Chapter Thirteen

The State of Food Security in Africa: Exploring the Role of Land Use Planning in Strengthening Urban Food Security

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Abstract

African cities are experiencing significant food insecurities attributed to multiple factors, for example, climate change, civil war, the recent COVID-19 pandemic, and disjointed food value chain systems. The situation is especially critical among the urban poor, who are disproportionately marginalised

in accessing food and markets due to financial constraints, locational discrimination and perpetuated segregation from urban food systems inherited from colonial times. This chapter examines the role of land use planning in strengthening urban food security in Africa. Through a comprehensive desktop review, the chapter analyses the current food security situation, factors contributing to food insecurity in urban areas, and the impacts on urban populations. The chapter also explores the concept and principles of land use planning, presents successful case studies, and identifies implementation challenges. It provides policy implications and recommendations for improving land use planning and suggests strategies for enhancing urban food security. The findings emphasise the importance of integrating food security into planning decisions, promoting participatory approaches, and fostering stakeholder collaboration. This study also acknowledges the significance of food sovereignty, advocating for community-centred approaches that enhance local control over food systems and reinforce resilience in urban food security post-COVID-19. Acknowledging the limitations of secondary data, we suggest directions for future research, emphasising primary data collection and comparative international studies to enrich understanding and application in different urban contexts.

Introduction

Food security is a fundamental concern in Africa, where a significant portion of the population faces persistent challenges in accessing adequate and nutritious food (Umarjonovna & Gulomjonovna, 2022). Rapid urbanisation, population growth, and climate change have further exacerbated food security issues in urban areas across the continent (Campbell, Vermeulen, Aggarwal, Corner-Dolloff, Girvetz, Loboguerrero, Ramirez-Villegas, Rosenstock, Sebastian, Thornton & Wollenberg, 2016; Ruel, Garrett, Yosef & Olivier, 2017). As urban populations continue to expand, ensuring access to sufficient and nutritious food becomes increasingly crucial for the well-being and development of these communities. Sustainable Development Goals (SDGs) provide a framework highlighting the significance

of addressing the challenge of urban food insecurity. SDG 1 aims to eradicate extreme poverty and hunger and recognise the role of land use planning in strengthening urban food systems; SDG 2 focuses on ending hunger and achieving food security; SDG 11 aims to create sustainable and inclusive cities, emphasising the need for urban populations to have consistent access to safe and nutritious food; SDG 12 promotes responsible consumption and production, emphasising sustainable agricultural practices and reducing food waste; while SDG 13 calls for urgent action on climate change, highlighting the vulnerability of African cities and the importance of integrating food security measures into urban planning. Consequently, understanding the state of food security in cities and the role of land use planning in strengthening urban food security has gained significant attention among researchers, policymakers, and practitioners.

Food security in African urban areas is a pressing issue that demands immediate attention (Bhanye, 2023). Urbanisation results in significant changes in land use patterns, including converting agricultural land into residential, commercial, and industrial areas (Ruel *et al.*, 2017). Such transformations have far-reaching implications for the availability and accessibility of food in urban settings. The rapid urban expansion, often unplanned and haphazard, has led to the loss of agricultural land, increased food prices, and limited access to fresh and nutritious food for urban residents. Multiple other factors also affect food insecurities in African cities, including climate change, civil war, the recent COVID-19 pandemic, and disjointed food value chain systems (Matamanda, Dunn, & Nel, 2022). Frayne, Crush and McLachlan (2014) outline that the African Food Urban Network (AFSUN) conducted a survey across 11 cities in southern African countries in 2008 and found that about 76% of households in low-income areas were moderately to severely food insecure. The marginalised seem to be the group that faces the challenge of accessing food and markets due to locational discrimination brought by segregated urban forms inherited from colonial times (Hermerijckx, Nakyagaba, Sseviiri, Janusz, Eichinger, Lwasa, May, Verburg, & Van Rompaey, 2023). Food security refers to the physical and

economic provision of safe, nutritious, and adequate food at all times to all people for a productive and healthy life (Shushu, Swanepoel, & Mmbengwa, 2021). Food security encompasses the entire range of dimensions and their interlinked value-adding activities involved in availability, access, utilisation, and stability (Zwelendaba, 2021:34).

There is an urgent need to explore the potential role of land use planning in addressing these challenges and strengthening urban food security in Africa. The primary objective of this chapter is to critically examine the role of land use planning in enhancing urban food security in Africa. To achieve this, the following research questions were addressed:

- What is the state of food security in Africa?
- What is the role of land use planning in strengthening urban food security?
- What policy recommendations can be derived from the findings to enhance African urban food security?

