influence urban governance and decision-making. The field acknowledges and is grounded in the position that cities of the Global South are epistemologically, methodologically, and empirically different from those explored in mainstream urban theories (Schindler, 2017; Parida and Agrawal, 2022).

Southern urbanism challenges mainstream urban theories by highlighting the limitations of Eurocentric perspectives and emphasizing the importance of context-specific analysis (Parida and Agrawal, 2022). It critiques the tendency of mainstream urban theories to prioritize Western experiences and neglect the diverse realities of cities in the Global South. Southern urbanism tends to argue that approaches derived from Western contexts may not adequately

capture the complexities of urbanization processes, social dynamics, and spatial patterns in Southern Cities.

The discipline advocates for decolonizing urban studies by centering perspectives from the Global South and acknowledging the historical legacies of colonialism that have shaped urban landscapes. It challenges the dominance of Western epistemologies and calls for more inclusive and pluralistic approaches to urban theory and research (Schindler, 2017). Southern urbanism also highlights the prevalence and significance of informal settlements, economies, and governance structures in cities of the global south. Unlike mainstream theories that often view informality as a deviation from the norm, and something to be 'brought in' to formal activities, Southern urbanism recognizes it as integral to urban life and emphasizes the need to understand its dynamics and implications (Parida and Agrawal, 2022).

This dissertation situates itself within discourse on Southern urbanism by critically examining mainstream models, theories, and concepts designed in Northern contexts that attempt to explain how urban food systems develop globally. Findings from this research offer a novel contribution to this body of literature because they demonstrate how food system models, theories, and concepts (specifically 'the supermarket revolution' and 'urban food deserts') are failing to adequately capture the actors, interactions, and development pathways occurring within Nairobi's food system. This research ultimately shows that the application of mainstream understandings of urban food systems fails to sufficiently explain interactions and dynamics occurring in Nairobi's food system.

5.2 Food Systems

Systems thinking is an interdisciplinary field that explores complex systems in various domains of life. including biology, engineering, economics, politics, and health. A system is understood as a set of interrelated components that, when operating together, lead to emergent properties that are not predictable from the behaviour of individual components. Systems literature often views problems and solutions in a holistic manner, rather than isolating components, which requires accounting for broader context across scales. It is also a field that elicits collaboration across multiple disciplines and integrates knowledge from different fields to fully understand and address system behaviours and issues.

The concept of a food system is often narrowed to a set of activities along the food supply chain ranging from production through to consumption. However, how the food system functions and the extent to which it is capable of achieving desired outcomes is a complex issue with numerous social, political, economic, and environmental determinants that extend throughout and beyond the food supply chain. In the same way there are diverging areas and approaches in systems thinking, so too are there divergent theoretical framings on what actually constitutes a 'food system'. This underscores both the contestation of the concept in discourse and the complex reality within which these systems operate. In this sense, food systems do not exist as an unequivocal objective reality, rather they are constructs that we apply to the world in order to make sense of a complex phenomenon, based on particular epistemological positions (Leeuwis et al. 2021).

This study contributes to the field of systems thinking by centering informality in its examination of the relationships between Nairobi's food economy, food security, and its

governance. By identifying connections between informal actors and the broader the food system, the study provides evidence and insights that challenge the commonly held assumption that food retail development will somehow displace informal economic activity. Previous models that have tried to explain interactions between informal food system actors and emerging supermarket economies foremost used agricultural economy as the methodological approach (Reardon and Minten; Neven and Reardon, 2004). This integrated systems thinking approach, however, uses data and documentation methods to explore perspectives from various points of connection within the food system. It does so while drawing from multiple disciplines, including global governance, global political-economy, public policy analysis, food security studies, and Southern urbanism. This work demonstrates the utility and increased accuracy in using systems thinking methods to describe how informality operates in relation to supermarkets within a food system. The results from this research challenge previously drawn conclusions within the literature on the subject and therefore offer a novel contribution to the debate.

5.3 Global Governance

Global governance as an academic discourse refers to the study of mechanisms, structures, processes, and institutions that address transnational issues and challenges beyond the scope of individual nation-states. It encompasses a wide range of topics including international law, diplomacy, economic cooperation, environmental protection, human rights, security, and development. Global governance scholarship examines how actors such as states, international organizations, non-governmental organizations, corporations, and civil society interact to shape

policies, norms, and regulations at the global level. The discipline analyzes the effectiveness, legitimacy, and accountability of global governance arrangements, as well as their implications for power relations, sovereignty, and democracy. Additionally, global governance discourse explores emerging trends, challenges, and innovations in global governance, aiming to inform policymaking, enhance cooperation, and address complex global issues in an increasingly interconnected world.

Global governance and international relations are closely interconnected fields that overlap and compliment each other. While international relations focuses primarily on state interactions and power dynamics, global governance expands the scope to include non-state actors, transnational issues, and cooperative mechanisms for addressing global challenges. The two fields intersect and inform each other, providing complimentary perspectives on the complexities of global politics and governance.

Global governance discourse also encourages the study of the implications and relationships of global governance 'on the ground' by examining how global governance mechanisms manifest in local contexts and impact the lives of individuals and communities (Weiss and Wilkinson, 2018). This involves analyzing how global policies, agreements, and initiatives are implemented at the grassroots level, as well as how they interact with local governance structures, cultural norms, and socioeconomic conditions. By focusing on the lived experiences of people in different regions and communities, scholars can assess the effectiveness, legitimacy, and equity of global governance arrangements. This approach recognizes that the outcomes of global governance are not uniform and may vary widely depending on factors such as power dynamics, resource distribution, and historical contexts.

Studying global governance processes from the perspective of those being governed enables a deeper understanding of granular and context specific relationships, facilitates the identification of gaps and challenges in implementation, and informs efforts to improve global governance mechanisms to better serve the needs and aspirations of diverse populations globally.

The work presented in this dissertation contributes to global governance scholarship in two ways. First, this research brings the globally governed into focus. Investigating trends in Nairobi's food system uncovers how global policies and economic trends shape local food security, market dynamics, and the livelihoods of those who depend on the city's food system for work. Zooming the analysis in on the relationship that an informal food vendor in Kilimani has with a new European owned supermarket in the neighbourhood and then zooming out to understand how global governance institutions and processes facilitated this relationship occurring, provides an opportunity to challenge the notion that global governance processes are too nebulous to bring into clear focus. Furthermore, this perspective contributes to overcoming the absence of feedback loops and the accountability gap between 'the governors' and 'the governed'.

Second, this research contributes to global governance discourse by reversing the analytical optic. By focusing on the food system of Nairobi through the perspective of those working in it and relying upon it, the research examines how policies and governance structures designed by the governing are received, adapted, and contested by local community. This provides insights into the efficacy, equity, and legitimacy of these policies from the perspective of those directly affected by them. It also creates space for exploring the agency that 'governed'

actors have within a trans-scalar governance ecosystem. With global governance discourse widely being a critique of the state-centric analysis in international relations, this works contributes to it by highlighting the roles that non-state actors have in shaping the development pathway of Nairobi's food system. By bringing the globally governed into focus and reversing the analytical optic of that focus, this research contributes to global governance discourse by identifying discordance and disconnect between narratives about Nairobi's food system produced by 'the governing' and the perspectives of those being governed.

6. Research Limitations

6.1 A Note on the COVID-19 Pandemic

The COVID-19 pandemic had significant impacts on international research at universities. Strict travel restrictions were implemented in both Canada and Kenya, including border closures and quarantine requirements. This disrupted international research collaborations and hindered researchers' ability to travel. The pandemic required much of our daily lives to adapt, and my research is not unique in this regard.

The pandemic posed significant challenges for this project's planned research methodology, which was primarily based on interviews with stakeholders within Nairobi's food system and required international travel. When considering hiring research assistants in Nairobi in lieu of travel, the pandemic raised ethical considerations regarding informed consent, participant safety, and data collection methods in the context of rapidly evolving public health policy. Ultimately, these requirements made this option unfeasible as well. Fieldwork and data collection activities were therefore paused, and then later abandoned altogether. In the

context of this study, and my positionality as a researcher, the inability to conduct in-person interviews with key stakeholders and participants posed a considerable limitation to the project moving forward.

6.2 Modifying Research Activities

I modified the research questions and methodology to accommodate for the restrictions in place. Documentation research was used alongside the treatment of pre-existing datasets provided by the Hungry Cities Partnership as a methodological approach. While qualitative interviews offer the advantage of direct interaction with participants and the opportunity to explore nuanced perspectives in depth, documentation research presented its own set of advantages when attempting to answer similar research questions. By analyzing existing documents, including reports, policy papers, and archival materials, this method was able to still access information that may not have been easily obtainable through interviews alone. Additionally, documentation research allows for the examination of historical trends, policy developments, and organizational practices, providing valuable context and depth to the study findings.

With that said, the limitations to this methodological approach are considerable and must be acknowledged when framing the findings of this research. Unlike interviews, which enable researchers to directly engage with participants and seek clarification or elaborations on their responses, documentation research relies solely on the availability of written records, which often lacks firsthand accounts and sufficient detail when exploring a specific set of narrow research questions. Documents cited within this research are produced outside of this

research agenda and are therefore inherently limited in their ability address the posed research questions. In addition to insufficient detail, documentation research is also limited by biased selectivity, which is when, in an organizational context, the available documents are likely to be aligned with corporate policies and procedures and with the agenda of the organization's principals.

Last, given my positionality as a Canadian researcher, documentation research did not provide me with the personal interactions that enhance the richness and contextual relevance of research findings, especially when studying a foreign context. Being physically present in the research setting would have afforded me the opportunity to immerse myself in the local environment, culture, and context. Observing nuances, gestures, and interactions that may not be captured through remote methods provides deeper understanding of the socio-cultural dynamics at play. In-person research facilitates the establishment of personal connections and trust with local stakeholders, participants, and communities, which on enhances the quality of the research process. This research was not afforded that luxury.

7. Structure of Dissertation

Following this introduction, the first chapter of this multiple manuscript dissertation revisits the supermarket revolution hypothesis in Nairobi, Kenya by examining the contemporary state of the supermarket economy to determine if it has been realized. This research fills the gap in literature on urban food systems in Africa by examining whether Kenya is following the path predicted by the original supermarket revolution hypothesis and the extent to which this retail format is driving transformation in the city's food system today. While some findings in this

paper align Nairobi's supermarket revolution with broader documented trends, other findings differentiate it. Nairobi's food system is experiencing transformation because of the highly competitive growth of the supermarket economy, but the rate of change has been slower than predicted and many of the urban propositions of the supermarket revolution hypothesis have not occurred at all.

The second chapter applies systems theory and the concept of a 'food system' to investigate the complex interplay between Nairobi's formal and informal urban food system and the governance environment that firmly entrenches the exclusion of the informal food economy and those who depend upon it for their livelihoods and food security. The application of systems theory in exploring Nairobi's food system is justified by its ability to provide an integrated perspective. Nairobi's food system is inherently complex, involving intricate relationships between ecological, social, economic, and political components. Further, Nairobi's food system is not isolated; it is embedded within larger regional and global systems. This chapter demonstrates that the exclusion of the informal food economy in Nairobi is embedded in a longstanding complex system of governance that, while hostile towards it, fails to concorporate it into the formal economy. This reflects the dynamic stability of informality within the broader food system and the results from this study challenge assumptions about informal economic displacement in the wake of 'modern' food retailing development.

The third chapter presented in this dissertation positions itself within the body of literature of 'food deserts' generally, and specifically in the small but growing body of literature debating its utility when applied to cities in the Global South. Cities in the Global South contain many poor neighbourhoods where the prevalence of malnourishment and food insecurity are

often more prevalent than in North America and the UK. Further, the higher prevalence of informality, a larger per capita number of micro-enterprises in the food system, extent of supermarket diffusion and market consolidation, and different phasing of the global nutrition transition all make for distinct characteristics of food systems in cities in the Global South. An important question to consider is whether the 'food desert' concept can be reformulated to fit the realities of urban food systems in the Global South. In light of growing criticism in Northern cities around 'food deserts', application of the concept in the global South should be carefully considered. This work demonstrates that applying various conceptions of food deserts to Nairobi, Kenya is problematic. When assessing the relative utility of three iterations of the food desert concept in the context of Nairobi, this study concludes that they are equally inapplicable.

The purpose of this dissertation is to contribute to the discourse on urban food security and urban food systems by testing the accuracy of common models, concepts, and their embedded assumptions when applied to a Southern city. Using Nairobi, Kenya as a case study, this research questions emerging areas of urban food security studies, particularly the focal points of supply-side dynamics and household food access. Thematically, this research will demonstrate that prevailing models and concepts used to explain urban food security dynamics fail to capture the transformation occurring in Nairobi, Kenya's food system. Each of the three chapters suggest a discordance between how we commonly describe urban food systems in the Global South and their actual function.

Chapter 2:
Revisiting the Supermarket Revolution - The Case of Nairobi, Kenya

1. Introduction

The supermarket is often characterized as a harbinger of progress for food systems in emerging economies (Reardon and Timmer, 2012; Weatherspoon and Reardon, 2003). Referred to as the 'supermarket revolution', this burgeoning economy is described as having swept across global food systems and presents a strategic opportunity for developing countries that can contribute to overall economic development (Wilkinson, 2008). The emergence of this retail format came to represent a sharp, rapid evolution of the entire food system in which they are located, impacting every stage of the food supply chain (Abrahams, 2010; das Nair, 2020). Their presence in urban food retailing landscapes also stimulates investment in agriculture (and pre-agricultural inputs), processing, transportation, and supplier systems, thereby improving the overall food system for consumers by increasing variety and quality of foods available while reducing costs (Wilkinson, 2008, 2009).

The anticipation of an unabating supermarket revolution in Africa became widespread after a series of publications at the beginning of the 21st century (Dakora, 2012; Reardon et al. 2003; Wilkinson, 2008). This view is premised on the assumption that Africa will follow the same food system development pathway as Euro-America and supermarkets would therefore diffuse in stages, or 'waves', within Africa, starting first in primary and secondary cities (Reardon et al., 2003). At the time, South Africa's food retailing economy was dominated by a small number of supermarket chains that were beginning to aggressively expand northward into the rest of the continent (Reardon et al. 2003; Dakora, 2012). This trend was supposedly

going to hasten the realization of a pan-African supermarket revolution by displacing other formal and informal food retailers (Miller et al., 2008). This assertion is premised on the view that "the mirror image of the spread of supermarkets is the decline of the traditional retail sector in substantial part because of the competition with modern retailers" (Berdegue and Reardon, 2008, p. 149). While this remains a prominent position in food security discourse today, it has also incited lively debate.

Others have argued that this commonplace assertion is a myopic view that overstates the impact of supermarkets and "sidelines evidence of other potentially transformative processes by which the transition of food economies is made possible" (Abrahams, 2010, pg 123). Researchers challenging this narrative have focused on obstacles to supermarket expansion, including the strength and resilience of traditional and informal food retailing, low agricultural production across the continent, poor transportation infrastructure, and inhibitive regulatory environments for businesses looking to expand (Abrahams, 2010; Brown, 2019, Crush and Frayne, 2011). In this sense, opponents of the supermarket revolution hypothesis argue that this transition will not be smooth, nor will it be the end of the informal food economy.

Southern Africa offers a case study where further examination of the supermarket revolution model has since been conducted, with context specific results that challenged some of its fundamental propositions (Blekking et al. 2023; Lane et al. 2012; Nickanor et al. 2017; Skinner and Haysom, 2017). South Africa was once seen as an archetype emulating the waves of diffusion that the economic model proposes (Weatherspoon and Reardon, 2003). Having the most developed retailing economy in Africa, the country has acted as an anchor state in the

region for foreign investment in the sector (das Nair and Dube, 2017). However, application of the supermarket revolution model in this context has been criticized for not adequately accounting for the resilience of the informal food economy despite the growing market share of supermarkets (Skinner and Haysom, 2017; Nickanor et al. 2017). Skinner and Haysom argue that the framing of supermarkets in this context as a revolution has actually created a regulatory environment of "benign neglect" for those dependent on the informal food economy for livelihoods and food security (2017, pg. 13). In neighbouring Botswana, informal food retailing in major cities is persistent despite South African supermarket penetration (Lane et al. 2012). Albeit outside of Southern Africa, informal traders in Ghana were also found to co-exist with supermarkets and are often used interchangeably by many urban residents (Oteng-Ababio and Arthur, 2015). In the case of neighbouring Windhoek, Namibia, evidence suggests that South African supermarket investment is not making food more accessible for urban residents, nor is it improving food security significantly (Nickanor et al. 2017). Primary beneficiaries from South African supermarket expansion into Windhoek "are not consumers or smallholders, but large monopolistic South African corporations whose bottom lines are flourishing through corporate expansion into the rest of Africa" (Nickanor et al. 2017, pg. 71-72).

While a growing body of research highlights the model's shortcomings in explaining the implications of supermarket investment for Southern Africa's food system, East Africa remains under researched despite there being a volatile and dynamic supermarket economy in the region. Nairobi, Kenya offers a unique case study to examine trends in Africa's modern food retailing landscape and further contribute to our understanding of the implications of

supermarketization on food systems broadly. Nairobi operates as a regional economic hub with many companies first entering the East African market in the capital city and expanding to other secondary cities and regional countries afterwards. In this sense, Nairobi is both telling of broader food retailing trends within the East African region and timely as the food retailing landscape within the city has recently undergone significant changes.

A few short years ago, Nairobi's formal food retailing economy was widely Kenyan owned. Supermarket companies Nakumatt, Uchumi, Tuskys, and Naivas operated most store locations in Nairobi City County and East Africa more generally. South African owned transnational supermarket chain Shoprite had just entered the regional market and aspired to grow their market share. As for non-African owned supermarket chains, they were few and far between with only French owned Carrefour and Wal-Mart owned Game having a minimal presence in the city. In the early days of market entry, there was little influence on Kenya's supermarket economy from foreign direct investment (FDI) by global retail chains (Neven and Reardon, 2004). However, this changed quickly between 2015 and 2021, as the top three locally owned supermarket chains all collapsed. This left ample opportunity for FDI within the food retailing sector, and as a result, the supermarket economy in Nairobi looks much different today.

This article revisits the retailing revolution in Nairobi, Kenya by examining the contemporary state of the supermarket economy and its implications for urban food security. Little attention has been specifically paid to the activities and impacts of supermarkets in Nairobi, Kenya. Of the research that has been conducted, much of it focuses on the sector's impact on rural communities and smallholder agriculture rather than the food system more

broadly (Rao & Qaim, 2011, 2013, 2015; Neven et al. 2009; Neven & Reardon, 2004; Chege et al. 2015). This body of literature perpetuates a pervasive rural bias in food system and food security research that has gone under criticized until recently (Crush & Riley, 2017). In 2006, Neven and colleagues explored the extent of supermarket penetration into Nairobi's lower-income neighbourhoods, with their key findings being that "purchasing from supermarkets has penetrated the food markets of the poor and low-income groups-in Kenya, already 56% of supermarket clientele" (Neven et al. 2006, 119). However, not only do findings from more recent studies call these claims into question, but ongoing volatility in the sector and the failure of several companies casts even further doubt (Berger & Helvoirt, 2018; Wanyama et al. 2019). The aim of this research is to fill the gap in literature on urban food systems in Africa by examining whether Kenya is following the path predicted by the original supermarket revolution hypothesis and the extent to which this retail format is driving transformation in the city's food system today.

2. Methodology

This study combines quantitative research components from a city-wide survey conducted in Nairobi City County with document research.

The Nairobi household food security survey was conducted by the Hungry Cities Partnership in 2016 and covered a total of 1,434 households. To generate as representative a city-wide sample as possible, the survey was conducted in randomly selected administrative sub-locations spread across all the administrative districts (or sub-counties) and divisions of Nairobi City County. The sampled households were randomly selected from these

administrative sub-locations. The households were located in 23 administrative locations and sub-locations, covering all the administrative divisions and districts of Nairobi City County. Nairobi is divided into four administrative districts (or sub-counties): Nairobi West, Nairobi East, Nairobi North and Westlands. The districts are further sub-divided into eight administrative divisions. These are Dagoretti and Kibera (in Nairobi West); Embakasi and Makadara (in Nairobi East); Central, Kasarani and Pumwani (in Nairobi North); and Westlands division (in Westlands). These divisions are further divided into a total of 49 administrative locations. Lastly, the locations are split into 111 sub-locations, which are the lowest administrative units in Kenya. The survey covered sampled households in 23 of the administrative sub-locations of Nairobi City County.

Documentation research is additionally used to analyze existing information related to the study's research question. This methodological approach categorizes and analyzes public records and personal documentation as primary sources for corroboration. Public records examined include government and private sector documents, strategic plans, and reports. News articles were namely used as personal documents to account for Nairobi's rapidly evolving retailing landscape. The study also reviews relevant academic literature to contextualize the research questions and methodological design.

3. Contextualizing Nairobi's Supermarket Revolution

The supermarket is a form of grocery self-service store that offers a wide variety of food and household commodities prearranged into departments. Relative to traditional grocery stores, supermarkets have more square footage and offer relatively low-cost, high-volume products

and services. This model of food retailing expanded rapidly in Euro-American countries during the post-World War II era and was isolated in these regions until the late 20th century (Humphery, 1998). It was at that point when supermarket economies began emerging in the global South, with a number of publications suggesting that the global food retail share of supermarkets increased sharply in the late 1980s and 1990s (Reardon et al., 2003; Reardon and Hopkins, 2006; Traill, 2006; Reardon et al., 2007).

The spread of supermarkets into lower-income countries was hypothesized to occur through what was called a punctuated equilibrium, a term borrowed from evolutionary biology to describe a "long evolutionary equilibria, suddenly punctuated by sharp and extremely active periods of rapid evolution." (Reardon et al. 2007, 401). This punctuation of supposed sharp and rapid evolution of food retailing in lower-income countries is explained to occur like "waves of diffusion rolling along" (Reardon et al. 2003, pp. 1142); this claim remains an integral component of the supermarket revolution model.

The first documented 'wave' within the global South occurred in the early 1990s in South America (Argentina, Brazil and Chile), East Asia (excluding Japan and China) and South Africa (Reardon, Timmer and Minten, 2012). In these geographies, the market share of supermarkets rapidly increased from 10-20% in the early 1990s to 50-60% in 2004 (das Nair, 2020). The second wave involved countries that had their growth and urbanization surges later and had strong internal pressure to limit FDI, such as Mexico, Central America, Southeast Asia, and Central Europe (Reardon, Timmer and Minten, 2012). The share of food retailing through supermarkets in these regions grew from 5-10% in the 1990s to 30-50% in 2004. The third wave involved countries that had their growth and urbanization increases in the 1990s and 2000s and

had lagged liberalization into the 1990s. In Russia, China, India, poorer Latin and Central American countries, as well as in Kenya, the third wave saw market share grow from 10 to 20% between the late 1990s and early 2000s (das Nair, 2020).