Understanding the nexus between land use planning and urban food security in Africa is crucial for designing effective interventions and policies to address urban populations' persistent food security challenges. The study provides valuable insights into the potential strategies, approaches, and policy implications that can strengthen urban food security. The findings contribute to the knowledge on food security in Africa and offer practical recommendations for urban planners, policymakers, and practitioners to enhance food security outcomes in rapidly urbanising contexts.

Literature Review

Food systems is defined as a multifaceted framework ranging from production through to the consumption stage (Smit, 2016:1). The activities start from production, processing, distribution, and consumption, constituting the four main components of the food system (Ingram, 2011). Food is central to the health and well-being of all people residing in African cities (Battersby & Watson, 2018; Bhanye, 2024). However, it

is unlikely for planning reforms and policy reviews to focus on food systems to enhance the state of food systems to attain the status of food security in African cities (Bhanye, Matooane, Matamanda, & Bhanye, 2024; Chigbu, Ntihinyurwa, de Vries, & Ngenzi, 2019). The studies show that most governments need to include food systems in their strategic planning processes in urban areas because they consider it a rural problem (Battersby, 2017; Crush, 2016; Raja, Morgan, & Hall, 2017). This calls for a sustainable food system in most African cities to ensure that people can steadily produce, process, distribute and consume food. The four components of food systems are outlined in Table 13.1, from production to consumption, to ensure food security in the urban environment.

Table 13.1: Components of Food Systems

Components	Explanation
Food Production	This involves the process of taking raw ingredients through to nutritious edible food for humans. This can be done from subsistence farming to commercial farming for sustainability in urban areas zoned for production and at home.
Food Processing	This means people have adequate income or other resources to access appropriate food domestically through home production, buying in local markets or as exchange, gifts, borrowing, or as food aid.
Food Distribution and Retailing	This is the important stage in food systems that addresses issues of moving the food from one place to another in an urban space, and marketing of such food for who and where people can access such food.
Food Consumption	This is the final stage where decisions about what to select through to preparation, eating, and digesting food come in. This should be easily accessible to everyone in an urban space.

Food security refers to when all individuals have physical, social, and economic access to sufficient, safe, and nutritious food to consistently meet their dietary needs and food

preferences for a healthy and active life (Smit, 2016:2). There are also determinants of food security, and this includes the household size, educational level, unemployment level, dependency ratio and climate shocks such as floods, landslides and drought (World Food Program [WFP], 2009). Webb, Coates, Frongillo, Rogers, Swindale and Bilinsky (2006) indicate a need to evaluate the state of all components of food security from the household level to determine the state of food security in African cities. These factors or components start from access, availability, utilisation, and stability within our communities (Saweda, 2011). Food security is a multidimensional concept encompassing the availability, accessibility, utilisation, and stability of food for individuals and communities (Bhanye *et al*., 2024). The key elements of food security are outlined in Table 13.2. Food security is often measured through indicators such as dietary diversity, caloric intake, and nutrition levels. In the African context, achieving food security poses unique challenges due to factors such as population growth, poverty, climate change, and limited access to resources.

Table 13.2: Key Elements of Food Security

Element	Explanation
Food availability	This means sufficient qualities of appropriate and quality food available from home-based production, commercial imports, food assistance, or food reserves on a consistent basis.
Food access	This means people have adequate income or other resources to access appropriate food domestically through home production, buying in local markets or as exchange, gifts, borrowing, or as food aid.
Food utilisation	This means people can use food properly through food storing and processing practices while having sufficient knowledge where they apply nutritional, health, sanitation, sociocultural as well as spiritual parameters to food.
Food stability	This means the availability of adequate food at all times, thus, certain that access and utilisation of appropriate food are not curtailed by any hindrance, shortages, or by emergencies, or crises.

Africa faces significant food security challenges, with a large proportion of the population experiencing chronic hunger, malnutrition, and food insecurity (Bhanye, Shayamunda, Mpahlo, Matamanda & Kachena, 2023; Adeyeye, 2017). The continent's vulnerability is exacerbated by factors such as climate change-induced droughts, conflicts, poor infrastructure, limited access to markets, and inadequate agricultural practices (Andenle, Wedig, & Azadi, 2019). Urban areas in Africa are particularly affected, as rapid urbanisation and population growth strain the capacity of cities to provide adequate food supplies and services (Satterthwaite, 2017). Urbanisation plays a crucial role in shaping food security dynamics in Africa. The rapid growth of cities leads to increased demand for food, putting pressure on existing agricultural systems (Chikanda, Crush, & Frayne, 2017). Urban areas rely heavily on food imports from rural areas or other countries, leading to supply chain disruptions and increased vulnerability to price shocks (Dodo, 2020). Urbanisation also brings about changes in dietary patterns, with a shift towards processed and less nutritious foods. Furthermore, land conversion for urban development reduces the availability of agricultural land and limits local food production (Huang, Ghazali, Azadi, Moghaddam, Viira, Janečková, Sklenička, Lopez-Carr, Köhl & Kurban, 2023).

Scholarly research on the relationship between land use planning and African urban food security is limited but growing. Studies have highlighted the potential of land use planning as a tool for improving urban food security by promoting sustainable agriculture, protecting agricultural land, and ensuring equitable access to food resources (Henry, 2018; Diehl, Sweeney, Wong, Sia, Yao & Prabhudesai, 2020; Le Mouël, Lattre-Gasquest & Mora, 2018). Some scholars have explored specific aspects such as urban agriculture, peri-urban land use, zoning regulations, and the role of local governance in supporting urban food systems (Bhanye, 2024; de Visser, 2019). However, more empirical evidence and comprehensive analyses are needed to understand the effectiveness and limitations of land use planning interventions in addressing food security challenges in African cities (Meyfroidt, 2018). The literature review reveals

the complex interplay between urbanisation, land use planning, and food security in Africa. It demonstrates the urgency of addressing food security issues in urban areas and highlights the potential of land use planning as a strategic approach to strengthen urban food security. Examining existing studies, the chapter bridges the gaps in knowledge and contributes to a more comprehensive understanding of the role of land use planning in enhancing urban food security in Africa.

Methodology

This study employed a qualitative desktop review to synthesise existing literature on the role of land use planning in enhancing urban food security in Africa. We meticulously selected peer-reviewed articles, reports, and policy documents from Google Scholar, Scopus, and Web of Science databases. The inclusion criteria focused on works published within the last fifteen years, ensuring the relevance and timeliness of the data. Keywords like 'urban food security,' 'land use planning,' and 'sustainable urban development' guided our search. To manage the extensive volume of literature, we prioritised sources that directly addressed the intersections of urban planning, food systems, and policy impacts in African contexts. This approach facilitated a comprehensive understanding of the subject matter without delving into overly granular details. Our analysis distilled key themes and gaps in the current research landscape, supporting the development of informed policy recommendations. Limitations of this methodology include the reliance on secondary data, which may not capture the most recent on-the-ground impacts or unpublished policy innovations. Future research could enhance this study by incorporating primary data, such as expert interviews or case studies, to provide more direct insights into the effectiveness of land use planning in various urban contexts across Africa.

The State of Food Security in Africa

Overview of Current Food Security Situation in Africa

Africa faces significant challenges in achieving food security, with a large portion of its population experiencing various levels of food insecurity (Frayne Moser & Ziervogel, 2012). The continent is characterised by a complex mix of factors that contribute to the precarious state of food security, including poverty, population growth, climate change, conflicts, inadequate infrastructure, and limited access to resources (March & Failler, 2022:136; Widayanigsih & Barokkatuminalloh, 2011). Climate change can directly affect food security in African cities through consistent droughts, lack of rainfall, and floods that continuously affect the African region (Gitz & Meybeck, 2016). Understanding Africa's current food security situation provides a crucial context for comprehending the urgency and importance of strengthening urban food security through land use planning interventions. Food insecurity remains pervasive in Africa, affecting millions of individuals and households. According to the Food and Agriculture Organization (FAO), as of the latest available data, approximately 250 million people in Africa (representing around 20% of the population) are undernourished. This high prevalence of undernourishment indicates a lack of access to sufficient and nutritious food, leading to malnutrition and negative health outcomes (Mirzabaev, Kerr, Hasegawa, Pradhan, Wreford, von der Pahlen & Gurney-Smith, 2023:2).

Food insecurity in Africa exhibits significant regional disparities. Sub-Saharan Africa, in particular, is disproportionately affected, accounting for the majority of the continent's food-insecure population (Militao Salvador, Uthman, Vinberg & Macassa, 2022). Within sub-Saharan Africa, countries such as the Democratic Republic of the Congo, Ethiopia, Nigeria, and Sudan face severe food security challenges due to a combination of factors such as armed conflicts, political instability, and environmental degradation (Kah, 2017). Africa's agricultural sector is highly vulnerable to the impacts of climate change, including erratic rainfall patterns, droughts, floods,

and heat waves (Kogo, Kumar & Koech, 2021). These climatic disruptions often result in reduced agricultural productivity, crop failures, livestock losses, and increased food prices. Smallholder farmers, who constitute a significant portion of the population, are particularly vulnerable to these climate-related risks, as they rely heavily on rainfed agriculture for their livelihoods (Connolly-Boutin & Smit, 2015).