The last formally documented fourth wave in the global South occurred in Southern and East African countries in the mid-2000s and was a result of South African and Kenyan owned supermarkets expanding throughout Sub-Saharan Africa (Weatherspoon and Reardon, 2003; Reardon and Hopkins, 2006; Reardon et al., 2007; das Nair et al., 2018). Supermarkets were forecasted to expand rapidly across Africa in the late 2000s due to global multinational and transnational chains entering the continent (Reardon and Swinnen, 2004; Traill, 2006). This prediction was premised on similar patterns evidenced in Latin America and East and Southeast Asia where major multinational and transnational retailers invested first in primary and secondary cities and later into smaller towns. However, only three of the top 20 global grocery retailers – Walmart, Carrefour and Casino – were present in Africa in 2018 (Coe and Wrigley, 2018). Instead, a handful of supermarket chains from South Africa and Kenya have spread in the Southern and East African regions respectively. South African retailing companies expanded into 17 countries after the end of apartheid, with their corporate footprint being heaviest in the Southern African Development Community (SADC) (Nickanor et al. 2021). Meanwhile, Kenyan owned supermarket companies, namely Nakumatt and Uchumi were expanding into neighbouring Uganda, Rwanda, and Tanzania (Nishiura, 2010). South African supermarket companies such as Shoprite and Game were also present in East Africa, but their market entry was both temporary and negligible (Ngugi, 2021; Wynne-Jones, 2020). South African supermarkets exiting the East African market was an early indication that the ‘waves’ of

supermarket diffusion in this context were non-linear, nor following the proposed supermarket revolution model.

Existing research identifies key supply and demand factors facilitating the spread of supermarkets globally and explores them as both exogenous and endogenous to retailing businesses (Reardon et al. 2008). This two-dimensioned lens employed by economists can be used to categorize the interaction of retailers, both domestic and transnational, and developing country economies, market institutions, trade, and food cultures. On the demand-side, exogenous factors to retailers include rapid rates of urbanization and growing population density coupled with increased per capita income leading to the rise of a middle class (Reardon and Swinnen, 2004; Tschirley et al., 2015; das Nair, 2020). Rising incomes are associated with more refrigerators and better access to transportation, making it easier to buy in bulk at supermarkets (Reardon et al. 2008). Consumer preferences and food purchasing behaviours are also demand-side factors, but partially endogenous to supermarkets as their marketing and promotional strategies have notable influence in these areas (Makhitha and Khumalo, 2019). These demand-side factors are argued to be necessary but not sufficient conditions for a retailing revolution.

On the supply side, success of a supermarket retailer is predicated on modernizing procurement systems to reduce costs and penetrate the mass market in order to out compete other supermarket companies and traditional retailer (Reardon et al. 2007). The capacity to modernize relates to procurement technology transfer from transnational chains and its further diffusion among leading domestic chains (Reardon et al. 2003; Coe, 2004). Mounting competition as the supermarket sector develops provides incentive for investment supply-chain

modernization, while increases in quality and product diversity and the decline of product and transaction costs become central competitive strategies. “As procurement modernization diffused over countries, chains and products, supermarkets became more competitive relative to traditional retailers and further penetrated food markets” (Reardon et al. 2007).

Last, policy, regulatory, and legislative environments that impact both supply and demand factors are critical facilitators in the diffusion of supermarkets. Debt and macroeconomic crisis in the 1980’s for a majority of African countries prompted economic reforms that replaced inward-looking import substitution strategies with outward-oriented trade liberalization strategies (Rodrik, 1995). Trade liberalization was expected to result in increased investment and productivity gains as a result of technology transfers, economies of scale would result from increased production in tradable sectors (UNECA, 2013). In East Africa specifically, trade liberalization took place both in multilateral WTO/GATT processes and through regional trade agreements. The former were partly influenced by pressure from international organizations such as the World Bank and the International Monetary Fund to liberalize their economies (UNECA, 2013). Most East African countries undertook comprehensive trade liberalization in the 1980s and 1990s. As a component of these reforms, trade policy was directed towards the reduction of tariff and non-tariff barriers on international trade.

Kenya specifically underwent extensive trade liberalization in 1993 and became of member of the WTO in 1995 (UNECA, 2013). During this period, Kenya had the largest declines in tariffs in East Africa, going from 39.2% in 1986 to 12.1% in 2010 (World Bank, 2011). By promoting free trade between countries, these policies facilitated a plethora of opportunities

for food retailing expansion. The emergence of a supermarket economy in Nairobi, which aligns with trade liberalization timelines, reflects both an increasingly globalised mode of commerce and liberalized policies which aimed to profit from this global interconnectedness. das Nair (2020) demonstrates that this was coupled with the modernization of procurement systems, including centralized distribution, and increasing efficiency in logistics and inventory management that resulted in lower product costs. In this sense, trade liberalization in East Africa provided opportunity for supermarket chains to not only "place the firm", but also "firm the place", or manipulate procurement systems to suit their competitive needs.REF?

Early research on the supermarket revolution proposed a generalized set of hypotheses detailing supermarkets' broader impacts for food system development based on limited evidence and misrepresentations of informality. Table 1 details the central propositions of the supermarket revolution hypothesis that directly relate to urban food systems. This set of propositions has encouraged others to explore the implications of the growth and spread of supermarket chains on the food security status and 'nutrition transition' of urban residents in African developing contexts (Asfaw, 2008; Crush and Frayne, 2011; Nickanor et. al., 2017; Peyton et al., 2015; Popkin et al., 2012; Popkin, 2017; Tschirley et al., 2015), as well as the development pathway of domestic food supply chain systems (Barrientos et al., 2016; Boselie et al., 2003; Brown and Sander, 2007; Weatherspoon and Reardon, 2003). The extent to which traditional informal markets and independent retailers might be displaced or face increased competition has also been examined (Abrahams, 2010; Crush and Frayne, 2011; das Nair and Dube, 2016; Berdegue and Reardon, 2008). While the original supermarket revolution hypothesis has since been questioned within urban food system discourse, the extent to which

it has taken shape in East Africa and Nairobi, Kenya specifically has not been adequately explored.

Table 1: The Urban Propositions of the Supermarket Revolution Hypothesis

Proposition #1: Impact on competition in the food retailing sector	Intense competition, consolidation, and multinationalisation in the supermarket sector will accelerate the spread of supermarket chains seeking to improve their competitive positioning.
Proposition #2: Impact on market share in the food retailing sector	Supermarkets will go well beyond the initial upper- and middle-class clientele in many countries to reach the mass market. They will charge lower prices and offer more diverse products and higher quality than traditional retailers, allowing them to win consumer market share.
Proposition #3: Impact on traditional retailers	As supermarkets spread and their market share grows, the market share of traditional retailers declines. This decline happens at different rates over product categories.
Proposition #4: Policy Approaches	The scope and effectiveness for policy and strategic effort to pursue public good objectives in a market-driven process is limited.

4. Revisiting the Supermarket Revolution in Nairobi, Kenya

Recent and dramatic change in Nairobi's food retailing environment provides compelling grounds for critically assessing the claim that supermarkets have transformed local food economies. This section tests the urban propositions of the original supermarket revolution hypothesis that are presented in Table 1.

4.1 Testing Proposition #1:

Intense competition, consolidation, and multinationalisation in the supermarket sector will accelerate the spread of supermarket chains seeking to improve their competitive positioning.

Kenya has experienced one of the most rapid increases in the number of supermarkets across all African countries (Demmler et al. 2017; Neven and Reardon, 2004; Tschirley et al., 2015). Since the appearance of supermarkets in Nairobi in the 1990s, food retailing has consistently been among the most rapidly expanding sectors of the economy. In 2020, the wholesale and retail sector was the 5th largest contributor to Kenya's GDP and the 3rd largest contributor to formal private sector employment (Mbatia & Wanjiku, 2020). Kenya's retail market is Africa's second most developed after South Africa, and the fastest growing sector within the continent (Muturi, 2018). Despite this growth, the country's supermarket economy has been highly volatile in recent years with many domestically owned companies struggling to maintain their market share and keep branch locations open.

In the early days of Nairobi's retailing revolution, the phenomenon was characterised as "endogenous and indigenous – without the heavy influence of FDI by global retail chains" (Neven and Reardon, 2004, 669). Nakumatt, Uchumi, and Tuskys were the 'big three' Kenyan owned supermarkets that operated the majority of supermarket locations in Nairobi City County and East Africa more broadly. Shoprite, a South African owned transnational supermarket chain, entered the regional market at the turn of the century but did not develop any significant market share. As for non-African owned supermarket chains, they were few and far between with only French owned Carrefour and Wal-Mart owned Game having a minimal

presence in the city. Within a five-year period though, the top three supermarket chains in Kenya collapsed, leaving ample opportunity for other companies to seize their market share.

In June of 2014, Uchumi operated 37 supermarkets throughout East Africa, with the majority of them located in Kenya (White & Rees, 2019). At the time, Uchumi was the third largest Nairobi based supermarket chain by both assets and number of locations. As of 2023, only three locations remain in Kenya and only one of them is in Nairobi City County. This was not the last Kenyan owned transnational food retailer to fall in the region.

In October 2017, Nairobi's leading supermarket retailer Nakumatt, which operated 65 branch locations, ran out of funds and did not pay rent or wages (White and Rees, 2019). By August 2018, the company had closed 60 of their store locations. The last of their branch locations were sold to Naivas Supermarkets in a deal that saw Nakumatt completely liquidated (Nandonde, 2021).

In June 2023, Kenya's High Court also ordered the liquidation of the Tuskys Supermarket chain, which ended the 30-year history of what was once East Africa's biggest family-owned business (Kiplagat, 2023). In August 2018, Tuskys owned and operated over 60 supermarkets in the country and employed 6,000 people. After slowly sliding into financial trouble and failing to pay suppliers, the company closed the vast majority of its locations across the country. The remaining stores yielded lower sales due to suppliers avoiding the company. Those margins were only further eroded due to their use of diesel generators to power their stores; Kenya Power stopped providing them electricity in reaction to a pending bill settlement (Anyanzwa, 2020). Owing creditors close to Sh20 billion against an asset base approximated to be Sh6 billion, the judges ruling came after a 3-year court battle filed by Hotpoint Appliances and

supported by dozens of other suppliers. This was the latest of the 3 Kenyan owned food retailing giants to have collapsed, leaving vacancy and therefore potential opportunity for other companies to acquire the market share left behind.

No comprehensive analysis has been done to explain why so many well-established supermarket retailers collapsed in a short timeframe. However, media speculations suggest a plethora of reasons, some of which were unique to specific to supermarkets, while others were city-wide (Njue, 2021; Ondieki, 2023; Masinde, 2017). As Njue writes, "mismanagement, poor expansion strategies/ blind expansion**,** management disputes, poor financial decisions, liquidity issues, poor corporate structures, huge losses, tax compliance issues, poor customer target, and theft of products and cash by owners, employees, suppliers, and the management are some reasons for the collapse of Kenya's retail giants" (2021). Nakumatt opted for aggressive expansion throughout East Africa with the intention of cornering the market and outcompeting their rivals. It was not long after this expansion when they began to struggle financially. Similarly, after Nakumatt's exit from Nairobi's retailing landscape, Tuskys chose to expand its operations under the logic that Nakumatt left behind a void within the market. Today, Tuskys is also entirely liquidated. Uchumi offers yet another example of a supermarket that originally established itself as an upper-end supermarket targeting high-income consumers and later decided to aggressively expand and begin targeting middle and low-income urban areas. These locations were among the first to close when Uchumi was forced to scale down their operations. The very supermarket expansionist strategies that Reardon and company claim to displace informal economic activity through balancing feedback are the same ones that may have been the most significant reason so many of Kenya's supermarket retailers have collapsed.

Table 2 lists the supermarket companies currently operating in Nairobi, the number of supermarket locations they operate, and when they started operating within the city. Despite other domestically owned chains struggling to maintain their footing within the market, Naivas Limited and Quick Mart Limited, both wholly Kenyan owned companies, have expanded their operations across Nairobi in recent years.. As of June 2022, Naivas was the largest supermarket chain in Kenya in terms of branch network with 26 locations in Nairobi and 92 locations across Kenya (Juma, 2022). Quickmart was the second-largest supermarket chain in Kenya, with 28 locations in Nairobi and 51 across Kenya (Juma, 2022).

Table 2: Taking Stock of the Supermarket Economy in Nairobi, Kenya

Supermarket Company	Domestic or Foreign Ownership	Number of Locations in Nairobi City County	Number of locations in Kenya	Date of Establishment
Naivas Limited	Domestic	26	92	1990
Chandarana	Domestic	17	27	1964
Eastmatt	Domestic	4	9	1990
Maathai	Domestic	1	7	2014
Quickmart Limited	Domestic	28	51	2006
Uchumi	Domestic	3	3	1975
Carrefour	Foreign (France)	14	18	2016 (Kenya)
Village	Foreign (Tanzania)	1	1	2011

* This table has been assembled using a mix of sources, including company websites, available annual quarterly reports, and news articles. At times, these sources contradict each other. Further, these figures change rapidly as a result of high market volatility.

Both Game and Shoprite recently announced the closure of all their East African locations (Phillip, 2021). Carrefour, however, has done the opposite. Being the 8th largest

retailer in the world, Carrefour has 12,300 stores in over 30 countries. Carrefour entered the Kenyan market in 2016 and has since opened 14 supermarkets in Nairobi as well as others in secondary cities within the country. Most of Carrefour Kenya's stores are located in shopping malls, in outlets vacated by two struggling local retailers, Nakumatt and Uchumi (David, 2015; Miriri, 2019; Wainainah, 2019).

Carrefour is the first foreign-owned supermarket outlet in Kenya that has had any real success in establishing themselves as a major competitor and this has significant implications for locally owned outlets. In addition to the increased competition, local players have to do more to match the multinational firm that has brought with them sophisticated supply chains and significant buying power. The exertion of their power is clearly seen in the negotiation of trading terms and the imposition of private standards. This results in additional costs for suppliers, thus squeezing their margins and limiting their participation in value chains.

While intense competition, consolidation, and multinationalisation in the supermarket sector has accelerated the spread of supermarket chains seeking to improve their competitive positioning, it has not been a linear process. Further, this accelerated spread of supermarket chains has been a factor in the downfall of a growing list of Kenyan owned supermarket companies.

4.2 Testing Proposition #2:

Supermarkets will go well beyond the initial upper- and middle-class clientele in many countries to reach the mass market. They will charge lower prices and offer more diverse

products and higher quality than traditional retailers, allowing them to win consumer market share.

Since supermarkets began spreading into lower-middle- and lower-income countries in the 1990s, researchers have claimed that they have been able to reach the mass market in many countries and begin serving lower-income neighbourhoods (Reardon and Gulati, 2008). This claim has been substantiated with the ensuing development and sophistication of highly efficient supply chains that decrease food product pricing and make food more affordable to lower income populations. Evidence suggests that this has not occurred in Nairobi.

The Lived Poverty Index (LPI) provides a reliable subjective experiential index of "lived poverty" (Mattes, 2008). It measures how often people report being unable to secure a basket of basic necessities of life, including food. The LPI of a household is determined by asking whether, in the past year, any of the household members had experienced inconsistent access to food, clean water, medical care, electricity, cooking fuel and cash income. Using LPI as a proxy indicator to measure socio-economic status, Figure 1 demonstrates that there is a clear connection between a household's Lived Poverty Index and supermarket patronage. The majority of households with an LPI below 2.00 shop at supermarkets while only one third of households with an LPI between 2.00 and 2.99 do so. The single household with an LPI above 3.00 does not shop at supermarkets at all.

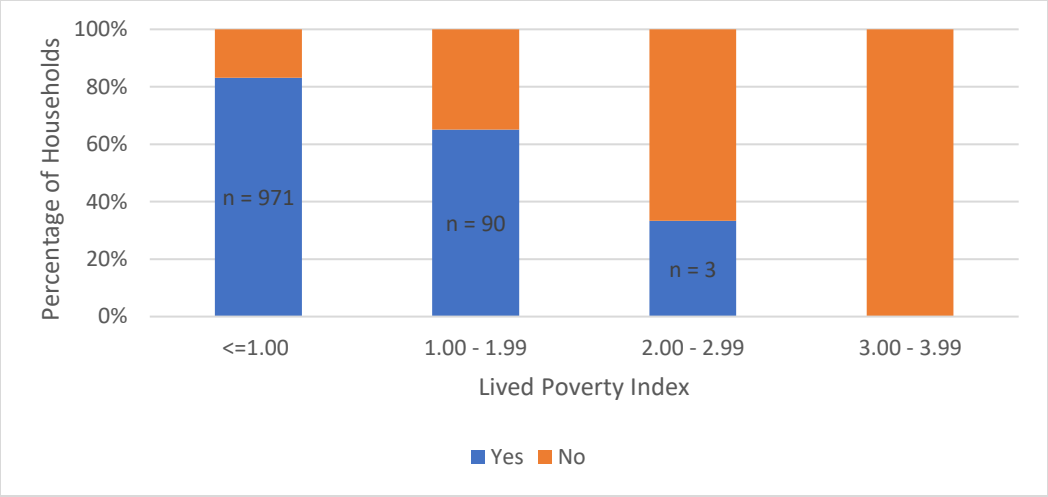

Figure 1: Household Lived Poverty Index and Patronage at Supermarkets

Figure 2 explores the connection between LPI and supermarket patronage frequency and highlights that households shopping at supermarkets more frequently are less likely to experience poverty. 16.7% of households with an LPI between 1.01 and 2.00 shop at supermarkets at least once a year. Comparatively, only 5.8% of households shopping at supermarkets at least 5 days a week fall within that same LPI range.

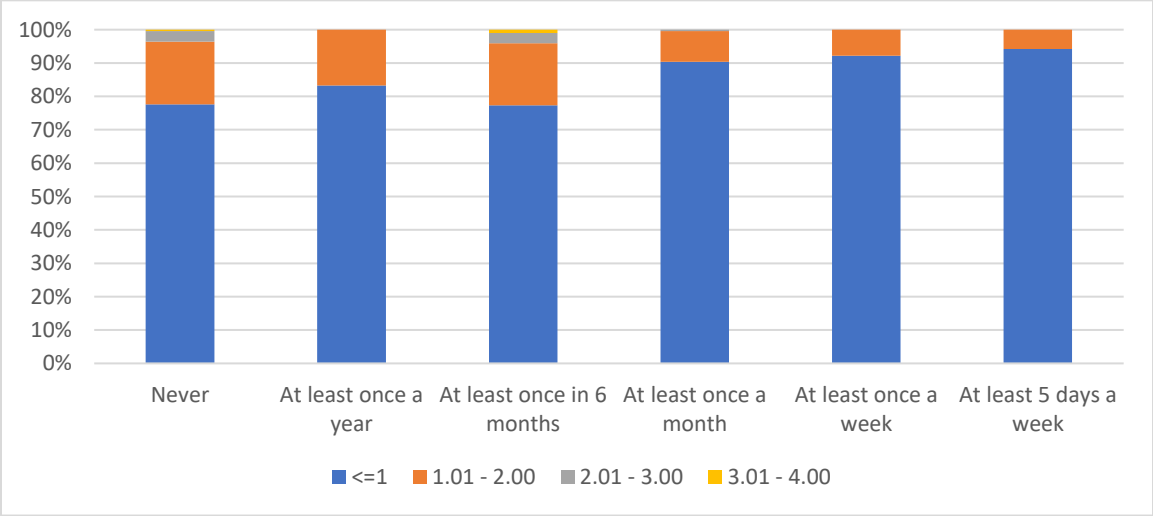

Figure 2: Lived Poverty Index and Supermarket Patronage Frequency

Households in Nairobi that shop at supermarkets do not necessarily see them as a source of cheaper food (Figure 3). This finding contradicts the premise that competition in supermarket and supply chain economies has lowered the cost of food for consumers relative to other forms of retailing. Supermarkets are perceived as having better quality foods though (80%), as well as having a greater variety of foods (95%). Patrons also see supermarkets as retailers where they can buy in bulk. These findings indicate that there is a convenience-oriented consumer culture in Nairobi that supermarkets are serving. In addition, these findings align with broader claims of the supermarket revolution improving overall food quality and variety (Wilkinson, 2008; Wilkinson, 2009).

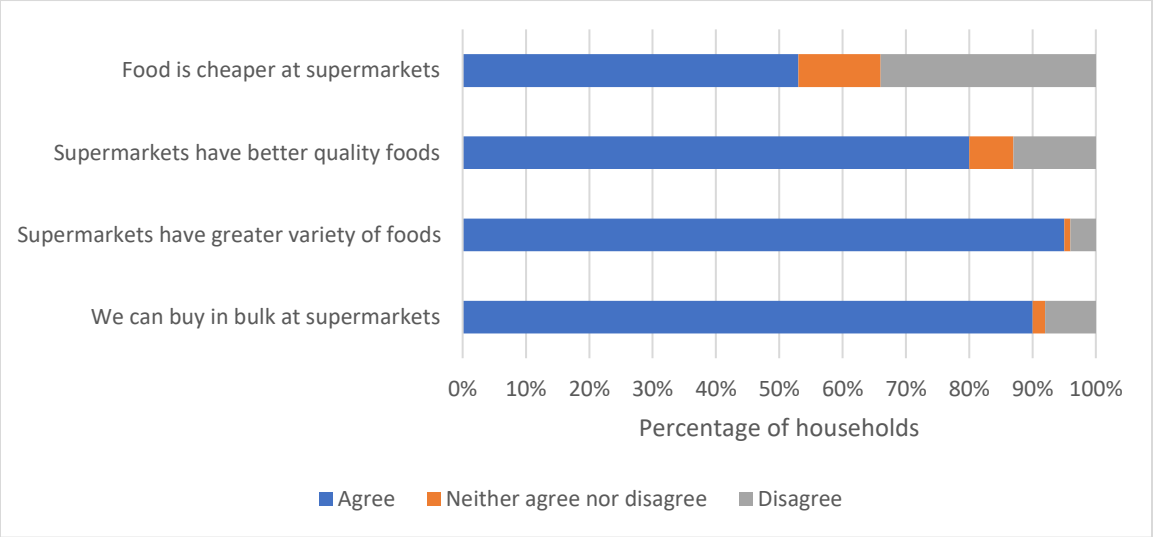

Figure 3: Perceptions of Supermarkets by Patrons

Figure 4 shows that the majority of households in Nairobi that do not shop at supermarkets see them as being too expensive (55%). Forty three percent of non-patrons also consider supermarkets as being retailers for the wealthy, indicating that supermarkets have not

successfully penetrated the lower-income market. Lack of access to credit is a clear reason as to why non-patrons do not shop there. This demonstrates that informal retailers offering credit to customers still play a critical role in the city's food retailing landscape.