Africa's population is growing rapidly, further straining the continent's ability to ensure food security. The United Nations projects that Africa's population will double by 2050, reaching over 2 billion people (United Nations, 2014). This population growth and rapid urbanisation place immense pressure on food systems and pose unique challenges for urban areas (Frayne, Crush & McLachlan, 2014:102). The great influx of people tends to cripple the already limited resources in most African cities, leaving most people food insecure. As more people move to cities, urban food demand increases, requiring robust systems for food production, distribution, and access (Güneralp, Lwasa, Masundire, Parnell & Seto, 2017). Many African countries rely on food imports to meet their domestic consumption needs. However, this dependence on imports makes African nations vulnerable to global food price fluctuations, currency exchange rates, and trade disruptions. Limited domestic production and inefficient supply chains contribute to the reliance on imports, undermining food security and increasing the risk of food shortages in times of crisis. Table 13.3 summarises the current food security situation in Africa.

Table 13.3: Summary of the Current food Security Situation in Africa

Aspect	Explanation
Rapid Population Growth	Africa has one of the fastest-growing populations globally. The increasing demand for food places pressure on agricultural systems to produce more food, exacerbating existing challenges.

Aspect	Explanation
Hunger and Undernourishment	Sub-Saharan Africa has the highest prevalence of hunger and undernourishment globally. According to the Food and Agriculture Organization (FAO), in 2020, nearly 246 million people in Africa suffered from chronic undernourishment.
Climate Change:	Africa is particularly vulnerable to the impacts of climate change, including droughts, floods, and unpredictable weather patterns. These events can lead to reduced agricultural productivity, livestock losses, and increased food insecurity.
Poverty and Economic Challenges	High poverty rates and economic instability contribute to food insecurity. Limited access to resources, such as land, credit, and technology, hinders agricultural productivity and the ability of people to secure sufficient food.
Conflicts and Instability	Ongoing conflicts and political instability in some regions in Africa disrupt agricultural activities, displace communities, and hinder food production and distribution.
Agriculture and Infrastructure	Agricultural practices in many African countries are often characterised by low productivity due to outdated farming techniques, lack of access to modern inputs, limited infrastructure for irrigation and transportation, and inadequate storage facilities. These factors contribute to post-harvest losses and limit the potential for food production.

Factors Contributing to Food Insecurity in Urban Areas

A range of interconnected factors influences food insecurity in African urban areas. While urban environments typically offer better economic opportunities and access to services than rural areas, they also present unique challenges contributing to food insecurity (Sisha, 2020). Understanding these factors is essential for developing targeted interventions to address urban

food security issues. Figure 13.1 depicts the factors contributing to food insecurity in African urban areas.

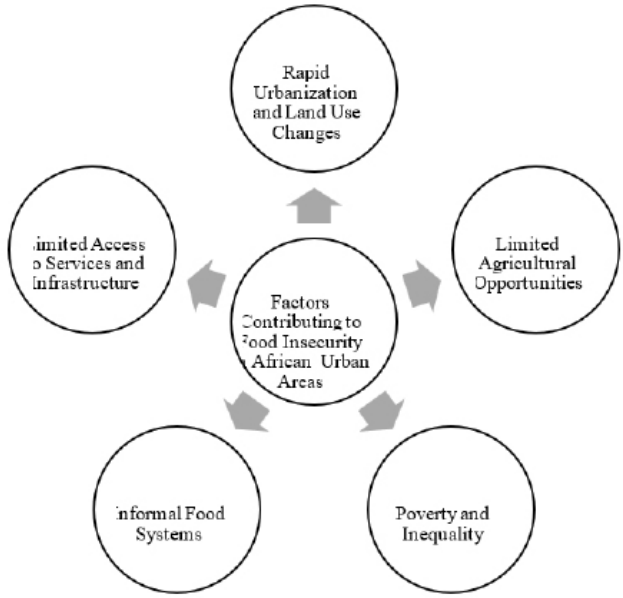

Figure 13.1: Factors contributing to food insecurity in African urban areas

Rapid Urbanisation and Land Use Changes

The rapid expansion of cities in Africa often occurs without proper land use planning, resulting in the conversion of agricultural land into residential, commercial, and industrial areas (Musosa, Shekede, Gwitira, Chirisa, Tevera & Matamanda, 2022). This phenomenon reduces the availability of cultivable land within urban boundaries, leading to decreased local food production and increased dependence on external food sources. Land use changes also disrupt traditional food supply chains and contribute to the loss of peri-urban agriculture, exacerbating food insecurity in urban areas (Bersamin, Loring, Johnson & Tholl, 2018).

Limited Agricultural Opportunities

Urban areas typically offer limited opportunities for agriculture due to space constraints, high land costs, and zoning regulations prioritising non-agricultural uses (Jayne, Chamberlin, Holden, Ghebru, Ricker-Gilbert & Place, 2021). This lack of agricultural opportunities restricts the ability of urban dwellers to produce their food or engage in urban farming activities (Matamanda, Mandebvu-Chaora & Rammile, 2022). Consequently, urban residents rely heavily on food purchased from markets, making them vulnerable to price fluctuations and disruptions in the supply chain.

Poverty and Inequality

Urban poverty and income inequality significantly exacerbate food insecurity in African cities (Odunitan-Wayas, Alaba, & Lambert, 2021). Many urban dwellers, particularly those in low-income communities, face economic challenges that hinder their ability to access nutritious food consistently. Limited financial resources, inadequate employment opportunities, and low wages make it difficult for urban residents to afford a balanced and diverse diet, leading to malnutrition and food insecurity (Zandi, Rehan, Hye, Mubeen, & Abbas, 2022).

Informal Food Systems

Informal food systems, including street vendors, informal markets, and small-scale food enterprises, are prevalent in African cities and serve as vital food sources for urban populations (Giroux *et al.*, 2021). However, these informal systems often lack regulation, quality control, and proper infrastructure, compromising food safety and undermining efforts to ensure access to nutritious food (Skinner & Watson, 2021). Informal food systems also face challenges related to licensing, hygiene standards, and limited access to credit and resources, affecting their ability to provide reliable and affordable food options.

Limited Access to Services and Infrastructure

Inadequate access to essential services and infrastructure, such as clean water, sanitation facilities, and reliable energy sources, can impact food security in urban areas (Sisha, 2020). Insufficient access to clean water for irrigation, poor sanitation practices, and unreliable energy sources for food preservation can limit the production, storage, and availability of safe and nutritious food in urban environments (Chikozho, Managa & Dabata, 2020). Additionally, limited transportation infrastructure can impede the efficient distribution of food, resulting in unequal access to affordable food options across different neighbourhoods (Du, Xu, Zhou, Li, Fu, Tang, Wang, Peng, Xu & Du, 2020).

Impacts of Food Insecurity on Urban Populations

Food insecurity in African urban spaces profoundly impacts the well-being and livelihoods of urban populations. These impacts span various dimensions, including physical health, economic stability, social cohesion, and overall urban development. Table 13.4 presents the impacts of food insecurity on urban populations.

Table 13.4: Impacts of Food Insecurity on Urban Population

Impact	Explanation
Nutritional Health	Food insecurity in urban areas often leads to inadequate dietary intake and poor nutrition, resulting in various health problems. Insufficient access to nutritious food can lead to malnutrition, stunted growth, micronutrient deficiencies, and increased susceptibility to diseases (Drysdale, Bob & Moshabela, 2021). Urban residents' lack of diverse and balanced diets can contribute to the prevalence of obesity, overweight, and diet-related non-communicable diseases such as diabetes and cardiovascular disorders (Battersby & Oni, 2019). The negative impact on nutritional health affects individual well-being, burdens healthcare systems, and undermines human capital development.

Impact	Explanation
Economic Productivity and Stability	Food insecurity in urban areas hampers economic productivity and stability (Garcia-Diez, 2021). When individuals and households experience food shortages or lack access to nutritious food, their physical and cognitive abilities are compromised, reducing productivity in work, education, and daily activities (Drammeh, Hamid & Rohana, 2019). Poor nutrition can also contribute to increased absenteeism, decreased work performance, and lower income-earning potential, perpetuating the cycle of poverty and limiting economic development in urban areas (Moradi, Mirzababaei, Dadfarma, Rezaei, Mohammadi, Jannat, & Mirzaei, 2019).
Social Implications	Food insecurity in urban areas can have social implications, including increased social inequalities and social unrest (Cherol, Ferreira & Salles-Costa, 2021). Limited access to food resources disproportionately affects vulnerable populations, exacerbating existing social disparities. Inadequate food access can also undermine social cohesion and contribute to social tensions, as competition for scarce resources may lead to conflicts and social unrest within urban communities (Pollard & Booth, 2019). Moreover, the stress and anxiety associated with food insecurity can negatively impact mental health and overall well-being, further straining social dynamics in urban areas.
Urban Development and Resilience	Food insecurity undermines urban areas' overall development and resilience (Jensen & Orfilla, 2021). When urban populations lack access to sufficient and nutritious food, their ability to thrive and contribute to urban development is compromised (Gunilla & Olsson, 2018). The impacts of food insecurity can be particularly detrimental in times of crisis, such as natural disasters or health emergencies when access to food becomes even more challenging (Kianersi, Jules, Zhang, Luetke & Rosenberg, 2021). Building resilient urban food systems that ensure food security contributes to cities' overall resilience and sustainability, enhancing their capacity to withstand shocks and stresses.