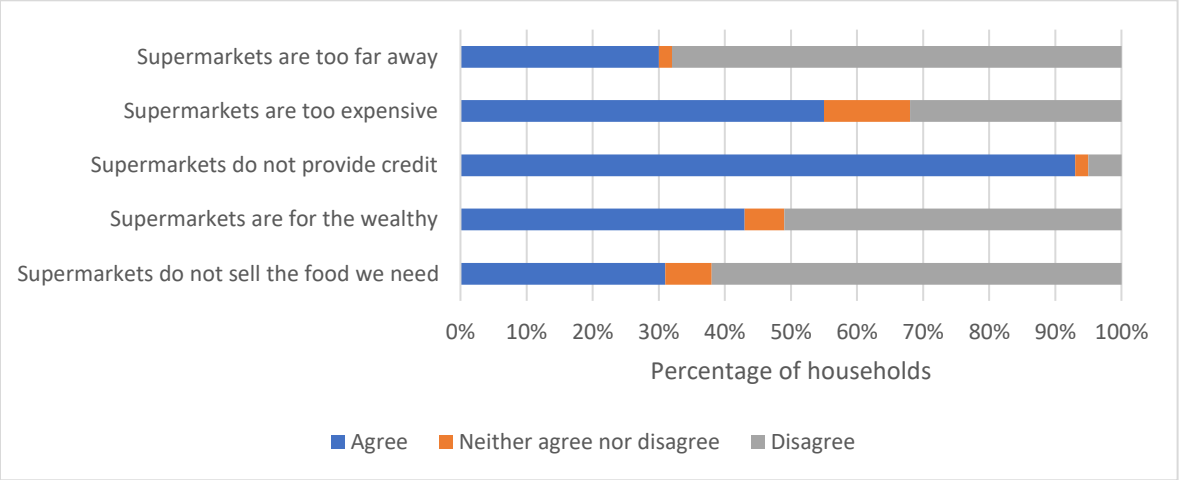

Figure 4: Perceptions of Supermarkets by Non-Patrons

Overall, this data suggests that the second proposition outlined in the supermarket revolution hypothesis is not entirely the case in the context of Nairobi, Kenya. Supermarkets have not gone "well beyond the initial upper- and middle-class clientele", failing to reach the mass market. Further, households in Nairobi do not necessarily see supermarkets as charging lower prices. However, diversity of products and higher quality foods in comparison to traditional retailers are common reasons for households to shop at them. This indicates a shift in shopping habits toward more convenience-focused one-stop retailing options.

4.3 Proposition #3:

As supermarkets spread and their market share grows, the market share of traditional retailers declines. This decline happens at different rates over product categories.

Many scholars argue that as the supermarket revolution continues globally, modern food retail channels with large and centralized distribution systems will gradually displace fragmented local markets and informal retailers (Reardon et al. 2003, 2012; Hu et al. 2004; Gorton et al. 2011). However, there is strong evidence that this has not happened in Nairobi, despite supermarkets operating within the city for decades.

Figure 5 shows that the most patronized food sources are small shops (81.6%). Nearly 60% of households use these small shops on an almost daily basis (at least five days a week). There are many of these outlets, located in both county designated and undesignated areas, and they sell fast-moving, lower-order goods needed daily by neighbourhood residents. Street sellers and traders are also frequented by over 40% of households. Supermarkets (77.6%) and kiosks/ corner stores (68.7%) are also frequented, but by fewer households and less often. Despite over three decades of supermarket development within the city, informal food retailers remain a central part of Nairobi's food retailing landscape.

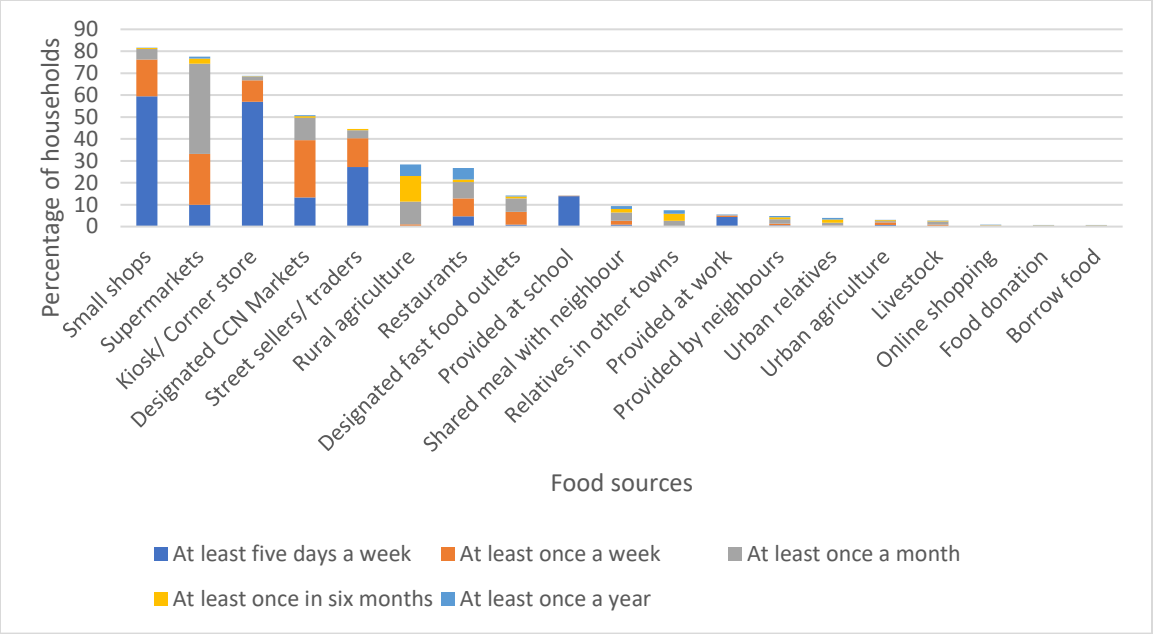

Figure 5: Household Food Sources by Frequency of Patronage

Other research has found that the informal food sector remains a critical source of food for Nairobi's residents (Owuor, 2020). Informal vendors make food more accessible and affordable in low-income areas and to food-insecure households in Nairobi (Brown, 2019). While accurately measuring informality is difficult given that it operates outside the ambit of regulation, the Kenya National Bureau of Statistics estimated that 53% of Kenya's urban population, or nearly 8 million people, are engaged in the informal economy (2012). Further, Budlender (2011) suggests that the informal economy is the most robust employment sector in Nairobi and creates 9 in every 10 new jobs. Of those who participate as informal vendors in the city, only 19.1% of them claim that they find themselves in competition with supermarkets (Owuor, 2020).

Table 3 indicates that households in Nairobi are less likely to purchase perishable food products such as fruit, vegetables, milk, eggs, and fresh meat at supermarkets than from other retailers. For instance, 52% of households buy their fresh milk from small shops and 92% buy their fresh meat from a butcher. Fresh fruit and vegetables are bought from small shops nearly 40% of time. Of the food items bought at supermarkets, the most common items are all non-perishable and processed foods, including canned goods, maize meal, pasta, rice, cooking oil, sugar, snacks and sweets.

Table 3: Household Food Purchasing Matrix

Food Items	Super-market	Small Shops	Butchery / Bakery	Formal Market	Informal Market	Kiosk	Whole-sale	Street Trader
Maize Meal	62.8	27.3		2.0	2.9	13.7	9.0	0.6
White Bread	32.2	54.8	0.3	0.1		34.3	0.4	0.5
Brown Bread	45.8	41.4	1.1		0.2	30.7	0.4	0.4
Rice	58.3	25.2	0.8	3.9	4.0	11.9	9.3	1.0
Pasta	82.9	25.2	0.8	0.2		5.0	5.0	0.4
Vegetables	6.7	39.4		20.2	13.9	29.2		25.3
Fresh Fruit	8.6	39.4		21.41	12.2	23.5	0.1	26.2
Canned Vegetables	84.0	8.0		12.0	8.0	4		
Canned Fruit	100.0	6.3						
Fresh Meat	4.6	1.2	92.6	4.8	0.8	0.4	0.4	0.2
Frozen Meat	73.5		35.3	2.9			2.9	2.9
Tinned Meat	100.0							
Eggs	16.3	54.5	0.3	1.8	2.8	35.1	4.5	4.9
Fresh Milk	30.0	52.7	0.1	0.3	0.8	38.6	1.3	1.6
Sugar	66.8	25.4		0.6	0.2	13.1	6.1	
Cooking Oil	67.2	22.8		1.1	0.5	12.5	6.6	0.5
Snacks	68.2	38.0	0.2		0.2	19.4	0.7	2.9
Sweets/ Chocolate	57.9	43.1				28.0	0.9	2.2

This evidence makes clear that informal economic activity remains a critical component of Nairobi's food system and the food security of its residents. Given the growing prominence of the supermarket economy in the city for well over two decades now, there is no evidence to suggest that informal retailers are in direct competition with supermarket firms or that they are being displaced.

4.4 Proposition #4:

The scope and effectiveness for policy to pursue public good objectives in a market-driven process is limited.

Proponents of the supermarket revolution hypothesis have expressed their pessimism regarding the ability of policy to address the negative implications of supermarket expansion in lower income countries, namely unfair competition and the sidelining of small and medium sized farms, suppliers, and traditional retailers. For instance, Berdegue & Reardon argue that the "effectiveness for policy and strategic effort to pursue public good objectives in a market-driven process appears to be limited" (2008, pg. 159). Even further, "without a substantial investment in market regulation and reform, a capacity development strategy is akin to rearranging the chairs in the sinking *Titanic*" (Berdugue & Reardon, 2008, pg. 154). However, in the case of Nairobi, this claim would be premised on both a narrow and distorted view of Kenyan's perceptions of the policy issues at play, as well as the fleet of not just policy tools available across a complex jurisdictional, and often informally governed, landscape, but also legislation, regulation, and bylaw. Further, the framing of policy being strictly applied to public good objectives (meaning a good for all members of society) is also a narrowing of the

discussion because it implies that policy cannot be applied for the good of some over others, which is commonplace. Yet, food security is a public good to the extent that access to affordable, or indeed any, food supplies is a basic societal need. Therefore, even through the narrow aperture of only considering policy options targeting public goods in a food system, there are an array of interventions available across this complex jurisdictional landscape that are being missed.

As discussed in the previous section, informal economic activity in Nairobi's food system is not displaced and informal retailers widely report that they do not consider themselves in competition with the supermarket economy. Further, any broad-based claim of supermarkets being good for food security negates the nuanced analysis of differential access between neighbourhood food environments and income levels as well as any recognition of the evidenced relationship between supermarkets and rising rates of overnutrition and the nutrition transition within the country as a whole (Peters et al. 2019; Rischke et al. 2014). These trends hold relevance to policy discourse in Kenya (and many other contexts) and yet are overlooked (Berdugue & Reardon, 2008).

To determine the scope and effectiveness for all policy options available, a thorough analysis of how jurisdictional authority overlaps with spaces of concern within the urban food system would be needed. Local and national governments in Kenya are not merely localized arenas in which broader global or national projects of neoliberal restructuring unfold. On the contrary, these administrative structures are central to the reproduction, mutation, and continual reconstitution of neoliberalism itself. Being in part both a product and constitution of

neoliberalism in cities, the policy spaces overlapping with supermarket activity are all sites of potential intervention and transformation – and there is plenty of overlap.

For instance, a long suite of tools has been used in other countries to thwart the public health implications of the nutrition transition, with many of them proving to be effective long after supermarket retailing had been established (Sunguya et al. 2014; Mozaffarian et al. 2018; FAO, 2017). In Kenya specifically, Carrefour has been deriving some of this discounting power by compelling its suppliers to shoulder the burden of the apparent bargains. In 2020, Kenya's Competition Tribunal ruled that the retailer had forced suppliers to accept lower prices and that they had abused their power as a major buyer (Majid Al Futtiam Hypermarkets Limited v Competition Authority of Kenya and Another, 2020). Evidence presented in the tribunal case detailed that Carrefour required suppliers to give a 10% rebate on all supplies as well as a 1.25% discount on annual sales. Carrefour was therefore paying 11.25% less than other outlets for the same products. The tribunal's order was to ultimately that Carrefour "must amend all current supply agreements relating to its Carrefour Hypermarkets in Kenya within the next thirty (30) days hereof with a view to expunging all offending provisions, specifically clauses that provide for, lead to or otherwise facilitate abuse of buyer power" (Majid Al Futtiam Hypermarkets Limited v Competition Authority of Kenya and Another, 2020). The outcome of this decision was that the company had to revise more than 700 supplier agreements and was penalized $5,000 USD (Gitona, 2021). While the small penalty for such a large corporation proved to not deter future behaviour, the order set a precedent that continues to impact their relationships with suppliers.

Swiftly following Carrefour being ordered to revise their supplier agreements, the Kenyan government strengthened their mandate under section 24A of the Competition Act in 2021 and published the new Retail Trade Code of Practice in an attempt to better govern the relationship between buyers and suppliers (Mwendwa, 2021). The 2021 Retail Code ensures that recorded supplier agreements or Joint Business Plans must contain the terms of payment, the payment date, the interest rate payable on late payment, the conditions for termination and variation of the contract with reasonable notice, and the mechanism for the resolution of disputes (Waweru et al., 2021). The 2021 Retail Code also now establishes two bodies, the Retail Trade Committee and the Retail Trade Dispute Settlement Committee, to govern its implementation.

In a press release published in December of 2023 by the Competition Authority of Kenya, the regulator announced that it was further penalizing Carrefour for abuse of buyer power (CAK, 2023). This time, however, the total amounts to Ksh. 1.1B (roughly $7m USD). Carrefour's ability to obtain terms of supply outside the scope of normal business practices and that are disproportionate was ruled to be unfair and detrimental to a supplier, and unrelated to the objective of a supply contract. The penalty is the biggest ever handed out by the Competition Authority of Kenya (Aradi, 2023).

Through Kenya's use of their Competition Act alone, the government has been able to promote inclusive economic development by protecting SMEs from unfair competition. This is a far cry from simply 'rearranging the chairs'. Outside of the purview of a completely free market, the scope and effectiveness for policy to pursue equity and inclusivity in a food system is actually rather broad.

5. Concluding Discussion

This article has revisited the supermarket revolution hypothesis in Nairobi, Kenya by examining the contemporary state of the supermarket economy to determine if it has been realized. This research fills the gap in literature on urban food systems in Africa by examining whether Kenya is following the path predicted by the original supermarket revolution hypothesis and the extent to which this retail format is driving transformation in the city's food system today. While some findings in this paper align Nairobi's supermarket revolution with broader documented trends, other findings differentiate it. Nairobi's food system is experiencing transformation because of the highly competitive growth of the supermarket economy, but the rate of change has been slower than predicted and many of the urban propositions of the supermarket revolution hypothesis have not been fully realized. In fact, with so many of the major food retailing businesses failing in recent years, Kenya is developing the reputation as a "retailers' graveyard" (Wambu, 2020).

The growing number of struggling supermarkets in Nairobi is a result of aggressive expansion as companies tried to target low-income households and lock out competitors. The underlying issue in the strategy of aggressive expansion is that companies overstretch their financial capacity when the profit margins are ranging from 1.5% to 3.8%, in turn precipitating a financial crisis (Kimani, 2019). While this is not the only reason for the collapse of these major retailers, it is an important factor. Nairobi's supermarket sector requires a company to have a solid corporate structure with strong management as well as business strategy targeting high and middle-income consumers for its sustainability. The claim that supermarkets will go well

beyond the initial upper- and middle-class clientele in many countries to reach the mass market has not been the case in Nairobi, Kenya.

With intense domestic competition within Nairobi's market, the pace of internationalization has been slow. However, the recent failure of the big three Kenyan owned supermarket chains has created opportunity for transnational retailer giant Carrefour to expand into now vacant buildings. With Carrefour consolidating Nairobi's supermarket economy, there are significant implications for suppliers. Suppliers now have fewer options in this increasingly consolidated market. Carrefour has taken advantage of their position by defining the terms of agreements and enforcing product and process constraints. Carrefour now effectively acts as a gatekeeper for suppliers seeking to grow their business and access a wider geographical area within Kenya and East Africa. This has affected supplier margins and their ability to even participate in formalized food supply chains.

Supermarkets often use listing fees, slotting allowances, advertising, and promotional charges, fridge space fees, category management fees, new store opening allowances, and distribution/warehousing allowances to exploit supplier systems in ways that are not in relation to costs incurred by the supermarket (das Nair, 2020). Cumulatively, these fees added up to 10−15% off the price of the product sold to supermarkets, placing considerable strain on supplier margins. "Negotiations of these terms are often skewed towards supermarket chains, resulting in the margins of smaller suppliers being squeezed and their exclusion from supply chains" (das Nair, 2020). Similar to regulatory measures implemented in other highly consolidated supermarket economies to protect suppliers against such potential abuses, the Kenyan government has been attempting to place formal arrangements to legally bind a

supplier-retailer relationship and avoid major retailers from unfairly squeezing Kenya's supplier system.

The claim that the spread of supermarkets will lead to the decline of traditional retailers is not accurate in the case of Nairobi. A common parallel narrative of the growing power and reach of supermarket economies is that, over time, they erode the significance of informal food economies as important sources of food for the urban poor. This body of literature argues that supermarkets eradicate smaller stores and local markets aimed at the poor consumer and encourage greater dependence on large scale retail formats for food (Reardon and Hopkins, 2006; Minten and Reardon, 2008; Franz, 2010). The persistent broad sweeping claim that supermarket expansion necessarily implies the retreat of the informal food economy is contradicted by the case of Nairobi, Kenya as well as by a small but growing body of evidence from many other African cities (Abrahams, 2010; Crush and Frayne, 2011; das Nair, 2020; das Nair and Dube, 2016; Berdegue and Reardon, 2008; Nickanor et al. 2019).

Informal food retailers in Nairobi continue to be adept at responding to the needs of residents, especially the urban poor (Owuor, 2020). With potentially erratic income, limited access to refrigeration, and a reliance on public transportation, small-scale food vendors within Nairobi remain an essential component of the city's food system. Many in this demographic buy daily necessities in small quantities from informal neighbourhood vendors with whom they have established relationships, allowing them to access credit purchases (Owuor, 2020). The supermarket revolution has not disrupted consumer purchasing behaviour in this regard. However, the finding that households who frequent supermarkets tend to buy non-perishable and highly processed foods aligns with the documented global nutrition transition towards

highly processed foods that lead to non-communicable diseases that is in part driven by supermarket proliferation (Popkin, 2017). This negatively impacts food security and is not properly accounted for in the supermarket revolution model.

Last, the governance landscape surrounding Nairobi's food system is not only full of opportunities for legal, regulatory, and policy intervention, but governing authorities have also mobilized some of those opportunities with meaningful effect. The policy proposition examined in this study is but a narrow and distorted view of Kenyan's perceptions of the policy issues at play in the wake of nearly three decades of a highly volatile and competitive supermarket landscape. The fleet of interventions available across formal and informal jurisdictional landscapes is broad. Berdegue and Reardon's pessimism regarding the ability of policy to elicit fair competition and inclusion is the result of a narrow understanding of policy (and governance) and lacks creative problem solving.

Based on the recent history of the retailing economy, the proliferation of supermarkets in Nairobi has been less of a retailing revolution and more so a competitive struggle in a food system that is still widely informal and operating outside of the ambit of regulation. With that said, the depth and implications of retail transformation in Kenya and beyond remains unclear. A transformation is certainly taking place and literature captures this and highlights some of its potential implications. Yet, as a pioneering analysis identifying a significant and broad sweeping global trend, the supermarket revolution model has over-generalized both its reach and impact. Intense competition, consolidation, and multinationalisation in Kenya's supermarket sector may continue to accelerate the spread of supermarket chains seeking to improve their competitive positioning. Yet, in an urban food system where informality is both persistent and

resilient, the future of Nairobi's food retailing landscape promises to be more varied than was originally predicted. Future research should seek to better understand how and why informality persists in this context and explore the potentially transformative and organic processes of informal self-governance and its relationship to legitimate governing institutions and the economies they attempt to govern.

Chapter 3:
Do Urban Food Deserts Exist in the Global South? An Analysis of Nairobi, Kenya

1. Introduction:

The 'food desert,' as a definitional concept, entered the lexicon of researchers and governments in the UK in the late 1990s. Yet, the notion of poor nutrition resulting from unequal access to food has a longer intellectual history than the literature on 'food deserts' might imply. In 1980, Amartya Sen's speech from the first Annual Lecture of the Development Studies Association was translated into the text *Famines* for the World Development Journal. In his speech, Sen traces Malthusian ideas about food depletion and overpopulation to Bernard Shaw's depiction of the differences between starvation and famine. Sen questioned the dominant food availability decline (FAD) view – that famines are all a result of FAD, and instead explored the notion that famines were characterized by *some* people not having enough food. He crafted what he referred to as the "entitlement approach" (1980, pg. 615), which he explained as seeing "starvation as arising from failure on the part of groups of people to establish entitlement over a requisite amount of food."

The same thread of this idea, that hunger is related not to a *lack* of food but a lack of *access* to food, has been central to the development of the concept of food deserts. Wrigley (2002) explored this concept by studying how poor neighbourhoods in the UK could suffer from inadequate access to healthy food sources and was quick to highlight concern for the lack of supporting evidence in the early days of food desert research. Not long after, 'food deserts' became a popularized conceptual vehicle through which issues of food access, broadly understood, have been explored. It has been extensively used in cities in the United States,

Canada and the United Kingdom to characterize economically disadvantaged areas where there is relatively poor access to healthy and affordable food because of the absence of modern retail outlets (Beaulac et al. 2009; Bitler & Haider, 2011; Smoyer-Tomic et al. 2006; Apparicio, 2007; Luan et al. 2015; Behjat et al. 2013). It has also, since its first conception, become another analytical mechanism under which supermarkets capture the policy space to advocate for governance approaches that are beneficial to the convenience, concentration, and profit-driven interests that underpins their prescriptive model of food systems. Major food retailers have a history of entering the food desert debate to advocate for market solutions to food insecurity issues, arguing that government policies such as tax write-offs and subsidies should be used to expand their businesses into low-income areas (Block & Subramanian, 2015). This allowed policymakers to offer succinct and immediate solutions to politically salient issues such as food security, which has encouraged simplistic policy interventions to proliferate (Sadler et al. 2015).