The Role of Land Use Planning in Strengthening Urban Food Security

Concept and Principles of Land Use Planning

Land use planning is a systematic and proactive process that guides allocating, utilising, and managing land resources within a defined geographic area (Metternicht, 2017). It involves deciding how land should be used for different purposes, such as residential, commercial, industrial, agricultural, and public spaces (Denoon-Stevens & Nel, 2020). Land use planning is rooted in the idea of achieving sustainable and balanced development while considering the needs and aspirations of present and future generations (Henry, Murphy & Cowie, 2018). Figure 13.2 depicts key principles of land use planning.

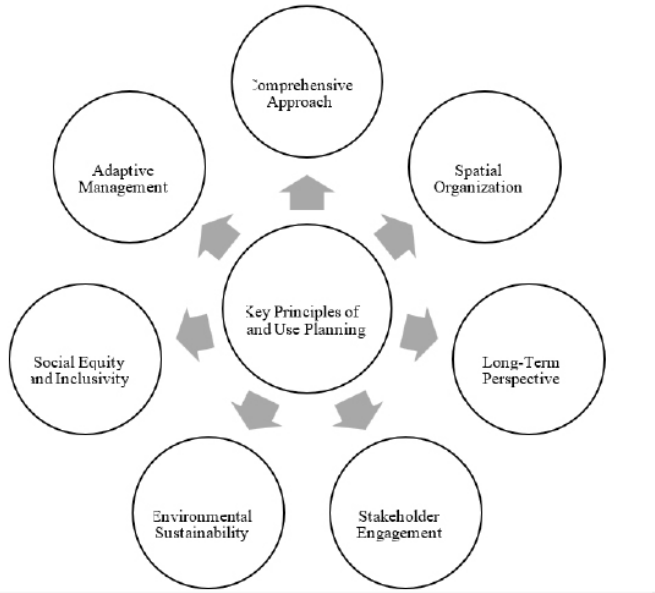

Figure 13.2: Key principles of land use planning

One of the key principles of land use planning is the emphasis on comprehensive approaches that consider various land uses and their interactions. This approach balances different

land uses to promote efficient resource utilisation, reduce conflicts, and maximise the benefits derived from land. The holistic approach ensures that the land is used to support economic development, environmental conservation, social well-being, and cultural values (Domingo, Palka & Hersperger, 2021). Another key principle of land use planning is spatial organisation. It involves systematically arranging different land uses to optimise land utilisation, minimise conflicts, and create functional and well-designed urban environments (Metternicht, 2018). Through designating specific zones or areas for different purposes, such as residential, commercial, and agricultural, land use planning ensures the orderly development of cities and facilitates the provision of essential services and infrastructure. Land use planning also takes a long-term perspective, considering a community or region's future needs and aspirations (Tsoraeva, Mezhyan, Kataeva, Hugaeva, & Rogova, 2020). It involves forecasting population growth, economic trends, and environmental changes to guide land use decisions that sustainably accommodate future demands (Roy, Pal, Chakrabortty, Chowdhuri, Malik & Das, 2020). Anticipating future scenarios, land use planning helps avoid ad hoc development, sprawl, and inefficient land use patterns that can hinder sustainable development and exacerbate food security challenges.

Effective land use planning also encourages active engagement and participation of stakeholders, including residents, community organisations, businesses, and government agencies (Kariuki, Munishi, Courtney-Mustaphi, Capitani, Shoemaker, Lane & Marchant, 2021). Stakeholder engagement ensures that diverse perspectives, local knowledge, and aspirations are considered in decision-making (Darvill & Lindo, 2016). This participatory approach helps build consensus, increase transparency, and create a sense of ownership and responsibility among stakeholders, ultimately leading to more inclusive and sustainable land use decisions (Poku-Boansi, 2021). Land use planning also promotes environmental sustainability by considering the ecological integrity of the land and its natural resources (Pacheco, 2020). It aims to

minimise environmental impacts, conserve biodiversity, protect sensitive ecosystems, and promote sustainable land management practices. Incorporating principles of ecological design, conservation, and resource efficiency, land use planning can contribute to mitigating climate change, preserving natural habitats, and enhancing the resilience of urban ecosystems (Shingirai & Happy, 2017).

Furthermore, land use planning seeks to achieve social equity and inclusivity by ensuring that land resources are allocated and utilised fairly and equitably (Meerow, Pajouhesh & Miller, 2019). It involves addressing social justice issues, access to basic services, and providing affordable housing, public spaces, and amenities for all members of society (Zhao, 2016). Considering the needs of marginalised communities, vulnerable groups, and future generations, land use planning can help create more equitable and inclusive urban environments. Finally, land use planning recognises the dynamic nature of urban development and the need for adaptive management. It involves continuous monitoring, evaluating, and adapting land use plans and policies to respond to changing circumstances, emerging challenges, and evolving community needs (Chen & Olden, 2020). Adopting a flexible and adaptive approach, land use planning can accommodate new knowledge, technologies, and innovations, allowing for the ongoing optimisation of land use patterns to strengthen urban food security.