Since its first use, the concept itself has undergone redefinition and transformation as well. At first, the concept was closely linked to physical distance to supermarkets and other grocers (Cummins & Macintyre, 2002; Elbel et al. 2015; Walker et al. 2010). Following this initial focus on distance to a retailers, 'food deserts' were redefined widely to include more accessibility factors such as transportation infrastructure (Cannuscio et al. 2014; Clifton, 2004; Coveney & O'Dwyer, 2009; Diao, 2015; Shannon, 2015; Widener & Shannon, 2014), socio-economic status, food affordability (Kato & McKinney, 2015; Krizan et al. 2015; Zachary et al. 2013), cultural preferences (Short et al. 2007; Kim et al. 2016; Wright et al. 2016), and access to healthy food options (Luan et al. 2015; Sadler, 2016; Zachary et al. 2013). The concept is now embedded within the broader framework of social determinants of health, which emphasize

the intersectionality and impact of structural inequalities in the social and economic factors on health outcomes (D'Rozario & Williams, 2005; Hendrickson et al. 2006; Lewis et al. 2011; Schafft et al. 2009; Suarez et al. 2010; Taylor & Ard, 2015; Thibadeaux, 2016; Zenk et al. 2005). Some have even come to argue that, given the amount the term now tries to capture, the language of 'food deserts' is no longer useful and we need to move 'beyond' it (George & Tomer, 2021; Needham et al. 2022; Raja et al. 2008).

Recognizing that issues of food access exist in various geographical and cultural contexts around the world, the application of 'food deserts' has expanded to cities of the Global South as well (Bridle-Fitzpatrick, 2015; Davies et al. 2017; Gartin, 2012; Su et al. 2017). The concept was not applied regularly in Southern cities until recent years, when criticisms of its application across North America and Western Europe were becoming more prevalent. Arguments of its limited utility were expanded upon in Southern contexts (Battersby, 2019; Crush & Battersby, 2017), with some going further to claim that, "in African cities, classic food deserts are at best a metaphor and more likely a mirage" (Crush & Si, 2021, pg. x).

This research positions itself within the body of literature of 'food deserts' generally, and specifically in the small but growing body of literature debating its utility when applied to cities in the Global South. Cities in the Global South contain many poor neighbourhoods where the prevalence of malnourishment and food insecurity are often more prevalent than in North America and the UK. Further, the higher prevalence of informality, a larger per capita number of micro-enterprises in the food system, extent of supermarket diffusion and market consolidation, and different phasing of the global nutrition transition all make for distinct characteristics of food systems in cities in the Global South. The key question therefore is

twofold; could the concept of the 'food desert' be reformulated to fit the realities of urban food systems in the Global South? And even if it can, should it? In light of growing criticism in Northern cities around 'food deserts' and recognition of its appropriation by corporate interests to shape favourable policies not grounded in evidence, application of the concept in the global South should be carefully considered. In order to perform a preliminary test of the applicability of the food desert concept in the Global South, this paper uses household survey data collected in Nairobi, Kenya by the Hungry Cities Partnership. The paper first provides an account of three iterations the food desert concept that that are based on the authors' interpretations of the literature.

2. Review of Literature

2.1 Classic Food Deserts

The 'food desert', as a definitional concept, entered the lexicon of researchers and governments in the UK in the late 1990s (Wrigley et al. 2003; Wrigley, 2002). Originally, conceptions of food deserts were based primarily on distance to supermarkets. Move this up? The further a neighborhood was from a supermarket, the larger the food desert was considered to be. An absence of supermarkets in a neighbourhood was deemed a result of redlining: a spatially discriminatory practice among retailers of not serving certain areas, based on their demographic composition (Beaulac et al. 2009). These same neighbourhoods were sometimes characterized as 'too low-income', leaving retailers concerned with profitability.

It is important to contextualize the emergence of food deserts in the late 1990s as a clear part of UK national government social policy. In this case, the political climate of the post-

Thatcher years and the collapse of the Soviet Union are considered in tying the concept of food deserts directly to the first Blair administration. Social exclusion was central to the platform of the 1997 election, and the Blair administration immediately established a Social Exclusion Unit following their ascent to power (Wrigley et al. 2003).

Wrigley (2002) and Cummins and MacIntyre (1999) have all questioned the speed at which the concept of food deserts was integrated into the public policy arena, viewing it with some skepticism. Food deserts have been treated as a given and repeated so frequently as to give them the appearance of facts, even when presented with a lack of evidence. The concept of a food desert is still relatively misunderstood and raises some questions. Bitler & Haider (2011) have continued to call for more rigorous research of 'food deserts', citing insufficient evidence to consider the concept a reliable indicator for health status. Even given this continued debate among scholars, food deserts have been widely accepted in policy circles, as well as in scholarly food security research and NGO circles. Food deserts have been accepted as a cause of poor nutrition and nutrition-associated diseases and are attributed to a deprivation of appropriate retailing within the area.

To summarize, the concept of a food desert grew out of a small but growing body of evidence that suggested food items may be more difficult to access in deprived areas (Wrigley, 2002; Wrigley et al. 2003; D'Rozario & Williams, 2005). While policy interventions were undertaken by the UK government, there was a dearth of evidence on the causal factors of food deserts. This first version of the food desert was tied to highly quantitative, easily calculable values like distances and food prices. However, without significant evidence to endorse the

quantifiable variables being used, the food desert concept has since evolved in its application to cities in the Global North.

2.2 Food Deserts Plus

More recent conceptualizations of food deserts are characterized by recognition and acceptance of the nuanced nature of food accessibility in a city. In this iteration, food deserts are no longer simply considered a spatial issue and instead are analyzed through the addition of more variables. Instead, the food desert is seen as a dynamic meshwork of social, economic, and political interactions (Horst et al. 2016; Sadler, 2016; Shannon, 2016). Studies increasingly consider the interrelated nature of income, mobility, transportation, time, seasonality, family structure, presence of different types of retail location, dietary diversity, education, and structural inequalities (Bridle-Fitzpatrick, 2015; Pearce et al. 2008). Perhaps the most important shift, however, was the growing understanding that distance to supermarkets was a proxy measure for food access, and that this may be an inadequate way to measure how marginalized populations were actually eating.

Sadler (2016) examined the relationship between structural theory (the association between the built environment) and individual agency, and the study of food deserts and argued that the application of 'food desert' is ineffective unless there is an analysis of individual behaviour coupled with larger systemic barriers. Often, it is the wealthiest in society who are able to effect change in their structural environment and the most vulnerable or marginalized who have the least power to address systemic inequalities (Sadler et al. 2015). Cannuscio et al.

(2014) also focused on structural limitations to food access and the role that the food justice movement plays in highlighting health inequities (Cannuscio et al. 2014).

Walker et al. (2010) demonstrates in the US that there are fewer supermarkets in predominantly Black neighbourhoods as compared to predominantly White neighbourhoods. This finding was further supported by Taylor & Ard (2015) in a study of Detroit food deserts. Powell et al. (2007) quantified this difference, with Black neighbourhoods having only 52% the number of chain supermarkets compared to White neighbourhoods. This statistic was confirmed by several studies cited in Dubowitz et al. (2015). Thibadeaux (2016) found a negative relationship between the number of supermarkets in a zip code and the percentage of Black residents. Gordon et al. (2011) found that New York City's food deserts often existed within areas of predominately Black and low-income populations, while predominately White middle/high incomes neighbourhoods had several healthy food choice options. Walker et al. (2010) stated that, at the national level, there are 30% fewer supermarkets in low-income neighbourhoods compared to high income neighbourhoods. Walker et al. (2010) summarized several studies that state living in low-income neighbourhoods put residents at a considerable disadvantage in accessing affordable and quality food.

The structural limitations extend passed the built environment to individual perceptions of acceptable food retailers. Participants in a study conducted by Cannuscio et al. (2014) in Philadelphia stated they felt out of place shopping at food retailers which they identified as above their socioeconomic status. Consumers were also noted to feel more comfortable shopping at food retailers where their government nutrition supports were accepted discretely and efficiently (Cannuscio et al. 2014).

Even alternative food retailers designed to increase consumption of fresh fruits and vegetables (FFV) were noted to be more concentrated in commercial areas as opposed to identified food deserts. Li et al. (2014) analyzed the location of 'Green Carts', a program designed to increase consumption of FFV in disadvantaged areas in New York city through mobile fruit and vegetable carts. They found that carts were not optimally placed in food deserts, instead they were located in high traffic areas such as near subway stops or other food vendors. Therefore, this program did not increase access to FFV for those with mobility constraints, such as the elderly or disabled. Even carts that accepted government food assistance were often not located in areas where residents could redeem these benefits.

Many academics now argue that neighborhood food environments for low-income urban residents pose challenges to healthy eating (Hendrickson et al. 2006; Lewis et al. 2011; Schafft et al. 2009). The Lamichhane et al. (2012) study suggests that increased accessibility and availability of supermarkets may significantly improve the overall dietary intake and support increased intake of fruit, vegetables, and low-fat dairy. This finding may be a result of the availability of a variety of healthful food in chain supermarkets compared to other food stores. Another study found that restaurants in less affluent neighbourhoods promoted unhealthy food options to residents more so than in other neighbourhoods (Lewis et al. 2011), suggesting that lower income neighbourhoods may be more so 'food swamps' than 'food deserts'. There is also a substantial body of evidence to suggest that there is no link between residence in a food desert and disparity in nutrition and health outcomes (Budzynska et al. 2013; Hager et al. 2016; Pearce et al. 2008; Pearson et al. 2005). In 2008, Pearce et al. examined the effects of differing scales of retail operations on fruit and vegetables consumption in 74 territories in New Zealand

and conclude that the consumption of the recommended daily intake of fruit and vegetables was not associated with living in a neighbourhood with better access to supermarkets or convenience stores. These findings directly challenge claims that residents of food deserts have poorer health as a result of a lack of access to healthy and nutritious foods.does this transfer to US context? In another study, deprivation, supermarket fruit and vegetable price, distance to nearest supermarket and potential difficulties with grocery shopping were not significantly associated with either fruit or vegetable consumption (Pearson et al. 2005).

Disinvestment in some neighbourhoods may work in conjunction with other factors (such as employment, education, transportation policies etc.) to diminish the health and quality of life of those residing in them. For instance, findings from the Wedick et al. (2015) study suggest that the effectiveness of dietary interventions (education) is likely minimal among patients living in communities without supporting nutrition environment. Thus, shorter distances between a household and nearest food store with adequate healthy food accessibility predicts greater improvements in consumption of both fiber and fruit and vegetable servings when supplementing with a dietary intervention (Wedick et al. 2015). Therefore, the Wedick study supports the notion that geographic access to healthy food retailing is an independent predictor of a participant's probable response to dietary interventions.

Economic constraints are frequently cited as a key barrier to food access (Kato & McKinney, 2015; Krizan et al. 2015; Zachary et al. 2013). Cost often plays a greater role in determining access to food than geographic proximity (Kato & McKinney, 2015), adding another complex variable to what was originally understood as a spatial issue. Fitzpatrick et al. (2015) show that supermarkets tend to have lower food prices as compared to small food retailers.

This creates a barrier for those who do not live near a supermarket to access healthy food, while also underlining, from a methodological perspective, the significance of analyzing different types of retailers (as explored above). In a review on pricing in food deserts, though, both Bitler & Haider (2011) and Beaulac et al. (2009) concluded that findings were mixed as to whether low-income consumers paid more for food. Although some finding conclude that prices may be higher in poor areas, this does not account for consumers travelling outside of their neighbourhood to access better priced food (Eisenhauer, 2001), but does emphasize some of the mobility and transportation issues highlighted above.

In research completed by Fitzpatrick et al. (2015), it was found that consumers with low incomes traveled to purchase the cheapest products, while those with the highest income pay the most. However, it was found that consumers with very low incomes paid 0.5% - 1.3% more for the same grocery items as low-income consumers. Mobility and cost were identified as strongly related within these results. Consumers with low incomes are more inclined to travel outside of their urban environment to lower-priced food retailers or sale items, as compared to consumers with high incomes. Those with very lower-income may have restricted mobility and be unable to access low-priced food establishments. As Zachary et al. (2013) and Bridle-Fitzpatrick (2015) identified, there may not be a large price difference between low-income and high-income consumers, but there is a large disparity in the proportion of income spend on food. This was found this to be especially true for single-income households and those access social supports (Tsang et al. 2007).

This section demonstrates that the food desert concept became stretched to include research on a broad array of factors determining food access and overall health. The inclusion

of dietary diaries into research methodologies was also popularized, and many studies underlined the need to grasp the 'healthiness' of foods being accessed (Pearce et al. 2008). This gave rise to concepts such as the 'food oasis' (pockets of healthy food access) and the 'food swamp' (an abundance of unhealthy food), further elaborating on the spatial component of inequality in food access in urban areas. Food deserts became more complex conceptualizations, and fruit and vegetable consumption became nearly as ubiquitous as supermarket analysis had once been. Food Deserts Plus represents a more recent understanding of the food desert concept reflected within the literature and remains predominantly applied to cities in the Global North.

2.3 Food Deserts in the Global South

Along with the more nuanced and critical understandings of food deserts emerging, researchers have also began providing supplemental perspectives on food deserts by using empirical evidence to test whether these assumed associations are relevant in cities of the Global South. Food deserts have been tested in urban areas in China (Zhong et al. 2018), Paraguay (Gartin, 2012), and Mexico (Bridle-Fitzpatrick, 2015). More comparable to this study, the utility of the concept has also been explored in Africa, namely Windhoek, Namibia (Crush et al. 2018), Maputo, Mozambique (McCordic & Abrahamo, 2019), and South Africa (Battersby, 2012, 2019; Odunitan-Wayas et al. 2018).

A recent survey of food research in the Global South identified that a significant research gap remains in the area of food deserts (Turner et al. 2020). However, of the emerging literature exploring African urban food systems, many argue that original iterations of food

deserts are at best a metaphor, and at worst a mirage (Battersby, 2012; Battersby and Crush, 2014; Crush and Battersby, 2016). There are, of course, reasons for caution when applying a Euro-American understanding of food deserts in cities with histories and geographies of urban food retailing and food system development that are remarkably different. For one, the importance of the informal food economy for residents' food security in growing cities in the South poses a set of challenges to conventional approaches measuring food deserts. Informal food vending is fluid, dynamic, and retailers might relocate their business frequently. Retail typologies and geographies are therefore significantly different, and lack of access to a supermarket is potentially less important of a factor in facilitating neighbourhood food insecurity. Supermarkets are, of course, an increasingly important retail type in many Southern cities globally (Reardon et al. 2003), but a sole focus on modern retailing cannot capture all of the market and non-market food sources, nor the spatial mobility of informal retailing. With important contextual differences considered, Crush and Battersby redefine food deserts in the Global South as "poor, often informal, urban neighbourhoods characterized by high food insecurity and low dietary diversity, with multiple market and non-market food sources but variable household access to food" (Crush and Battersby, 2017).

This paper intends to add to the growing body of literature on urban food deserts in the Global South by empirically assessing these three conceptualizations of urban food deserts in the context of Nairobi, Kenya. The following sections evaluate the usefulness of three definitions when applied to this context. Following an analysis and discussion of the results, the paper concludes by highlighting the research and policy implications.

3. Materials and Methods:

Nairobi, Kenya was selected for this study because of its location as a city in the Global South – a geographic area where the concept of food deserts has not been systematically applied. Nairobi is a relatively young city experiencing a rapid rate of urbanization that is stretching existing food and agriculture systems, now struggling to provide food and nutrition security for inhabitants (Owuor et al. 2017). In 2009, the population of Nairobi was 3.1 million, with projections estimating this number to double by 2025 (KNBS, 2010). As a result, the city is dynamic and growing, and its food supply chains are always adapting to changing local conditions. Kenya's domestic food supply chain system is a significant contributor to the economy: the agricultural sector is 26% of national GDP (Ministry of Agriculture, 2015). Informal traditional value chains continue to play a vital role in food provisioning throughout the city. These chains are characterized by the variety of actors and intermediaries that increase transaction costs, creating an inefficient post-harvest procurement network, and thereby pushing food products out of reach for those who need them most. Local authorities have used by-laws and regulations to suppress the development of street vending and other forms of informal trade. As a result, Kenya's informal economy has often been subject to policies that produce unfavourable business environments. Even so, the informal food economy is dynamic and persists as a central source of food for the cities inhabitants (Owuor et al. 2017).

Nairobi's formalized food system is expanding as well and relies on centralized and regionalized procurement networks, specialized wholesalers and supplier systems, and modern retailing outlets that seek competitive advantage through direct control of their procurement systems (Owuor et al. 2017). This trend towards a formalized food system development is

recent, however, and the impact it will have on food access, neighbourhood food environments, and the city's vitally important food markets and associated informal sector within the city remains unclear. In this sense, Nairobi offers a unique case study of an evolving food system in the Global South and provides an opportunity to operationalize food desert conceptions in an urban setting distinct from most other studies.

3.1 Research Objectives and Questions

Research Objectives	**Research Questions**
Objective 1: Test the Original Concept of Food Deserts	1.1 Is there a relationship between household supermarket access and household food security?
	1.2 Is there a relationship between household poverty and supermarket access?
Objective 2: Test Emerging Concepts of Food Deserts (Food Deserts Plus)	2.1 Is there a relationship between household access to all food retail sources and household food security?
	2.2 Is there a link between the type food products purchased and the sources of those food products at the household level?
	2.3 Is there a link between fruit and vegetable purchase/consumption and household food security?
	2.4 Is the number of household food retail sources related to household food security?
Objective 3: Test Crush and Battersby's (2017) definition of food deserts (Food Deserts in the Global South)	3.1 Is there a relationship between access to all food sources (market and otherwise) and household income, household dietary diversity, food access/food price challenges?

3.2 Sampling

The data used to answer these questions is drawn from household survey data from Nairobi, Kenya in 2016. The household sample was stratified by sub-district population, with sub-districts randomly selected from within all districts in Nairobi City County (Figure 1). Households were

then selected by enumerator teams within each sub-district using systematic sampling, resulting in a final sample size of 1424 households.

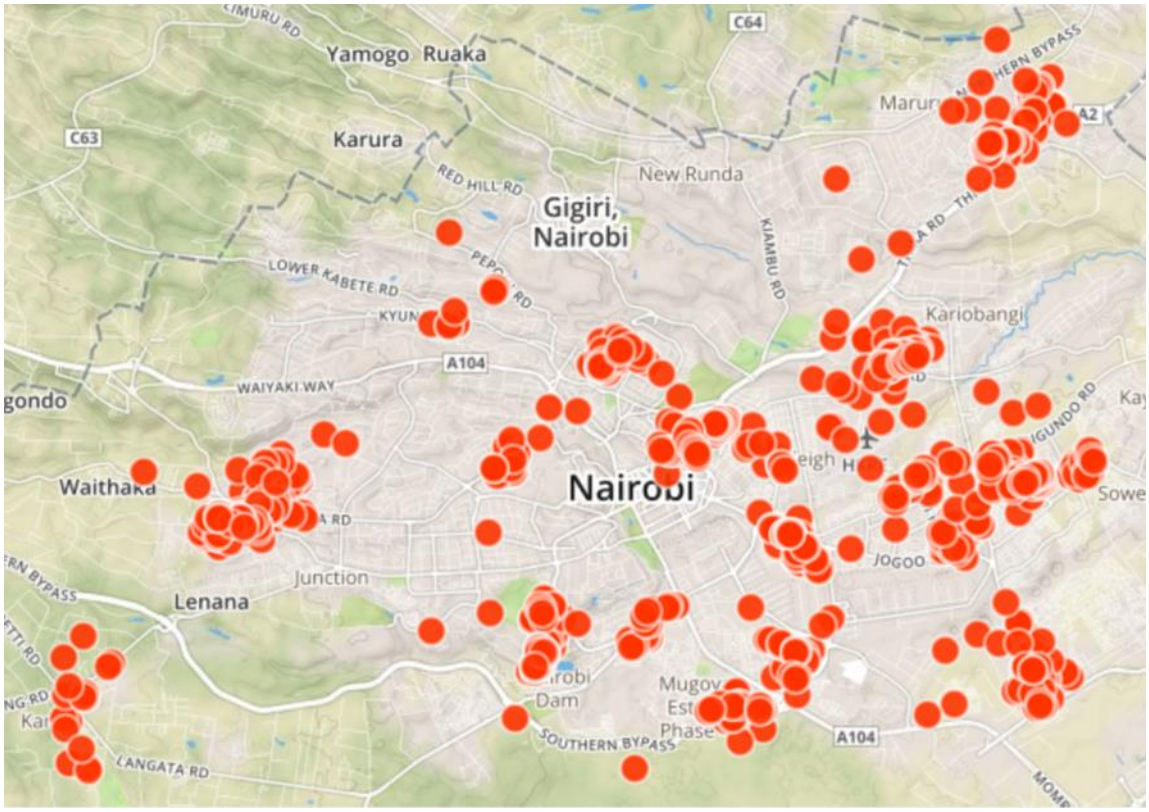

Figure 1: Nairobi Sampling Distribution

3.3 Measures

This city-wide survey used the Hungry Cities Partnership (HCP) household survey instrument, which measured household food security and food sourcing behaviour, together with measures of poverty and demographic characteristics. This paper relies on the following measures taken from this survey instrument: the Household Food Insecure Access Prevalence scale (HFIAP), the Household Dietary Diversity Score (HDDS), the Lived Poverty Index (LPI), household income quintiles, food price impact, and household food sources.

The HFIAP is an ordinal-level scale that measures the severity of household food insecurity in the last month (Coates et al. 2007). The score is calculated using 9 Likert-scale questions on the frequency with which households have experienced various dimensions of food access challenges in the last 4 weeks. The answers to these questions are then aggregated using a scoring algorithm to classify households according to four categories of food insecurity: Food Secure, Mildly Food Insecure, Moderately Food Insecure, and Severely Food Insecure.

The HDDS is an ordinal-level scale that represents the number of food groups that have been consumed by any member of the household in the last 24 hours (with a total of 12 possible food groups included in the scale) (Swindale & Bilinksy, 2006). A higher score on the HDDS indicates greater dietary diversity. The LPI is an ordinal-level scale that measures lived poverty. The scale is made up of 6 Likert-scale questions measuring the frequency with which households have gone without electricity, clean water, medical care, cooking fuel, food, or a cash income in the last year. The LPI scale score is the average of these 6 sub-scale questions. A higher score on the LPI represents greater severity of lived poverty.

Household income quintiles were calculated by summing the amount of income earned by households in the last month across all household income sources (except for any loans or credit). This total household income was then binned into 5 ranked and proportionately equal categories or quintiles. This calculation was done within each city and not across both cities. A higher score on the household income quintiles represents higher household income.

The HCP household survey instrument also included a question on food price impact. In this question, the respondent was asked to indicate the frequency with which his or her household went without food due to rising food prices in the previous six months. The response

was recorded using a Likert-scale indicating frequency of occurrence. The household food sources measured in the survey instrument indicate the source of food accessed by the household in the previous month. The food items and food sources measured in each survey varied slightly to ensure that contextually important food sources were recorded in the survey instrument.

3.4 Analysis

To achieve the research objectives, the study used frequency distributions, measures of central tendency, Pearson's chi-square test of independence, Fisher's exact test, and Spearman's Rho correlation. All analyses were carried out using the SPSS version 24 statistical package.

Some of the assessments of the relationships between the variables use cross-tabulations. These cross-tabulations represent both measures of central tendency (averages) across the categories of other variables as well as frequency distributions. The frequency distributions were assessed using Pearson's chi-square test of independence. This test determines whether the distributed frequency of households across any two categorical variables is random. In the case where the assumptions of this test are violated, the Fisher's exact test was used to test for the association between two categorical variables. Pearson's chi-square test of independence was used to assess the relationship between the HFIAP and supermarket access and the LPI and supermarket access (to achieve research objective 1). These tests were also applied to cross-tabulations of the HFIAP by household fruit and vegetable consumption (to achieve research objective 2). The mean HFIAS scores were also calculated according to different household food sources (to achieve research objective 2).

Spearman's Rho correlations determine the extent to which two ordinal or continuous-level variables are related. This correlation is sensitive to non-linear relationships but also assumes a monotonic relationship (continuously increasing or decreasing relationships). The Spearman's Rho correlation strength was assessed using the criteria according to Prion and Haerling (2014), where: <.4 indicates a negligible or weak relationship, .4-.6 indicates a moderate relationship, and >.6 indicates a strong relationship. The HFIAP, HDDS, household food price impact, and household income quintiles were all correlated with the number household food sources (to achieve research objective 3).

4. Results

4.1 Objective One Results: Test the Original Concept of Food Deserts

4.1.1 Is there a relationship between household supermarket access and household food security?

This investigation found a statistically significant but weak relationship between household supermarket access in the year prior to the survey and household food security status in Nairobi. As indicated in Table 1, these variables share a non-randomly distributed relationship according to a chi-square test of independence at an alpha of 0.05 ($x2= 73.509$, $p<.001$, $n=1401$). Among the sampled households in Nairobi that accessed supermarkets in the last year, there was a negligible but statistically significant Spearman's Rho correlation of .193 ($n=1093$, $p<0.001$) between frequency of supermarket access and household food security status (Table 1). Only 14.4% of those who did not access supermarkets in the last year were food secure, whereas 41.8% of those with no access were severely food insecure. 33.2% of

those who accessed supermarkets in the last year were food secure while only 20.7% with access were severely food insecure.

Table 1. HFIAP Scores and Supermarket Access in Previous Year in Nairobi

Food Security Status	no access n (%)	access n (%)
Food Secure	43(14.4%)	366(33.2%)
Mildly Food Insecure	28(9.4%)	148(13.4%)
Moderately Food Insecure	103(34.4%)	360(32.7%)
Severely Food Insecure	125(41.8%)	228(20.7%)
Total	299(100%)	1102(100%)

These observations also extend to regular (monthly) household supermarket access. In Nairobi, regular supermarket access shared a non-randomly distributed relationship with household food security according to a chi-square test of independence at an alpha of 0.05 ($x2= 132.596$, $p<.001$, $n=1382$) (Table 2). Over a third (35.2%) of households with regular access to supermarkets were food secure while only 17.7% of households were severely food insecure. Among the households that irregularly accessed supermarkets, 43.8% were severely food insecure while only 13.9% were food secure.

Table 2. HFIAP Scores and Regular Supermarket Access in Nairobi

Food Security Status	regular access n (%)	irregular access n (%)
Food Secure	345 (35.2%)	56 (13.9%)
Mildly Food Insecure	143 (14.6%)	31 (7.7%)
Moderately Food Insecure	319 (32.6%)	139 (34.6%)
Severely Food Insecure	173 (17.7%)	176 (43.8%)
Total	980(100%)	402(100%)

4.1.2 Is there a relationship between household poverty and supermarket access?

The sampled households in Nairobi indicated a significant, but weaker, relationship between supermarket access and lived poverty. Table 3 shows that households that accessed supermarkets shared a non-randomly distributed relationship with the Lived Poverty Index (LPI) according to a Fisher's exact test of independence at an alpha of 0.05 (F= 42.866, p<.001, n=1351) and a negligible but statistically significant Spearman's Rho correlation of .074 (n=1067, p=0.015) with LPI. 91.1% of households who accessed a supermarket in the past year had an LPI of 1.00 or less, compared with 77.6% of households who did not access a supermarket.

Table 3. Lived Poverty and Supermarket Access in Previous Year in Nairobi

Lived Poverty Status	no access n (%)	access n (%)
<=1.00	215(77.6%)	978(91.1%)
1.01-2.00	52(18.8%)	93(8.7%)
2.01-3.00	9(3.2%)	3(0.3%)
3.01+	1(0.4%)	0(0.0%)
Total	277(100%)	1074(100%)

Regular supermarket access did not appear to have a significantly different relationship with the overall LPI in Nairobi. The variables in Table 4 share a non-randomly distributed relationship according to a Fisher's exact test of independence at an alpha of 0.05 (F = 50.427, p<.001, n=1349). 92.3% of households with regular access to a supermarket had a score of 1.00 or less on the LPI, compared with 78.4% of those with irregular access.

Table 4. Lived Poverty and Regularity of Supermarket Access in Nairobi

Lived Poverty Status	regular access n(%)	irregular access n(%)
<=1.00	891(92.3%)	301(78.4%)
1.01-2.00	71(7.4%)	74(19.3%)
2.01-3.00	3(0.3%)	8(2.1%)
3.01+	0(0.0%)	1(0.3%)
Total	965(100%)	384(100%)

Differences also emerged when examining the relationship between household poverty and supermarket access. There was a consistently weak but statistically significant correlation between accessing supermarkets more regularly with lived poverty, indicating that access to supermarkets may be a good indicator of better living conditions.

4.2 Objective Two Results: Test Emerging Concepts of Food Deserts (Food Deserts Plus)

4.2.1 Is there a relationship between household access to all food retail sources and household food security?

This question assumes that household food security status can vary according to the type of household food sources accessed. Table 5 demonstrates that households in Nairobi accessing street sellers and venders had a higher average HFIAS score than those households that accessed supermarkets, fast food outlets, online market shopping, or restaurants.

Table 5: Mean HFIAS Scores by Household Food Sources in Previous Year

Food Sources	n	Mean HFIAS
Informal street sellers/vendors	631	6.46
kiosk / corner store	961	5.91
Other shops including grocer or butcher	1144	5.83

City Council/County market	715	5.48
Supermarket	1096	4.98
Restaurant	306	3.44
Online market shopping	12	2.83
Fast food outlets	199	1.98

4.2.2 Is there a link between the type of food products purchased and the sources of those food products at the household level?

One potential reason underlying the distribution of HFIAS scores by food source may have to do with the types of food accessed at these food sources. Supermarkets were the most common place to buy many food items in Nairobi, followed by kiosks, small shops, and street sellers. Items most commonly purchased at supermarkets included maize meal, brown bread, rice, pasta, tinned food, frozen meat, sour milk, tea/ coffee, sugar, cooking oil, snacks, and sweets. Fresh foods, on the other hand, are not often purchased at supermarkets. Items such as fruit and vegetables were commonly purchased at small shops, kiosks, and street traders. Fresh fish, cooked fish, and pies/ samosas were most often purchased from street sellers. Fresh and whole foods are therefore most often purchased at smaller scale retail types while more processed foods and foods high in sugar and fat are most often purchased at supermarkets.

4.2.3 Is there a link between fruit and vegetable purchase/consumption and household food security?

In Nairobi, there seems to be a statistically insignificant relationship between fruit and vegetable consumption and food security (Table 6). These variables do not share a non-randomly distributed relationship according to a chi-square test of independence at an alpha of 0.05 ($x2=6.504$, $p=0.09$ $n=1402$).

Table 6. HFIAP Scores by Household Fruit and Vegetable Consumption in Nairobi

Food Security Status	None consumed n(%)	Fruit/Veg. consumed n(%)
Food Secure	33(21.6%)	377(30.2%)
Mildly Food Insecure	17(11.1%)	159(12.7%)
Moderately Food Insecure	56(36.6%)	407(32.6%)
Severely Food Insecure	47(30.7%)	306(24.5%)
Total	153(100%)	1249(100%)

4.2.4 Is the number of household food retail sources related to household food security?

In Nairobi, there was a negligible but statistically significant Spearman's Rho correlation of -.140 ($n=1401$, $p<0.001$) between the number of retail food sources accessed by the household in the last year and household food security status. The sign on this correlation suggests that a higher number of food retail sources is associated with greater household food security, although the correlation effect size is minimal.

To summarize, there appears to be a relationship between household access to food retail types and household food security in Nairobi. Households accessing street sellers and vendors are more likely to be food insecure than those accessing fast food outlets, online market shopping, or restaurants. Households accessing supermarkets are moderately more food secure than those accessing street vendors.

There also seems to be a link between the types of food products purchased and the sources of those food products. Supermarkets appear to be the most common place to buy many food items. Fresh or cooked vegetables, however, are most often purchased from markets whereas fresh meats are purchased at butcheries. Lastly, there was a negligible relationship between the number of food retail sources accessed by households and household food security status in Nairobi.

4.3 Objective Three Results: Test Redefinition of food deserts (Food Deserts in the Global South)

4.3.1 Is there a relationship between access to all food sources (market and otherwise) and household income, household dietary diversity, food access/food price challenges?

Table 7 indicates that there was a positive statistically significant relationship between the number of food sources a household accesses and both household income and household dietary diversity in Nairobi. A higher number of food sources was related to improved household food security, dietary diversity, reduced food price impact, and higher household income. While these correlations were statistically significant, their effect sizes were small, indicating a weak relationship between the number of household food sources and each variable. The strongest relationship was observed between household dietary diversity and the number of food sources accessed in the last year, although this relationship is weak (Rho=.209).

Table 7: Spearman's Rho Correlation of HFIAP, HDDS, Household Food Price Impact and Household Income with Household Food Sources in the Previous Year

	Number of Food Sources		
	Rho	P-Value	n
HFIAP	-.096**	<0.001	1401
HDDS	.209**	<0.001	1413
Food Price Impact	-.093**	<0.001	1396
Household Income Quintiles	.186**	<0.001	830

*P-value<0.05

**P-value<0.01

While there was a statistically significant correlation between the total number of household food sources accessed in the last year and household food security, dietary diversity, reduced food price impact, and higher household income, these correlation coefficients tend to be weak. In comparison to testing the relationship between household food retail sources and

food security (section 2.4), adding non-market food sources does not seem to have a significant impact on the outcome.

5. Conclusion

The food desert concept has proven to be a useful way to raise debate about the structural inequalities in urban food systems overall. However, this chapter has demonstrated that applying various conceptions of food deserts to Nairobi, Kenya is potentially problematic. While these associations are, with some exceptions, statistically significant and show the expected correlation direction between household food sourcing behaviour and food security, the strength of these relationships tends to be weak. When assessing the relative utility of the three food desert concepts in the context of Nairobi, they appear to be equally inapplicable.

This chapter shows that food deserts in the Global South should not be understood through the proxy measurement of supermarket access, which was commonplace in the early literature. Supermarket intervention responses to neighbourhood scale issues of food and nutrition insecurity does not reflect the plurality of food sourcing options residents frequent. Rather, households in Nairobi access large numbers of food retail sources, including informal neighbourhood retailers, kiosks, corner stores, small shops, and markets. Supermarkets are not providing access to healthy food either. Instead, they are key accelerants in the nutrition transition and the increasing consumption of processed foods. Many residents in low-income areas already have food access to fresh produce through informal vendors, indicating that food utilization is a key determinant of food insecurity in urban centres. These findings mirror those of Battersby (2019) for Cape Town, Kitwe, and Kisumu.

The model of supermarkets as a pathway to food security derived from the orthodox food deserts literature (and elsewhere, see Reardon et al. 2003) is inherently problematic as a policy fix. With the growing prevalence of supermarkets in Nairobi, and in cities across the Global South generally, application of the original food desert concept runs the risk of major food retailers entering the conversation to advocate for favourable market-driven solutions to food insecurity issues.Just as many corporate retailers in Northern contexts benefited from tax write-offs and subsidies in the name of food security to support business expansion into low-income areas (Block & Subramanian, 2015), the same political risks apply to Nairobi as well. Social sciences should continue to be wary of applying a conceptual model that has historically been taken by policymakers and used to justify simplistic policy interventions to proliferate (Slater et al. 2017). Instead, policy responses to food insecurity challenges should be culturally and contextually relevant, which necessitates engagement with vital food sourcing options for urban residents other than just modernized retailers such as supermarkets. These findings align with a growing body of literature from the Global South that call into question whether the food desert concept should be laid to rest (Battersby, 2012; Battersby and Crush, 2014; Crush and Battersby, 2016).

There are important limitations that accompany the findings in this chapter. First, this study should not be interpreted as an analysis of any causal relationships between food sourcing and food security. The methods test the predictive relationship between food source access and food security assumed by the three urban food desert definitions. The chapter therefore assesses whether food insecurity can be inferred based on limited household access to specific food sources. Additional research will be needed to assess any causal interpretations

of urban food deserts. Last, investigating food deserts through an understanding of their complexity requires the inclusion of factors such as mobility, transportation, time, education, structural inequalities, and neighbourhood policy environments, which have not been explored in this study.

With that said, other studies have explored these factors in detail, and a clear conclusion to the food desert debate is beginning to emerge. Beyond its classic conception, the 'food desert' was a useful conceptual vehicle through which academics were able to explore the nuanced social, economic, political, environmental factors determining health and food security outcomes. However, its utility as a concept has been fully exhausted; it has been stretched to include so much that the term is essentially flattened, and the language is imprecise. There is no need to use overly simplified language to explore complex issues related to food security. To end where we began, there are other ways to describe differential accessibility and availability of food in urban environments that are more precise. We did so prior to the popularization of food desert literature (Sen, 1980), and academia continues to do so today (Battersby, 2012; Block & Subramanian, 2015; George & Tomer, 2021; Needham et al. 2022).

Chapter 4:
Inside the System, Outside the Law -
Political and Economic Geographies of Exclusion in Nairobi's Food System

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1. Introduction

The urban population in sub-Saharan Africa is growing rapidly, from an estimated 31% of the overall population in 2000 to 42% in 2022 (World Bank, 2023). The majority of this urban population growth is located in crowded, low-income informal settlements where rates of poverty and formal unemployment are extremely high (Crush and Frayne, 2011). This migration of poverty is shifting the historical locus of food insecurity from rural to urban areas and "cities are fast becoming epicenters of the food security challenge in Africa" as a result (Crush et al. 2012). This rapid and often unplanned urban growth is in part causing more and more people to participate urban informal food economies, which are composed of small-scale enterprises that do not fully participate in formal social, political, and economic structures within the food system and work across all stages of the food supply chain.

Simultaneously, the complex and multifaceted process of modern food retail expansion across the continent has produced significant economic growth of retail sectors as well as entire food systems in which they are located (Peyton et al. 2015). Trends of globalization, liberalization, and urbanization have all been key drivers of supermarket expansion across Africa (Peyton et al. 2015; Reardon et al. 2004). The increasing economic interconnectedness between states and regions has made it possible for supermarket economies to lower food product pricing, open new import purchasing channels, and access greater food variety (Neven & Reardon, 2004; Nishiura, 2010; Weatherspoon & Reardon, 2003). As Peyton et al. (2015)

argue, supermarkets diffused into developing countries as a result of liberalized economic policies for multinational corporations. In promoting free trade between countries, these policies opened a plethora of opportunities for retail expansion. This phenomenon is transforming local economies, supply chains, and pre-existing retail sectors, as well as broader issues of food security, formalization, and the integration of African economies into the global food system (Crush & Frayne, 2011; Reardon et al. 2003). The presence of supermarkets within a food system has been characterized as an indicator of overall food system formalization, spurring supply chain sophistication, increased food security, and competition with the informal economy (Weatherspoon & Reardon, 2003). However, the obverse of this modernist narrative is a discounting of the significance of the informal sector in increasing food security and providing livelihoods. Only when and if they formalize do they become acceptable and 'legitimate' food system actors in this narrative.

The current and widely accepted model that aims to explain how urban food system transformations occur in the wake of urbanization and modern food retail investment falls short in adequately describing how informality operates within this evolving environment (Reardon et al. 2003). At its core, the supermarket revolution model fails to properly understand and account for informality within food systems, claiming that it simply gets absorbed by the formal economy by way of opportunity through investment within the sector. Therefore, when applied to cities such as Nairobi, Kenya, where both formal and informal food economies are growing, the model is discordant and problematic.

Nairobi, Kenya is no exception to these co-occurring trends in Africa's urban food systems. As the capital of Kenya and the regional political and economic hub of East Africa, the

city's dynamic and rapidly evolving food system underwrites the food security experiences of 5.3 million residents in the city limits. Despite being at the centre of the region's financial, banking, commerce, and domestic and international governance sectors, Nairobi has never had an orderly and planned urban food system. Even in the colonial period, the state adopted a dual mode of managing the urban system that focused on concerns over food contamination and the spread of disease coupled with urban food supply from rural areas (Duminy, 2019). As Duminy argues, wider aspects of the food system were considered well beyond the remit of government and were therefore widely left to the incentives of private producers and traders (2019). The unplanned design of Nairobi's food system was only further exacerbated by the rapid rural-to-urban migration throughout the post-colonial period that continues today. Between 1960 and 2020, the share of population living in Kenyan urban areas rose from 7.36% to 27.99% (World Bank, 2023). This will reach 50% over the next twenty years, and Nairobi's population is doubling each decade (Brown, 2019). This urbanization phenomenon is a result of a confluence of factors, not the least of which being a growing disinterest in farming full-time and migrants seeking better economic opportunities in cities (Bruckner, 2012; LaRue et al. 2021). A wider range of job opportunities and more investment in infrastructure development makes urban areas attractive hubs for economic activity. With the formal economy only employing a limited number of people, the informal sector has grown significantly. Approximately half of all employed adults in Nairobi work in the informal sector, which creates 9 in every 10 new jobs, making it critical for the livelihoods of urban residents (Budlender, 2011; KNBS, 2012; UN-Habitat, 2006).

The globalization of governance, trade, and investment coupled with the rapid urbanization of poverty make Nairobi's food system dynamic and constantly evolving. The interlacing dynamics of urbanization, poverty, and food supply chain transformation resulting from supermarket diffusion have given rise to complex political and economic geographies of inclusion and exclusion in the city's food system. Because the current 'supermarket revolution' model inadequately characterizes the transformation occurring within Nairobi's food system, this chapter instead employs a systems thinking framework to the analysis of Nairobi's food system to assess if it has stronger utility for explaining current phenomenon. A growing body of work has developed similar frameworks to be applied to food systems broadly (Foran et al., 2014; Kanter et al., 2015; Leeuwis, C. et al., 2021; Termeer et al., 2018), but the application of this conceptual approach within the context of Nairobi, Kenya has not been conducted.

This paper applies systems theory and the concept of a 'food system' to investigate the complex interplay between Nairobi's formal and informal urban food system and the governance environment that firmly entrenches the exclusion of the informal food economy and those who depend upon it for their livelihoods and food security. Ultimately, the development of Nairobi's food system is facilitated in part by a series of policy reforms that have created political and economic geographies of exclusion within the city that systemically deprives the informal economy of the technical, economic, and financial support that would otherwise enable enterprises to invest and progress. This process of inclusion into the formalized and regulated economy is there for those who are willing and able to participate, but the informal food economies that stand in the way of the neoliberal 'wave of diffusion' are relegated to the margins and operate outside of the legal and regulatory framework. As

governance technologies in Nairobi's food system continue to evolve, it is imperative that government institutions are made aware of the extent to which their policy excludes large swaths of economic activity within the food system.

2. Conceptual Framework

Systems theory is a multidisciplinary approach that treats a phenomenon as an interconnected and interdependent set of elements that interact to achieve specific goals or outcomes (Baraldi et al., 2021). This theory aligns well with the multifaceted nature of urban food systems, which encompass various stakeholders, processes, and components that interact to shape overall political and economic dynamics. The concept of a *food system* is often narrowed to a set of activities along the food supply chain ranging from production through to consumption. However, how the food system functions and the extent to which it is capable of achieving desired outcomes (say, food security) is a complex issue with multiple environmental, social, political and economic determinants that extend throughout and beyond the food supply chain. As Leeuwis et al. (2021) demonstrate, researchers tend to subscribe to different theoretical ideas regarding the nature of systems, the processes through which systems change, and the kinds of interventions that may be appropriate to support transformation. It's difficult to conceptualize a food system without first understanding the common approaches taken in systems thinking generally.

Leeuwis et al. (2021) provide a summary of the common types of systems thinking that hold relevance to food systems discourse. *Hard system thinking*, which was one of the first forms of systems thinking published, tends to characterize a system through machine

interactions that can be known and predicted (Taylor, 1947). This approach employs an engineering perspective, which simply seeks to optimize the component parts to get a predictable output. Similarly, functionalist systems thinking tends to focus on the management of relations within a system with a rebalancing approach as a strategy to drive change (Roethlisberger & Dickson, 1961; Parsons, 1951). Closer to approaches applied in the food systems literature, *soft systems thinking* centres people with different epistemologies and boundary definitions and tends to encourage dialogue, learning, and consensus building among actors to elicit systems change (Checkland, 1981; Churchman, 1979). *Political/critical systems thinking* characterizes systems by the power structures that constrain system change and create path dependency (Jackson, 1985; Ulrich, 1988). Institutional systems thinking highlights the rules, both formal and informal, that result in a particular order (Giddens, 1984; North, 1990). This approach uses amendments to rules and incentive structures to facilitate desired outcomes. Last, *complex systems thinking* focuses on emergent orders from a system that behave without central steering or governance, and are unintended outcomes derived from multiple intentional actions (Prigogine & Stengers, 1984). Depending on the type of systems thinking one applies to a food system, the interventions they deem useful will vary.