Linking Land Use Planning and Food Security

Land use planning is crucial in strengthening urban food security by guiding the allocation and management of land resources in urban areas (Diehl *et al*., 2020). It involves making strategic decisions about the use of land for various purposes, including agriculture, residential, commercial, and industrial activities (Metternicht, 2017:5). Linking land use planning with food security entails recognising the importance of integrating food production, distribution, and access considerations into urban planning processes (Zerriffi, Reyes & Maloney, 2023). It involves recognising the interdependence between land use decisions and the availability, accessibility, and stability of food

in urban areas. This integration allows for the development of sustainable and resilient urban food systems that can meet the nutritional needs of urban populations. The key aspects of how land use planning can strengthen urban food security are discussed below.

Optimal Use of Land

Land use planning ensures the optimal allocation of land resources, considering the competing demands for various land uses (Morales & de Vries, 2021). Land use planning can support local food production and reduce dependence on external food sources by designating suitable areas for agriculture within urban or peri-urban zones. This approach maximises the use of available land, enables efficient food production systems, and enhances the self-sufficiency of urban areas in meeting their food needs (Steenkamp, Cilliers, Cillers & Lategan, 2021). Land use planning employs zoning and regulatory measures to support food security objectives. This includes designating land for agricultural use, establishing buffer zones to protect agricultural land from encroachment, and ensuring appropriate zoning regulations for food retail and distribution. Land use planning can play a significant role in advocating for food security by improving sustainable food systems to ensure food security in African cities (Chigbu *et al.*, 2019; Mwambo, Fürst, Nyarko, Borgemeister, & Martius, 2020). This can be achieved by drawing land use plans that restrict encroachment on agricultural land, which is prominent in African cities due to the high rate of urbanisation (Hermerijckx, 2023). Land use plans can advocate for urban agriculture and include special zoning for food production in urban areas to encourage urban dwellers to take part in food production.

Preservation of Agricultural Land

Effective land use planning recognises the importance of preserving agricultural land from conversion to non-agricultural uses (Kassis, Bertrand & Pecqueur, 2021). Urbanisation often leads to the conversion of fertile agricultural land into built-up areas, resulting in a loss of local food production capacity. Land

use planning strategies can include policies and regulations to protect agricultural land from urban encroachment, ensuring its long-term availability for food production (Samiullah, Rahman, & Mahmood, 2019). This preservation of agricultural land supports urban food security by maintaining local food production potential. Land use planning can actively promote and support urban agriculture initiatives to enhance food security in cities (Smit, 2016:84). Urban agriculture encompasses a range of practices, including rooftop gardens, community gardens, vertical farming, and aquaponics. By incorporating provisions for urban agriculture in land use plans, such as allocating space, providing infrastructure support, and addressing zoning regulations, cities can produce fresh and nutritious food within their boundaries (Amusan, 2018:158). Urban agriculture not only contributes to food security but also offers additional benefits such as improved nutrition, job creation, and community engagement.

Enhancing Food Distribution and Access

Land use planning can facilitate the development of efficient food distribution networks and improve access to nutritious food within urban areas. Strategically locating food markets, retail outlets and community food centres, land use planning can ensure equitable access to fresh produce and essential food items (Diehl *et al*., 2020). Planning for transportation infrastructure, such as roads and public transportation systems, can also enhance the efficiency of food supply chains, reducing food losses and improving access to food for all urban residents, including those in underserved neighbourhoods (Yacamán Ochoa, Ferrer Jiménez & Mata Olmo, 2020).

Integration of Food Security Goals

Linking land use planning with food security involves integrating food security goals, objectives, and indicators into urban planning frameworks (Flippini, Mazzocchi & Corsi, 2019). This integration requires collaboration among stakeholders, including urban planners, policymakers, agricultural experts, and community representatives (Degarege & Lovelock, 2019).

Land use planning facilitates spatial integration by strategically locating food-related infrastructure and activities within urban areas. This includes designating areas for agricultural production, food processing facilities, wholesale and retail markets, and community gardens. Land use planning can promote mixed-use development, integrating various land uses within a compact urban footprint (Raman & Roy, 2019). Opportunities for urban agriculture, community gardens, and localised food production are created by encouraging a mix of residential, commercial, and agricultural activities. This approach reduces the need for long-distance food transportation, supports local economies, and fosters a sense of community engagement and food sovereignty (Ayambire, Amponsah, Peprah & Takyi, 2019). When food security considerations are incorporated into land use planning processes, cities can prioritise actions that support local food production, enhance food access, and promote sustainable food systems.