With so many diverging areas in systems thinking generally, it is not a surprise that Foran et al. (2014) find that academic literature offers divergent theoretical framings on what constitutes a 'food system'. This underscores both the contestation of the concept in discourse and the complex reality within which these systems operate. In this sense, food systems do not exist as an unequivocal objective reality, but rather they are constructs that we apply to the world in order to make sense of a complex phenomenon, based on particular epistemological

positions (Leeuwis et al. 2021). With that said, there tend to be six core features of food systems that are consistently recognized and referred to within academic literature on the subject. Table 1 summarizes work done by Leeuwis et al. who initially identified these six core features (2021). Based on these core features, food systems are best conceptualized as complex multi-dimensional and multi-disciplinary systems. Further, any effort to transform a food system in a particular direction needs to consider the array of 'systems thinking' approaches that lead to different forms of intervention.

Table 1: Six Core Features of Food Systems

Core features of a food system	**Examples from Food Systems**
Emergent properties (Bene et al. 2019; Veldhuizen et al. 2019; Willet et al. 2019)**:** • Fundamental to systems generally, 'emergent properties' refers to the notion that the whole is more than the sum of its component parts • Higher order behaviours become distinct from individual component behaviours • Usually categorized as either intended or unintended consequences	• Food insecurity • Inequality • Obesity and non-communicable diseases • Consolidation of wealth • Consolidation of influence • Environmental degradation
Interactions between actors are essential components (Van Berkum et al. 2018)**:** • Most boundary definitions of a system involving actors include them and their operations at different levels and in different spheres • Not necessary feature of systems generally, but essential to food systems • Interventions in the system to influence a particular benefit for people at one level is likely at the cost	• Private sector actors (along the food supply chain) • Public sector organizations • International organizations • Households/ consumers • Civil society organizations • Research and development institutions • Interactions between all of them

of other values at the same or other levels	
Diverse segments and networks (Gaitan-Cremaschi et al. 2019; Magnus 2015)**:** • Within the same geographical space and/or value chain, there exist different segments and networks of actors • Not just one system that operates according to a set logic, but rather multiple parallel and sometimes converging systems that serve different actors in different ways	• Different segments and networks of producers, traders, processors, retailers and consumers that work in different ways. • Different levels and forms of formality, quality control, infrastructure
Diversity between actors within segments and networks: • People within a system are not likely to perceive the system in the same way as those who observe an analyze the system from a distance • People located in different areas of the same system are less likely to share the same perspective	• Some may see an informal retailer as a capitalist actor at the end of the supply chain while others see it as a livelihood resort • Some may see capital as the most important outcome of a food system whereas others may see it as being food security and proper nutrition • Some perceive informal trade as a sub-optimal and illegal process that jeopardizes food quality and safety, while others see it as a reliable network that serve the food security needs of community
Self-organization (Castells, 2004; Van Woerkum et al., 2011)**:** • The evolution and emergence of new patterns and orders without central steering and control.	Obesity, as an emergent property in a food system, is a result of relatively autonomous trends: • Increased capacity to produce cheap processed foods • Proliferation of retailing selling processed foods • Changes in lifestyle • Urban design While some of these trends emerge with intention, none of them are deliberate in fostering an obesogenic society. This is a self-organizing emergent property.
Dynamic stability (Arkesteijn et al. 2015): • While characterized by continuous dynamism, interaction and flux,	• Because stakeholders are interdependent, meaningful change is likely to happen only if key players

systems tend towards relatively stable patterns of interactions and outcomes and are often resilient to efforts to change them. • Prevailing legal, market and cultural rules and resource distributions tend to have a degree of stability, and attempts to change the status quo are often resisted by those who benefit from the existing system configuration	succeed in achieving a sufficient degree of agreement, coordination, and alignment in working towards a particular transformation • Despite obesity being unhealthy and some actors rallying to address the issue, others deliberately continue their practices of selling cheap unhealthy foods in vulnerable neighbourhoods in order to pursue their priority goal of making profit.

* This is table summarizes work from Leeuwis et al. (2021).

Recognizing that a food system is a construct that can be designed through a plurality of 'systems thinking' perspectives and a focus on particular core features and desired outcomes, this paper uses a narrowed conceptual approach to constructing Nairobi's food system. In particular, this research employs political/ critical systems thinking, social/ institutional systems thinking, and complex systems thinking to understand both intended and unintended higher order behaviours in the food system of Nairobi, Kenya. Informal activity is placed at the centre of the analysis, with the intention of understanding its emergence, resilience, and utility relative to other actors within the food system and what outcomes should be prioritized when designing interventions. The intention of this approach is to explore reasons as to why informality has been misunderstood in previous attempts to explain urban food system transformation.

The application of systems theory in exploring Nairobi's food system is justified by its ability to provide an integrated perspective. Nairobi's food system is inherently complex, involving intricate relationships between ecological, social, economic, and political components. Further, Nairobi's food system is not isolated; it is embedded within larger regional and global systems. Systems theory facilitates the examination of trans-scalar interactions and therefore

highlights how different parts of the system interact and influence each other and aids in identifying unintended consequences, and non-linear dynamics that may not be evident through traditional monodisciplinary approaches.

3. Methodology

Drawing from the principles of systems theory, a series of system maps were developed to visually represent the interconnected elements and relationships within Nairobi's food system. Specifically, this study uses an iceberg model, causal loop diagrams, and connected circles mapping exercises for the purposes of identifying and understanding entities within the system and their interactions and connections with one another that determine system outcomes. These mapping exercises are prescribed by Map the System Canada as methods to analyze, understand, and ultimately visualize complexity within a given system (MTS Canada, 2024). Kumu, an online system mapping program, was used to organize complex data into relational maps. The purpose of these mapping exercises is to identify feedback loops, leverage points, and potential areas of intervention within the system. A stakeholder analysis was also conducted to identify key actors and their roles within Nairobi's food system. By applying systems thinking to stakeholder analysis, the research reveals geographies of exclusion and identifies potential collaborations or conflicts. This analysis uses documentation research, including academic, policy, news, and private sector sources to identify and substantiate connections made within the mapping exercises.

Along with documentation research and systems mapping exercises, the study utilizes two separate city-wide surveys in Nairobi City County collected by the Hungry Cities Partnership

that examine (1) household food security and purchasing behaviour and (2) informal food vending. The Nairobi household food security survey was conducted by the Hungry Cities Partnership in 2016 and covered a total of 1,434 households. To generate as representative a city-wide sample as possible, the survey was conducted in randomly selected administrative sub-locations spread across all the administrative districts (or sub-counties) and divisions of Nairobi City County. The sampled households were randomly selected from these administrative sub-locations. The households were located in 23 administrative locations and sub-locations, covering all the administrative divisions and districts of Nairobi City County. The Nairobi informal food vendor survey covered a total sample of 1,267 informal food vendors. To achieve city-wide coverage, the survey was conducted in all eight of Nairobi's administrative divisions. The number of sampled food vendors was determined using a multi-stage proportional-to-geographical size random sampling procedure.

4. Understanding Informality in Nairobi's Food System

The majority of Kenya's urban population is engaged in the informal economy (Federation of Kenyan Employers, 2021). The informal food sector in particular employs males and females at nearly equal rates as well as a significant number of youth aged below 35. Many informal food vendors are relatively well-educated, with 42% having completed high school and 20% having advanced to tertiary education (Owuor, 2020). 72% of this young and relatively well-educated demographic are migrants to Nairobi from rural areas in Kenya (Owuor, 2020).

The informal food sector is an essential component of Nairobi's food system and contributes to it by making food more accessible and affordable in low-income areas and to

food-insecure households (Brown, 2019). Over 80% of Nairobi's population rely on income from the informal sector, without which their access to affordable food would be severely constrained, pushing them into critical levels of poverty and food insecurity. It is therefore essential that food system governance pays particular attention to the role of the informal food economy in the urban food system and urban food security. Currently, the policy landscape surrounding informal food system entrepreneurship in Nairobi is ambivalent at best and hostile at worst. Governance approaches to informality have created an environment that systemically marginalizes those who depend on it for their livelihoods. This section details the ways in which the exclusion of Nairobi's informal food sector occurs.

4.1 Iceberg Model

Iceberg models are often used in systems thinking to uncover the systemic structures that generate patterns and events (Kim, 1999). Because we only see events, or 'the tip of the iceberg', this model advances an understanding of the deeper patterns, systemic structures, and mental models at play within a given system. This iceberg model (Figure 1) depicts the events, patterns of behaviour, system structure and mental models that underlie the formal economic and political exclusion of the informal food economy in Nairobi's urban food system. Many of the factors contributing to this problem are a result of a subset of mental models that perpetuate myths and misrepresentations of informality throughout the food system, including: (1) sustained bias towards solving rural poverty and supporting the urban formal economy (Republic of Kenya, 2011; Andae, 2020), (2) the informal economy being seen as illegal and the source of social, economic, and health problems (Brown, 2019; Lagerkvist et al. 2013a and

2013b), (3) and general ambivalence and hostility towards the informal food system (Republic of Kenya, 2011).

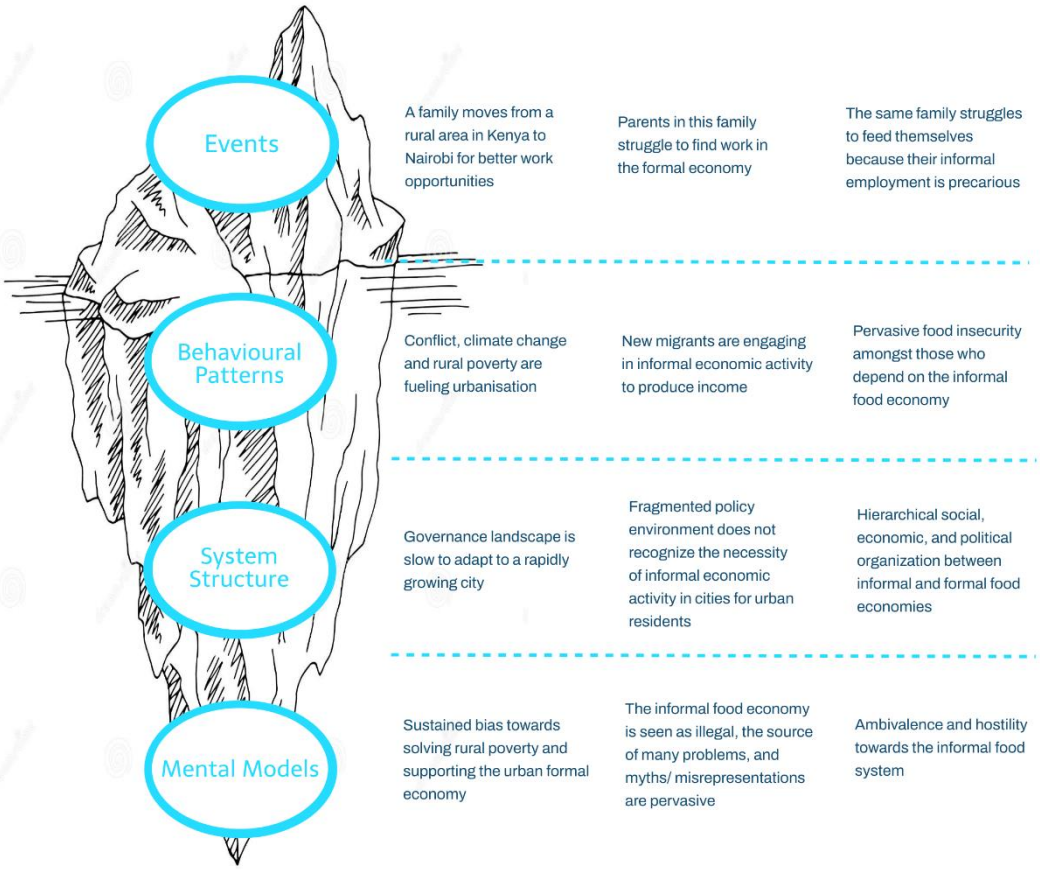


Figure 1: Iceberg Model

Source: Authors

4.2 5 Myths About Nairobi's Informal Food Economy

Myth 1: "Informality, with its disorderliness, inefficiencies, and parasitic tendencies will (or has to) disappear" (Kamete, 2018, pg. 170).

Across much of sub-Saharan Africa, the perspective that the informal economy is disordered and inefficient has been normalized. Many authorities and bureaucrats associate informality

with backwardness and grip to the prospect of its eventual modernization (Kamete, 2018; Kamete, 2013). It is widely considered that the informal sector needs to be modernized because it is seen as both undesirable and illegal (UN-Habitat, 2009). This view of informality is prevalent in Nairobi as well. Kenya's Vision 2030 exclusively frames the informal sector as an issue in cities, citing tax evasion, inefficient market distortions, and the site of social and environmental risks (Brown, 2019; Republic of Kenya, 2011).

The myth of the eventual disappearance of the informal food sector is not only a fatalistic view that is contrary to an abundance of evidence (Brown, 2019; Budlender, 2011; Owuor, 2020), but has also led to attempts of eradication by assimilation (Kamete, 2018). As Kamete (2018, pg. 181) suggests, "there seems to be a feeling that what authorities cannot achieve by clean-un campaigns, they seek to achieve by this pernicious integration" (Kamete, 2018, pg. 181). The result of this common myth is political exclusion and misrepresentation between the understandings and practices of government and the realities of informal food enterprises and those who advocate for them.

Despite these attempts at eradication and integration, informal employment remains the main source of employment for most workers in Nairobi as 90% of new jobs are created in the sector. Out of all the food retailing formats in the city, small shops, kiosks and corner stores, designated City Council of Nairobi (CCN) markets, and street sellers and traders make up 4 out of the 5 most frequented outlets by Nairobi households (Figure 2). All of these food retailing types have a high degree of informality. During the three decades that supermarket style food retail formats have been operating in the city, the number of informal food retailers has

continued to grow. Further, over 70% of informal food vendors in Nairobi intend to remain in the informal sector and expand their business operations (Owuor, 2020).

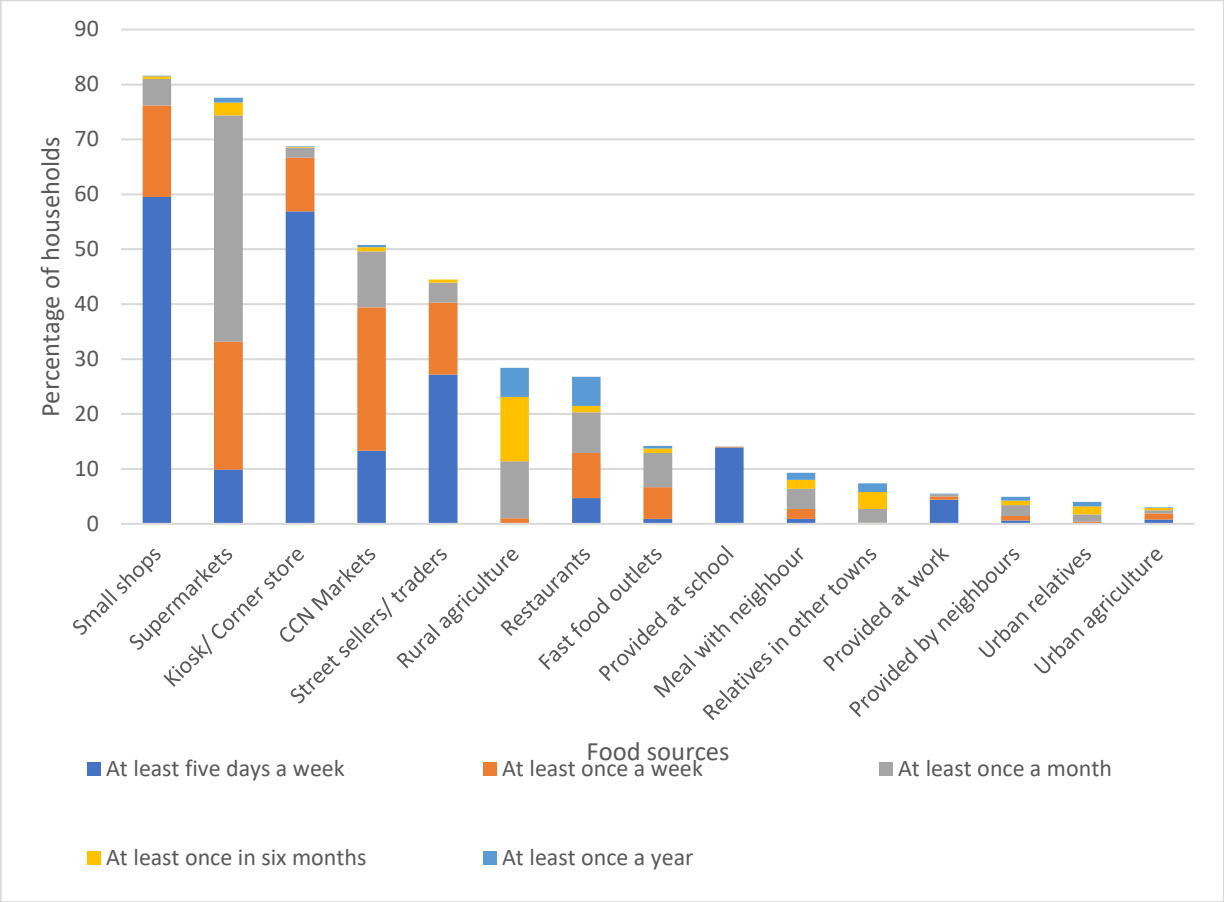


Figure 2: Household Food Sources by Frequency of Patronage

Myth 2: Governments must take "urgent and appropriate measures to enable the transition of workers and economic units from the informal to the formal economy" (ILO, 2015).

The ILO, World Bank and a growing number of other state and non-state actors are proponents of formalization (ILO, 2015; World Bank, 2022). The benefits of such an integration are framed as bringing order to the city, recognition for informal businesses, and freeing vendors from harassment by the authorities. Further, from the state perspective, this notion of parasitic free riding is done away with as everyone pays their dues. Formalization is framed as a win-win

situation for the authorities, the city, and those in the informality economy that become formalized. These general views are shared by major international organizations in specifically (UN-DESA, 2022). Further, while limited in scope and detail, the Kenyan government also subscribes to this approach and outlines four distinct policy interventions to do so: (1) education around registration of businesses, (2) harmonize and streamline processes of registration, (3) develop and promote creative approaches towards registration, and (4) incentivize SMEs to formalize (MSEA, 2020).

In this sense, an informal enterprise is required to adhere to laws relating to registration, licensing, taxation, land use, and social security in order to be considered a formal business (Figure 3). In practice, the steps to formalization may not be chronological, and compliance may take different routes for different enterprises. Further, the relative dearth of policies extending specifically to the informal food economy does not mean it is ungoverned (Young & Crush, 2019). In Nairobi, many informal enterprises adhere to some but not all of the regulations in place, and are also subject to often draconian-like enforcement (Brown, 2019). Last, informal governance and self-organization of informal food economies emerges when the state fails to include them in their governance logics. This is known as a power-vacuum, or governance vacuum.

Figure 3: Steps Towards Formalising a Food Business

Source: Authors

Myth 3: "The informal economy is a result of firms and workers who choose to operate informally after weighing the costs and benefits" (Dell'Anno, 2021).

Literature exploring why people decide to participate in the informal economy tends to be characterized by survivalist or opportunistic motivations. On the one side, survivalist motivations to engage in informal economic activity are conflated with a lack of choice. On the other side, opportunistic motivations are conflated with having choice. Rather than seeing the informal food economy as emerging due to economic opportunism and people choosing to comply with regulation or survivalists relying on livelihood opportunities, it should actually be seen as comprising both. In Nairobi, economic survival is the most significant motivating factor for entering the informal food economy (Table 2). The desire to create greater financial security and being unemployed or unable to find a job are also important motivations. Given the importance of these motivations for informal food vendors, this data suggests that survivalist motivations are widely prevalent.

Table 2: Vendor Motivations for Starting Business

Motivation	Mean score out of 5
I needed money just to survive	4.19 (Very Important)
I wanted more control over my own time/to be my own boss	3.96 (Very Important)
I wanted to give my family greater financial security	3.87 (Very Important)
I have always wanted to run my own business	3.87 (Very Important)
I was unemployed and unable to find a job	3.27 (Moderately Important)
I have the right personality to run my own business	3.05 (Moderately Important)
I wanted to do something new and challenging	2.58 (Moderately Important)
Support starting my business was available from other people	1.68 (Little Importance)
I wanted to provide employment for other people	1.30 (No Importance)

Of course, opportunism also exists in the sector, and evidence from Namibia suggests that, when using a particular methodological approach with a similar set of survey questions to distinguish between opportunistic and survivalist motivations, “there is clearly a minority of vendors who are more opportunistic in their orientation” (Crush et al. 2023). What is not clear, however, is how the study comes to this conclusion using a list of entrepreneurial motivations that was not designed to distinguish between survivalist and opportunistic behaviours. For this reason, similar conclusions will not be drawn in the case of Nairobi.

Myth 4: The informal economy is not linked to the formal economy (Sethuraman, 1976; Tokman, 1978)

While perhaps a dated myth that is more commonly now called into question, dualists have historically argued that informal enterprises have few, if any, linkages to the formal economy and instead operate as a distinct separate sector of the economy (Sethuraman, 1976; Tokman, 1978). This was the original framing of informality’s relationship to formality when the term was first employed. That said, conversations about informality still tend to frame the economies as dichotomous without proper analysis of how they are actually deeply connected REF or do you literally mean conversations?.

Many informal enterprises or own account operators produce and exchange goods and services with formal firms, which work as networks of independent units involved in the production and distribution of a product or commodity (Chen, 2007). In such networks, individual units are involved in transactions with suppliers and customers. The terms and

conditions of these transactions are governed largely by the more competitive firm in specific transactions. In systems literature, this would be an example of diverse segments within the food system, and diversity of the actors within those segments and how they interact with one another (Table 1). In this sense, the informal food economy is actually embedded in the overall food system.

In Nairobi, informal food vendors tend to source most of the food they sell from other retailers in the city, especially wholesale and formal markets (Table 3). Wholesalers are a significant source of dry cereals, eggs, meat, and ingredients for cooking snacks and meals. Wholesalers are the primary source of all processed foods as well, including flour, bread, and milk. The city's formal markets, which are designated by Nairobi City County, are the preferred source of stock for fresh fruits, leafy vegetables, other vegetables, roots and tubers, dry cereals, fish, meat, and chips.

This evidence demonstrates that informal businesses in Nairobi's food system operate as intermediaries in the movement of food along both formal and informal supply chains. Interactions between informal and formal food economies in Nairobi are therefore dynamic and complicate any dichotomous understanding of economic activity.

Table 3: Informal Vendor Sources of Food Stock

Food Item	Factory	Wholesalers	Supermarkets	Small shops	formal markets	Farms	Informal sector	Other
% of vendors for each food item								
Fruits and vegetables								
Fresh fruits	0.0	9.9	0.6	1.3	79.6	8.6	4.5	1.0

Fresh leafy vegetables	0.0	10.9	0.5	0.5	75.6	9.0	7.5	1.0
Other fresh vegetables	0.0	12.8	0.5	0.5	78.4	4.1	6.4	0.5
Cereals, roots and tubers								
Roots and tubers	0.0	14.3	1.6	0.8	73.0	12.7	4.0	0.0
Dry cereals	0.0	43.5	0.0	5.8	46.4	7.2	1.4	0.0
Meat, fish, chicken and eggs								
Eggs	0.0	54.7	1.2	18.6	8.1	15.5	7.5	1.9
Fish	5.7	26.4	0.0	1.9	47.2	7.5	15.1	0.0
Meat	2.7	40.5	0.0	0.0	35.1	13.5	2.7	5.4
Chicken	0.0	13.9	0.0	2.8	22.2	47.2	19.4	0.0
Meat organs	14.8	29.6	0.0	3.7	29.6	3.7	14.8	3.7
Processed food								
Other processed food	3.0	75.4	3.6	9.0	7.2	0.6	7.8	1.8
Fresh milk	6.5	54.5	0.8	5.7	6.5	11.4	9.8	4.9
Bread	8.1	59.3	0.8	9.8	5.7	0.0	9.8	5.7
Maize, wheat flour	5.2	69.1	2.1	9.31	4.4	2.1	3.1	0.0
Beverages	2.1	47.9	10.6	16.0	16.0	0.0	8.5	2.1
Sour milk	5.3	42.1	5.3	5.3	2.6	0.0	13.2	10.5

Myth 5: The informal economy does not contribute to the economy

As a percentage of overall jobs, formal employment in Kenya has been decreasing while informal employment has been increasing (Figure 4) (ILO, 2021). Increasing employment in the informal economy is an indication of the limited capacity of the formal economy to create livelihood opportunities to accommodate a growing labour force (Obare, 2015). While most of

the informal food vending businesses in Nairobi are operated by a single person, this economy is still creating jobs. Further, 16% of vendors had staff as well (Owuor, 2020). Figure 4 clearly depicts a balancing feedback loop between formal and informal economic activity, with informality operating as a form of economic safety net for those who are unable to find employment in the formal sector.

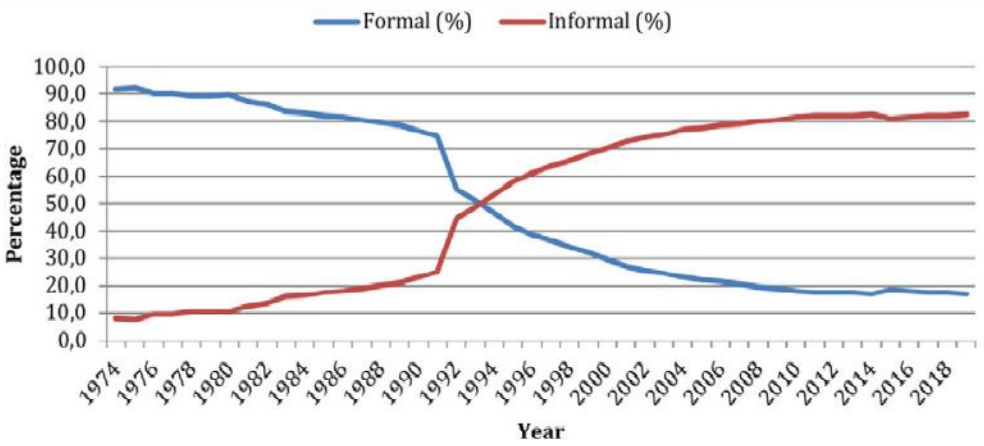


Figure 4: Proportion of Formal And Informal Employment in Kenya, 1974-2019 (ILO, 2021)

With myths and misrepresentations of informality being widespread, there is a clear need to strictly define informal economic activity within Nairobi's food system. As Young and Crush (2019) argue, "issues of governance are at the core of understanding the emergence, evolution, and dynamics, of informal economic activity" (Young & Crush, 2019, pg. 10). Governance is at the core because informality in an economy is defined by policy failing to meet the survival needs of those it intends to govern. By enforcing policy that is unreasonably difficult for many economic actors to follow, 'informality' as a category of economic activity is created by government through its failure to govern. This creates political and economic geographies of activity that outline the scope and scale of the governance failure. Where the

formal economy is not accessible, informal economies emerge. Where governance fails to meet the needs of common people, common people informally govern within their capacity. At its first emergence, informal practices are unorganized, individually centred, and act as a survival strategy. Thereafter, self-organization develops.

4.3 Stakeholder Map

Stakeholder mapping exercises aid in identifying key entry points to catalyse change in a system, including strengthening weak linkages or addressing governance gaps (MTS Canada, 2024). As such, Figure 5 visualises the landscape of key actors, organizations, and initiatives that are related to the overarching activities and interlinkages in Nairobi's complex food system. Figure 5 identifies three dynamics between stakeholders that impact the governance of the informal food economy:

1. Informal economic actors work along the entire food supply chain and are integral to the supply of food to the residents of Nairobi;
2. Financial flows and knowledge flows are directed heavily towards the first stage of the supply chain – i.e agricultural production;
3. Decision making influence is consolidated among public sector actors, but without clear information feedback linkages with informal economic actors along the supply chain or the self organized professional associations representing them.

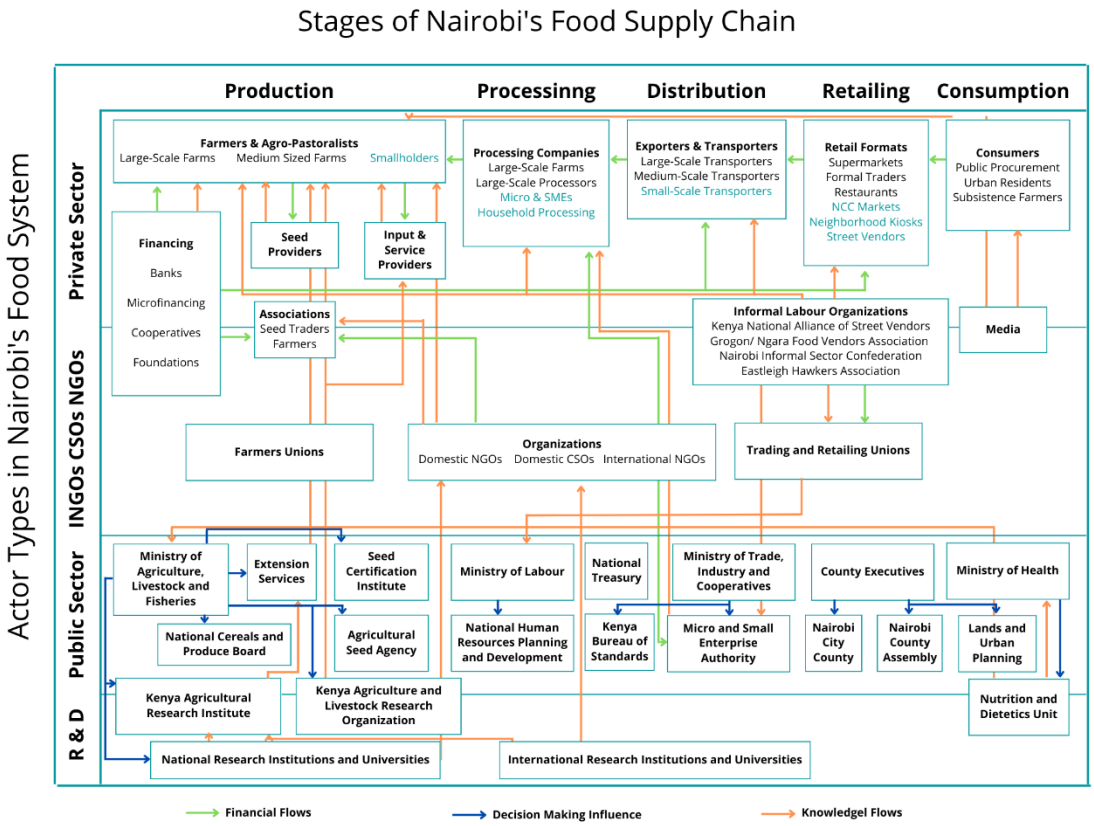


Figure 5: Stakeholder Map of Nairobi's Food System

Source: Authors

4.4 System Map

System mapping exercises aid in defining the boundaries and scope of the system, identifying its various components, mapping the relationships between these components, and identifying feedback loops that are critical for understanding how changes in one part of the system can have cascading effects elsewhere (MTS Canada, 2024). This system map (Figure 6) represents Nairobi's complex food system and aids in identifying three feedback loops that impact the

functioning of the informal food economy in Nairobi and visually depict the root causes of its exclusion from formal political and economic structures.

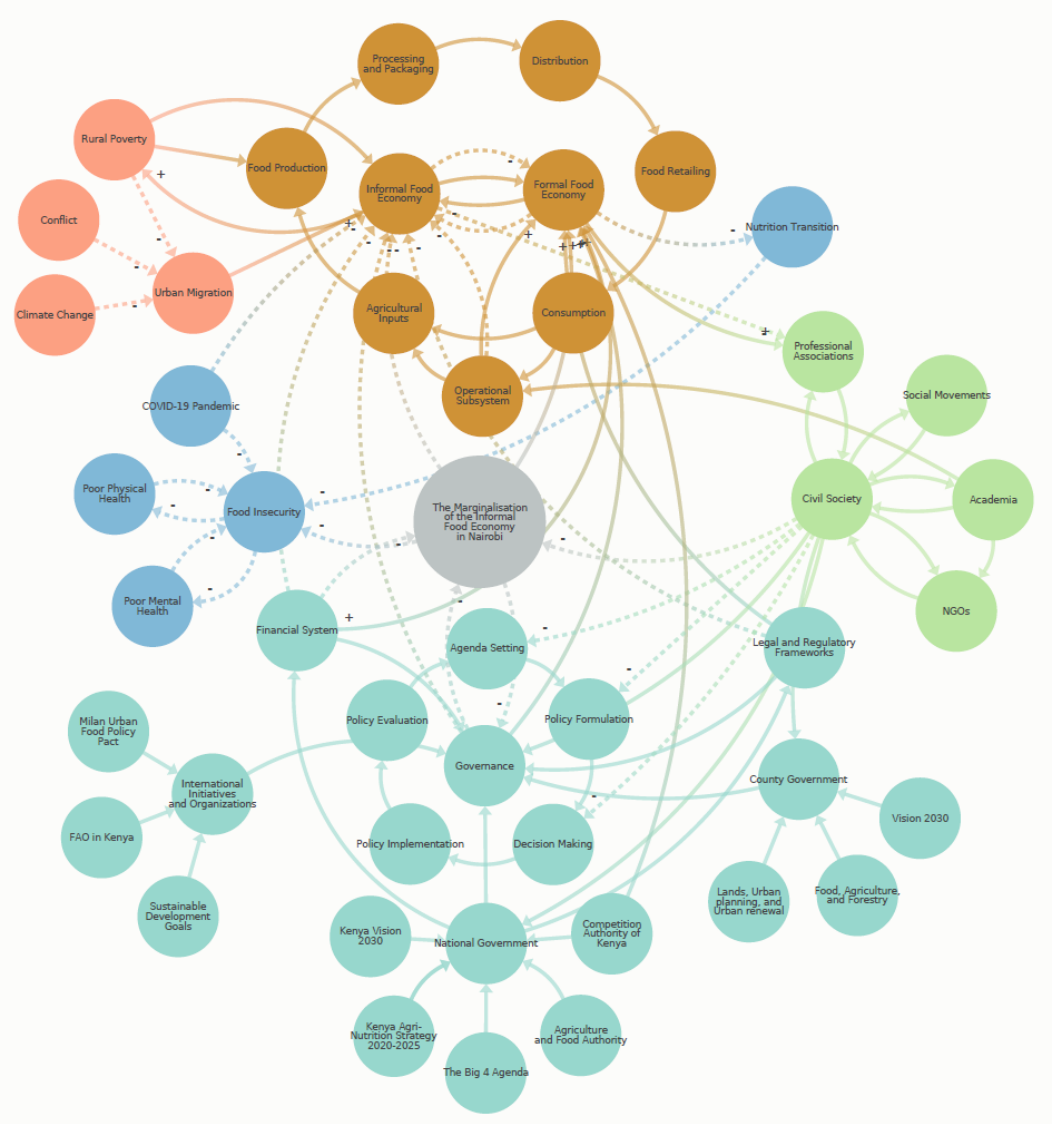


Figure 6: System Map - The Exclusion of Nairobi's Informal Food Economy

The root cause analysis map (Figure 7) shows that there are three separate feedback loops that lead to the systemic exclusion of the informal food economy from fully participating in legal and regulatory measures: the relationship between food system informality and (1)

governance, (2) civil society, and (3) the formal food economy. This occurs within the system despite the informal food economy's reinforcement feedback relationship with improving food security.

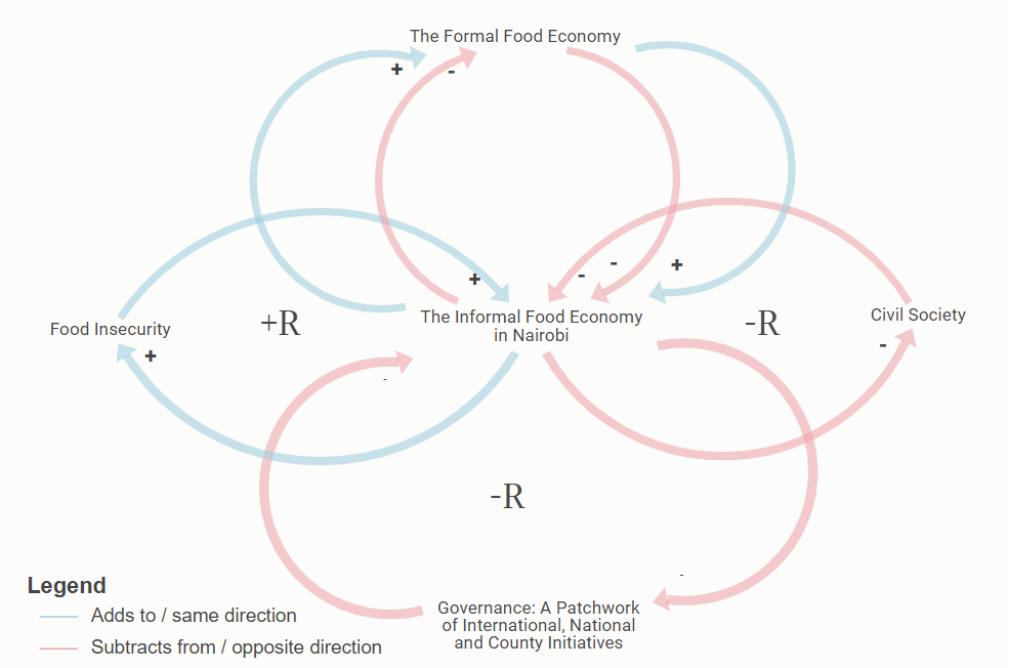


Figure 7: Root Causes of the Marginalisation of Nairobi's Informal Food Economy

4.4.1 Governance

The legitimacy of Nairobi's political system relies largely on the ability to integrate and represent millions of citizens who are excluded from formal political and economic structures. Despite informality being a necessity for so many within Nairobi, governance approaches to the issue view it as a problem, identifying it as tax evasion, a market distortion, and the site of social and environmental risk (Brown, 2019). A lagging development agenda that has not fully accounted for urbanisation and is almost solely focused on rural agricultural production is also to blame (Battersby, 2016).

The failure of policymakers to recognise a continuum from fully legal to fully informal also means legal barriers prevent informal food vendors from meeting their potential. Duplicate licensing systems at national and local levels of government, corruption, and long wait times are all ways in which policy and regulatory frameworks marginalize informal food system workers (UN-Habitat, 2006). A patchwork of legislation including the Physical Planning Act, the Land Act, the Local Government Act, the Trade Licensing Act, the Public Health Act, and the Employment Act are all used to regulate informal economic activities within the system (Owuor et al., 2017). These regulatory requirements are financially unrealistic for the majority of actors (Brown, 2019). City by-laws are also used to remove informal vendors from streets, while other times forced removal is conducted illegally by authorities (Kigame, March 2022).

Our key finding from this negative reinforcing feedback loop is that, for Nairobi's food system to be democratically inclusive, governance institutions need to respond to the legitimate demands of informal workers. Because the relationship is bidirectional, it also depends on how informal food system workers are able to enter political spaces in order to claim these rights. These are both gaps in how the systemic issue is being addressed and as well as potential levers of change that could be a step towards the enactment of informal workers' rights.

4.4.2 Civil Society

Civil society organisations are located in different areas of the same food system and represent an array of perspectives. Of those that receive funding from government and other international organizations, they often perpetuate the same development biases as their

funders. This is in part a reflection of the deeply entrenched mental models that determine how we value one development pathway over another (Figure 1). Equally as important, however, is the policy cycle and the ways in which government institutions dictate policy making processes (Figure 8) (Howlett et al. 2009). Many civil society actors receive funding from governance institutions and therefore further similar agendas.

With that said, civil society has the potential to play a critical role in addressing how policy marginalises the informal food economy. These roles include communicating the needs of the most disadvantaged groups, facilitating and participating in civil actions aimed at improving working environments, generating political will and improving policy-making processes that can support informal economic activity in the food system. Despite many academic institutions, professional associations, non-governmental organizations, and social protests being active in advocating for informal actors' rights within the food system, those concerns are not adequately reflected in government documentation or action.

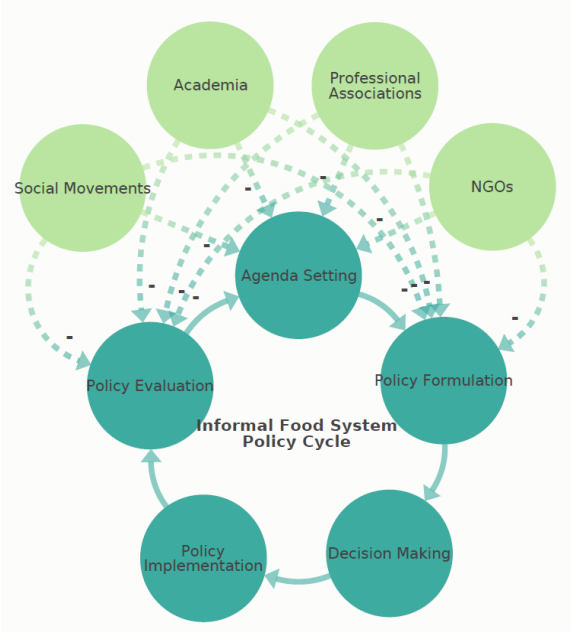


Figure 8: Interactions Between Civil Society and the Policy Cycle

Our key finding from this is that, while civil society struggles to facilitate system level change, it has the potential to play a critical role in addressing how policy marginalises the informal food economy. Potential levers include communicating the needs of informal economic actors within the food system, facilitating and participating in civil actions aimed at improving working environments, generating political will, and improving inclusive policy-making processes. There has been progress made in this regard. An agreement was signed in 2019 between five informal workers' associations and three trade unions representing the formal workers, which brings some informal actors within the food system under the protection of labour laws in the country for the first time (Peoples Dispatch, 2019; Federation of Kenya Employers, 2021).

4.4.3 The Formal Food Economy

The informal sector is involved in a balancing loop that expands and contracts in line with formal sector fluctuations (Arvin-Rad et al. 2010). At the same time, it tempers the effects of formal economic shocks by absorbing displaced labour and serving as a source of the supply of and demand for food (Fiess et al. 2010; Loayza and Rigolini, 2011). However, structuralist approaches to informality view its relationship with the formal sector as one of subordination and exploitation (Chen, 2012), and governance discourse tends to stratify this relationship. The informal food sector serves as a source of low-cost goods and services for formal firms, thereby allowing them to reduce expenditures on labour, production, and distribution to maximizing profits (Juma, 2021).

Our key finding from examining this relationship is that interactions between informal and formal actors within Nairobi's food system are diverse. In some instances, there is a mutually beneficial relationship between informal vendors and supermarkets, where vendors will buy processed foods in bulk from a neighbouring supermarket and sell those items in smaller quantities (Owuor, 2020). In other instances, there are no interactions at all; only 19.1% of vendors claim that they are in competition with other supermarkets and large retailers within the food system (Owuor, 2020). Last, exploitation occurs between formalized large firms and informal actors along the supply chain that the government struggles to address (Mbabazi, 2020).

5. Considering Food System Transformation

The existing dominant food system generates undesirable and unintended outcome such as economic exploitation, environmental degradation, malnutrition, food insecurity, increased inequalities, and poverty (McMichael, 2013). Even further, in the case of Nairobi, the food system, including the governance and policy cycles surrounding it, create economic and political chasms, or geographies of exclusion for those participating in informal activity. Transformation in food systems can be seen as a governance effort to alter such undesired emergent properties of the system. Efforts to build and inclusive and equitable food system food system in Nairobi have not been very successful in fundamentally changing the food system towards these outputs. This should be no surprise, however, as planned interventions in a food system often have limited effect as they tend to ignore key political, competitive and institutional dynamics and processes (Leeuwis et al. 2021).

5.1 Current Interventions

Various international organizations and initiatives are currently in place to support informal workers in the food system in Kenya. Within the United Nations alone, numerous specialized agencies work in this area (FAO, IFAD, ILO etc.). Other countries, including Canada, engage in international aid within Kenya's food economy. The majority of these initiatives aim to support rural agricultural production, and as a result urban food systems are neglected.

An innovative international solution that focuses on urban food security is the Milan Urban Food Policy Pact (MUFPP), to which Nairobi is a signatory (Nairobi City County, 2019). A monitoring indicator within this pact is public investment in food markets and retail outlets. The total proportion of county investment in markets is consistently 0.024% and the budget is allocated to formal retailers (MUFPP, 2019). While MUFPP remains a promising initiative, county authorities have yet to implement the recommended interventions to any significant effect. Nairobi county officials could learn from other African municipalities like Tamale, Quelimane or Douala that have won the MUFPP Governance Award for their food policy reform.

The Government of Kenya has a number of food system related initiatives, including Vision 2030, the Kenya Agri-Nutrition Strategy 2020-2025, and the Big 4 Agenda. Much like most international initiatives, their focus is on rural agriculture. For instance, Kenya Vision 2030 is a development blueprint aimed at "providing high quality of life for all its citizens" (Republic of Kenya, 2011). One of the pillars of Vision 2030 is to invest heavily in agriculture, with the Galana Kulalu project at the center of this plan. This initiative is a USD52 million investment by

the Government of Kenya through pubic-private partnerships aimed at addressing Kenya's perennial maize shortage (Andae, 2020). The Kenyan government also strengthened their mandate under section 24A of the Competition Act Competition Act in 2021 and published the new Retail Trade Code of Practice in an attempt to better govern the relationship between food retailers and suppliers (Mwendwa, 2021). At the national level, there was once official support for creating an 'enabling environment' for informal trade beginning in the 1980s under the Moi government (Njeru and Njoka, 1998; Hope, 2012). However, despite there being supportive policy language at the national level, it never translated into legislation or implementation at the urban neighbourhood scale (Fraser et al. 2014). More recent language in Kenya's Vision 2030 frames the urban informal sector exclusively as a problem, identifying the informal sector in terms of tax evasion, market distortions, and the site of social and environmental risks (Brown, 2019; Republic of Kenya, 2011).

The Nairobi City County government has a food system strategy that seeks to provide affordable, accessible, nutritious, and safe food for all Nairobi City County residents within the existing policy and legal foundation (Nairobi City County, 2020). While the strategy document itself recognizes the significance of informal activity within the food system, County authorities dedicated to this plan work within this patchwork of county legislation that limits any legitimate recognition of informal food system actors within the city and therefore significantly favours formal partnerships. Of the approaches emphasized to achieve their vision of 'affordable, accessible, nutritious and safe food for all Nairobi City County residents, one is to align and support initiatives that have been articulated at the national level by promoting urban agriculture. The other is concerned with food distribution, noting that "there will be

formalization and integration of the system" but without noting how and this formalization process will occur (Nairobi City County, 2020, pg. 5).

At the neighbourhood level, interventions approaches are diverse. Platter of Compassion is a non-profit organization that attempts to alleviate hunger by empowering poor communities to generate incomes for self-sustainability through collecting, purchasing, growing, and packaging food for distribution (Food Banking Kenya, 2021). Another organization called Kwanza Tukule aims to alleviate food insecurity in Nairobi by providing economically empowering, energy-saving, and socially inclusive food supply services through market solutions (Kwanza Tukule, 2018). There are also self-organized informal labour organizations, such as the Kenya National Alliance of Street Vendors and Informal Traders and the Nairobi Informal Sector Confederation. They serve as organizing bodies that empower street vendors and informal traders through training, access to credit, and dialogue with authorities (KENASVIT, 2022; Peoples Dispatch, 2019).

5.2 Gaps and Levers of Change

When reviewing possible interventions within a system, it important to think in terms of leverage points, where change is most likely to catalyse subsequent self-organizing changes elsewhere in the system (Leeuwis, 2021; MTS Canada, 2024; Meadows, 1999, 2009). The Impact Gaps Canvas is a tool that can be used to understand the landscape of a problem and possibly identify some paths for what interventions could enact change (MTS Canada, 2024). The exercise is intended to highlight what has already been tried, what has worked and what has not, how these efforts connect and build upon each other, and what future efforts are

planned. In the middle, is the impact gap, or what is missing in the whole ecosystems of the solutions landscape, what could connect up these efforts, what regulation might be needed, or what types of efforts are broadly missing.

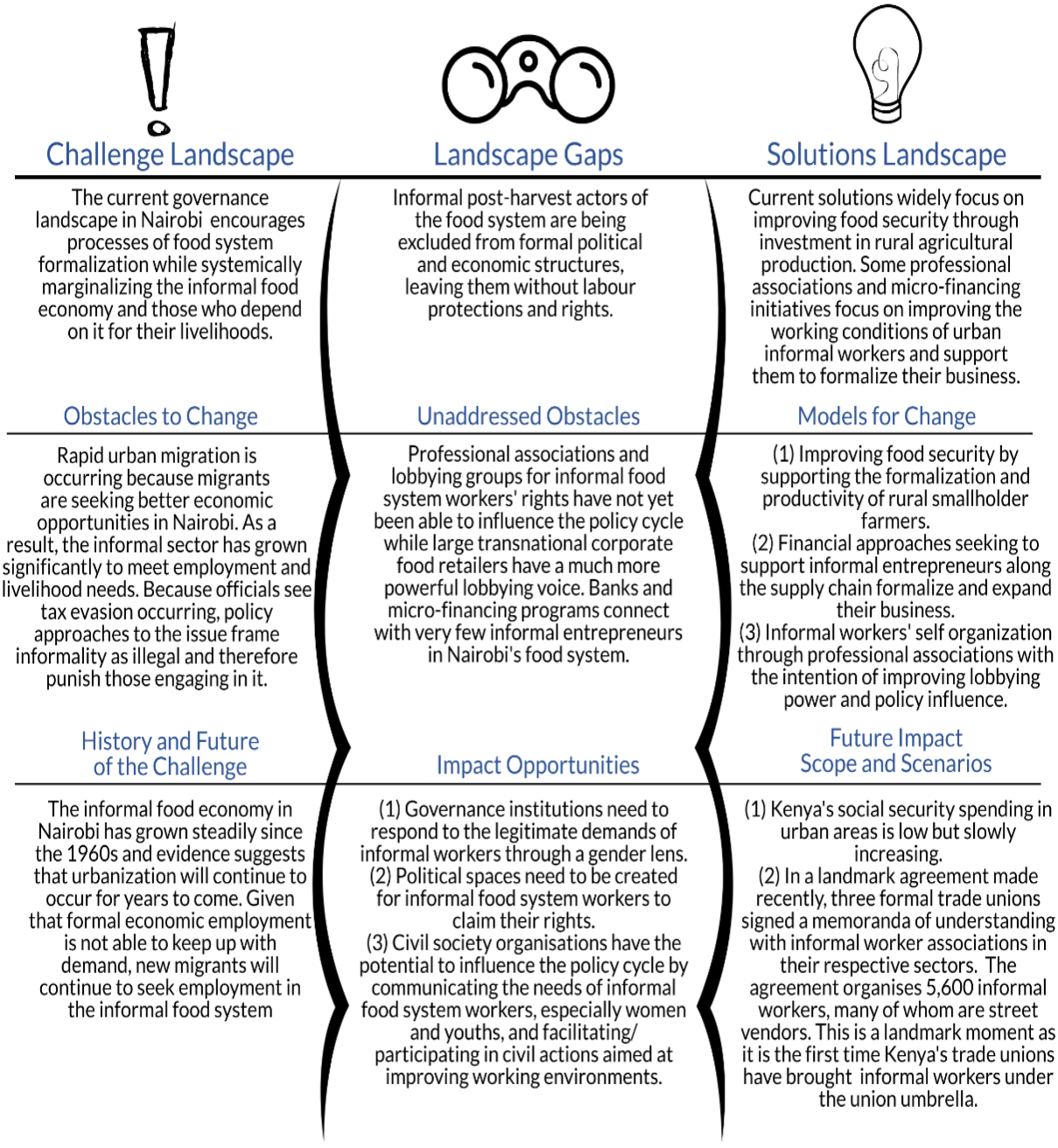


Figure 9: Impact Gaps Canvas

Gap 1: There is a disconnect between the self-organization of informal food system actors and government agencies, leading to tension between the two in the enforcement of rules and regulations.

Lever of Change 1:

Self organized associations and unions like the Kenya National Alliance of Street Vendors and Informal Traders, the Central Organization of Trade Unions, Grogon-Ngara Food Vendors Association, and the Muthurwa Food Court Vendors Association all support the informal food economy in Nairobi and attempt to represent and advocate for informal food system workers. These organizations need to be leveraged in policy co-creation.

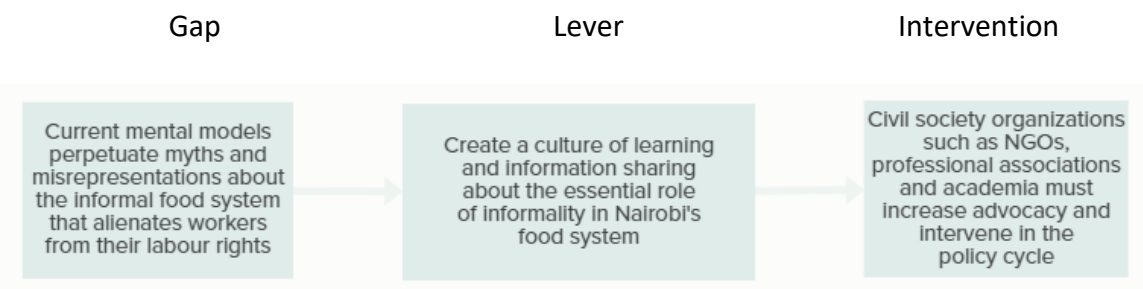
Gap 2: Informal post-harvest actors of Nairobi's food system are being excluded from the development agenda as well as formal political and economic structures.

Lever of Change 2:

The location and characteristics of food insecurity in Kenya are shifting rapidly. There is an urgent need for development practitioners to be responsive to these new realities through critical engagement with the drivers of food system change.

Gap 3: Myths and misrepresentations about informality hinder the inclusive development of Nairobi's food system.

Lever of Change 3:



Based on our identified three levers of change, we find that acknowledging informal food actors as key stakeholders deserving a voice at the decision-making table is a starting point for intervention. In order for this necessary engagement between informal food system actors and authorities to take place, the myths about informality must be debunked, mental models must be reshaped, and the resilience of the people who depend on it for their lives and livelihoods must be respected.

6. Conclusion

This research demonstrates that the exclusion of the informal food economy in Nairobi is embedded in a longstanding complex system of governance that, while hostile towards informality, fails to address its existence. This reflects the dynamic stability of informality within the broader food system. Despite growing concerns about the capacity of the city's food system to handle the growing number of urban migrants, food security discourse at all levels of governance and policy continues to perpetuate an outdated development agenda that widely neglects urban food security and urban food system development. Further, hostility from authorities towards informal economic actors persists because of pervasive biases that frame them as illegal, aesthetically unpleasing, and avoiding responsibility.

If viewed positively, processes of informal urbanization can lead to an affirmation of civil and social rights, to the reinforcement of the rule of law, and to the inclusion of citizens in democratic institutions and processes. Above all, Nairobi's food system functions because of the entrepreneurial, innovative, and deeply resilient people who work within it despite being excluded from proper rights and labour laws. A common justification for the magnitude of this issue is that governments are simply unprepared to face the challenges of rapid urbanization in the Global South. While there is a measure of truth in this assertion, it does not justify the hostility towards informal urbanization. Until government stops selectively including and excluding people depending on the power they yield in political and economic processes, informal food system workers will remain essential inside the system, yet still outside the law.

Chapter 5:
Conclusion

This multiple manuscript dissertation critically analyzed dominant frameworks used to conceptualize neighbourhood food supply, access, and household food security dynamics in the Global South. Using Nairobi, Kenya as a case study, this research situated itself in emerging areas of urban food security studies, particularly the focal points of supply-side retailing dynamics and household food access. The dissertation contends that much of the existing literature misrepresents the transformations taking place within Nairobi's food system, leading to oversimplified or inaccurate conclusions that are regularly generalized across large and diverse political and economic geographies. By offering fresh perspectives on these changes, this research highlights the need for more context-specific approaches to understanding how urban food systems and household food security explores how conclusions drawn in this still emerging body of research are mischaracterizing transformations occurring in Nairobi's food system.

Each manuscript explored distinct, yet thematically related, sets of research questions. The first chapter critically examines the applicability of the widely cited supermarket revolution hypothesis to Nairobi, Kenya. It focuses on four key urban propositions linked to supermarket expansion in the city, exploring how this growth influences competition, market share, informal food economies, and food security. Additionally, this chapter evaluates and criticizes assumptions made about the role of policy and governance, assessing their scope and effectiveness in governing evolving food system dynamics.

The second chapter situates itself within the literature on 'food deserts', with a particular focus on debates about the term's relevance in cities of the Global South. Food insecurity and malnutrition rates tend to be higher in these regions compared to North America and the UK. Additionally, food systems in cities across the Global South differ markedly due to a greater degree of informality, a higher concentration of micro-enterprises, varying levels of supermarket expansion and market consolidation, and different stages within the global nutrition transition. This research examines whether existing food desert concepts can be reinterpreted to better align with realities of urban food systems in Nairobi, Kenya. The first research question investigates whether the original food desert concept applies adequately in this context. The second question evaluates emerging interpretations of food deserts that include new elements and relationships within the food system. Finally, the third question tests a definition specifically developed for food deserts in cities across the Global South. and more specifically the literature debating the terms' utility when applied to cities in the Global South.

The third chapter uses systems theory and the concept of a 'food system' to delve into why established views on informal economic activity do not align with the realities of Nairobi's food system. Research has often suggested that supermarket expansion can reduce informal economic activity through competition, exclusion, and displacement. By focusing on informality as a central aspect of the food system, this study challenges the common assumption that supermarkets will shift consumer preferences, outcompete informal vendors, and drive the formalization of procurement systems.

Nairobi's food system offers a useful case study when testing generalized frameworks developed in academic settings that seek to explain and predict global, regional, and local food

system development pathways and dynamics. The city's food system operates as a key trading hub for agricultural products sourced from both within Kenya and neighbouring countries. The city's demand for food drives production and distribution networks that extend into rural areas, influencing farming practices, crop choices, and market access for producers across the region. The city is a major transportation and logistics hub that facilitates the integration of regional food supply chains as well. This integration allows for efficient movement of food products from production areas to urban markets, benefiting both producers and consumers throughout East Africa. Any innovation and transformation occurring within Nairobi's food system has implications outside of its borders, offering early indications of food system development pathways for the region more broadly.

As a whole, this research makes modest yet novel contributions to three overlapping areas of discourse, including Southern urbanism, systems thinking, and global governance. As a contribution to discourse on Southern urbanism, the dissertation critically examined mainstream models, theories, and concepts designed in Northern contexts that attempt to explain how urban food systems develop globally. As a point of criticism aligned with Southern urbanism literature, this research contends that food system models, theories, and concepts (specifically 'the supermarket revolution' and 'urban food deserts') that were first designed for and by actors outside of the global South are failing to adequately capture the actors, interactions, and development pathways occurring within Nairobi's food system. This research ultimately shows that the application of mainstream understandings of urban food system dynamics fails to sufficiently explain what is happening in Nairobi, Kenya.

By challenging mainstream food system models and assumptions designed in Northern contexts, this work underscores the importance of creating frameworks that are context sensitive. In particular, it highlights the need for models that capture the distinct interactions and development pathways found within Nairobi's food system. This challenges researchers and practitioners alike to consider how frameworks developed in different socio-economic and cultural contexts might not fully address the unique dynamics of cities in the Global South. As the field of urban studies increasingly engages with southern urbanism, this research suggests a shift towards more localized, inclusive models that respect the agency and realities of informal economies rather than seeking to displace or formalize them.

This work contributes to the field of systems thinking by centering informality in its examination of the relationships between Nairobi's food economy, food security, and its governance. By identifying connections between informal actors and the broader the food system, the study provides evidence and insights that challenge the commonly held assumption that food retail development will somehow displace informal economic activity. Previous models that have tried to explain interactions between informal food system actors and emerging supermarket economies foremost used agricultural economy as the methodological approach. This integrated systems thinking approach, however, uses data and documentation methods to explore perspectives from various points of connection within the food system. It does so while drawing from multiple disciplines, including global governance, global political-economy, public policy analysis, food security studies, and Southern urbanism. This work demonstrates the utility and increased accuracy in using systems thinking methods to describe how informality operates in relation to supermarkets within a food system. By using systems

thinking to explore Nairobi's food system, the study provides a new perspective that broadens the conceptual boundaries of food system research. This challenges the field to recognize that informal systems are not peripheral but rather core components of many urban food systems in the Global South. It also suggests that systems thinking can be especially useful when examining complex, multi-layered economies, as it allows for a more holistic view of interactions and dependencies. Future studies in urban food systems might benefit from adopting similar frameworks, with a particular emphasis on integrating diverse local perspectives to generate nuanced insights into informal economies.

The research also contributes to global governance scholarship and does so in two ways. First, this research brings the globally governed into focus. Investigating trends in Nairobi's food system uncovers how global policies and economic trends shape local food security, market dynamics, and the livelihoods of those who depend on the city's food system for work. Zooming the analysis to the relationship that an informal food vendor in Kilimani has with a new European owned supermarket in the neighbourhood and then zooming out to understand how global governance institutions and processes facilitated this relationship occurring, provides an opportunity to challenge the notion that global governance processes are too nebulous to bring into clear focus. Furthermore, this perspective contributes to overcoming the absence of feedback loops and the accountability gap between 'the governors' and 'the governed', particularly in the context of conceptualizing and governing the 'informal economy' as a categorical tool for those who govern.

Second, this research contributes to global governance discourse by reversing the analytical optic. By focusing on the food system of Nairobi through the perspective of those

working in it and relying upon it, the research examines how policies and governance structures designed by the governing are received, adapted, and contested by local community. This provides insights into the efficacy, equity, and legitimacy of these policies from the perspective of those directly affected by them. It also creates space for exploring the agency that 'governed' actors have within a trans-scalar governance ecosystem.

This work makes the case for more grounded and relational approaches to research, where policies are not viewed in isolation but as actively experienced and reshaped by local actors. This approach suggests that global governance processes can benefit from accountability measures that connect the governing with the governed more effectively. For institutions, this research points to the need for feedback mechanisms that ensure that policy and governance approaches at any level resonate meaningfully at the level of the individual working in or depending on the food system for their livelihoods and food security. With global governance discourse widely being a critique of the state-centric analysis in international relations, this works contributes to it by highlighting the roles that non-state actors have in shaping the development pathway of Nairobi's food system. By bringing the globally governed into focus and reversing the analytical optic of that focus, this research contributes to global governance discourse by identifying discordance and disconnect between narratives about Nairobi's food system produced by 'the governing' and the perspectives of those being governed.

Finally, this study contributes to discussions around agency in the context of trans-scalar governance. By emphasizing the perspectives of informal vendors and other local actors, it highlights the role of non-state actors in shaping urban food systems. This is not only

countering the state-centric focus often present in food system policy discourse but also positions informal economies as active participants within the governance ecosystem. For practitioners and researchers, this means acknowledging and leveraging the agency of those within informal systems. This perspective encourages further research into the ways in which informal actors negotiate, resist, and reshape governance practices, which could be instrumental in developing policies that are both equitable and effective.

There has long been recognition that urban food security remains a critical research gap within the broader discourse on food security, food systems, and governance. Despite this recognition, the field remains under researched. While attention to cities and their food systems has increased in the last decade, the field is still very much an emerging one. While this dissertation makes contributions to the field through the interdisciplinary and critical analysis of current models, this work also leaves unanswered questions.

Future research opportunity on urban food systems remains broad. While relationships between retailers and consumers have long been the focus of urban food research, a more comprehensive approach could investigate the roles of suppliers, wholesalers, transporters, and informal market participants in shaping food access and affordability in urban settings. Examining these overlooked actors could provide critical insights into the full complexity of food systems, especially in Southern cities where informality may play significant role, as is the case in Nairobi.

Developing a uniquely Southern model for food system research is a crucial next step in understanding how these systems operate in different socio-economic and cultural contexts. As this dissertation has demonstrated, current frameworks for food system development often

draw from models in the Global North, which may overlook the unique dynamics of informality prevent in many Southern regions. Research that builds a model grounded in Southern urban contexts can help combat misrepresentations and misunderstandings of, say informal actors operating in these spaces and the roles they play in economic opportunity and food security for urban residents. Limited infrastructure, varying regulatory environments, are disconnect between the governing and the governed, and unique and dynamic consumer cultures are but a few significant distinguishing factors that a new model could incorporate. There is a growing body of literature exploring this area by identifying shortcomings of foreign made and universally applied models, and this work has made a modest contribution to that debate. However, there is ample opportunity for further research in this regard.

The agricultural and supplier system supporting urban food environments represents another essential area for research. In particular, studies can more thoroughly investigate the dependencies and relationships between actors across the entire food supply chain. Researching "chains" implies focusing on the relations between actors and the linkages that bring them into cooperation and conflict. Urban food system research that has done well to analyze and improve the understandings of Southern urban food systems could expand more thoroughly in this regard. Too often is urban food security in Southern cities made unique by the mere inclusion on informal food retailers into the conversation, when in fact there are a plethora of actors across the Southern food system that remain underexplored in urban research. The retailer is an easy entry point to urban food system research because of it's accessibility to researchers. More innovative methodological approaches could explore the social, economic, and political (governance) relational practices of all actors.

Last, governance in urban food systems is an area full of exploratory opportunities. Future research could investigate how cities can implement adaptive governance structures to better support a diversity of essential food actors, including those operating and being governed informally. While the informal food economy operates outside of the ambit of formal regulation, it is not ungoverned. Instead, it is informally governed. Aligned with global governance discourse and a recognition that governance is done by more than government, this concept of informal governance within food systems could be explored in more detail.

Moving forward, there is also an emerging consensus that the language of 'food deserts' is expiring and its utility as a conceptual vehicle has been driven into the ground. With the transformation of the definition over time being significant, the language of scarcity is misleading, and the term has been tasked to include so many socio-cultural, economic, political, and environmental factors impacting neighbourhood food access that it has been essentially flattened. This research contends that, at this stage of our collective knowledge on neighbourhood food access, more accurate language is available and should be used.

All together, future research on urban food systems should aim to broaden our understanding of the actors, structures, and systems that sustain food access in diverse urban environments. By incorporating the perspectives of Southern cities avoiding reductive terminology, exploring the intricacies of supplier systems, and advancing inclusive governance models, researchers can build a foundation for more resilient and equitable urban food systems in the global South. These insights would not only expand the field but also inform policies that address food security challenges in cities with complex challenges and underexplored opportunities for positive transformation.

Within this set of distinct, yet thematically connected chapters, this dissertation reveals how actors with varying degrees of power within Nairobi's food system produce, negotiate and contest the rules that govern it. The dissertation demonstrates that despite limited space and recognition existing for seemingly less powerful actors to influence the formal governance and transformation of Nairobi's food system, they remain adaptive and resilient in the face of new forms of conflict with emerging actors and system dynamics. Although informal actors within Nairobi use techniques and forms of expertise to influence contestations over the food system, the actual terrains of these contestations and negotiations remain under-explored in research. In order to better understand how transformation is negotiated within a food system, researchers need to shift their gaze to less explored venues where struggles for change take place. Key spaces that remain poorly explored are inside of court rooms, through the work of competition commissions, in the boardrooms of businesses, in the informal rent and protection arrangements of vendors, bureaucratic government proceedings and organized public consultation processes. While not always easy to access for researchers, it is within these spaces that food regimes are being negotiated and determined.

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