Climate Resilience

Land use planning can incorporate climate resilience strategies to enhance urban food security in the face of climate change (Schmidhuber & Tubiello, 2007). This includes considering climate-smart agricultural practices, promoting sustainable land management techniques, and prioritising the preservation of green spaces and natural ecosystems (Stevens & Senbel, 2017). By integrating climate resilience into land use planning, cities can mitigate the impacts of climate change on food production, protect agricultural land, and ensure the long-term sustainability of urban food systems.

Collaboration and Stakeholder Engagement

Effective land use planning for food security requires collaboration and stakeholder engagement. This involves engaging with various actors, including local communities, farmers, food retailers, policymakers, and civil society organisations (Fisher, Workman, Mulyana, Institute, Moeliono, Yuliani, Colfer & Adam, 2020). When diverse stakeholders are

involved, land use planning processes can incorporate local knowledge and community needs and ensure the inclusivity of food security interventions. Collaborative approaches foster ownership, build partnerships and facilitate the implementation of context-specific and culturally appropriate strategies.

The linkage between land use planning and food security highlights the importance of considering food-related aspects in urban planning decisions. By recognising the role of land use planning in strengthening urban food security, cities can take proactive measures to create sustainable, inclusive, and resilient food systems that ensure the availability, accessibility, and affordability of nutritious food for all urban residents.

Case Studies of Successful Land Use Planning Strategies for Urban Food Security

Several case studies and examples demonstrate the successful implementation of land use planning strategies that have strengthened urban food security. These examples highlight innovative approaches, effective policies, and collaborative efforts in integrating food-related considerations into urban planning processes. Box 1 shows some noteworthy case studies showcasing successful land use planning strategies that have strengthened urban food security.

Box 1: Case Studies Showcasing Successful Land Use Planning Strategies that have Strengthened Urban Food Security

Vancouver, Canada - Urban Agriculture Zoning: Vancouver implemented a zoning bylaw that designates specific areas for urban agriculture, such as community gardens, market gardens, and rooftop gardens. The city's land use planning policies promoted the integration of food production into urban areas, ensuring that residents have access to locally grown food. The urban agriculture zoning facilitated the establishment of numerous community gardens and commercial urban farms, fostering food self-sufficiency, community engagement, and ecological sustainability.

Detroit, United States - Urban Farming and Land Reuse: Detroit faced significant urban decline and vacant land challenges. However, the city leveraged land use planning strategies to support urban farming and transform vacant lots into productive agricultural spaces. Through initiatives like the Detroit Future City Strategic Framework, the city encouraged the establishment of urban farms, community gardens, and food forests. These efforts improved residents' food access and contributed to economic revitalisation, job creation, and community empowerment.

Malmö, Sweden - Agroecology and Sustainable Land Use: Malmö embraced agroecological principles in land use planning to enhance urban food security (Bibri & Krogstie, 2020). The city implemented policies that promote sustainable and resource-efficient agriculture, including organic farming, urban permaculture, and hydroponic systems (de Vries, 2020). Through integrating food production into urban spaces, Malmö reduced food miles, improved access to fresh and locally grown food, and fostered a sense of food sovereignty and environmental stewardship.

Rosario, Argentina - Urban Agriculture and Participatory Planning: Rosario prioritised urban agriculture as a key component of land use planning to enhance food security and community well-being (Dubbling, Bracalenti & Lagorio, 2009). The city established a comprehensive urban agriculture program that includes the provision of land, technical support, and training for urban farmers. Through participatory planning processes, Rosario engaged residents in land use and agricultural practices decision-making, ensuring that local knowledge and needs are integrated into urban planning policies (Spiaggi, 2010). The city's efforts resulted in increased food production, improved access to fresh produce, and strengthened social cohesion.

Johannesburg, South Africa - Food Sensitive Planning: Johannesburg embraced food-sensitive planning strategies to address food insecurity and promote sustainable urban development (Haysom, 2021). The city integrated food security considerations into its spatial development framework, land use policies, and development plans (de Visser, 2019). Johannesburg established urban agriculture hubs, food markets, and community food centers in underserved areas, promoting food access, job creation, and community resilience. The city's approach emphasises partnerships with local stakeholders, including community-based organisations and farmers, to ensure the success and sustainability of food-related initiatives.

These case studies demonstrate that successful land use planning strategies for food security involve a combination of supportive policies, community engagement, and innovative approaches. Through integrating food-related considerations into urban planning processes, cities can create sustainable and resilient food systems that enhance food access, support local food production, and improve the well-being of urban populations. The following table provides a comparative overview of selected case studies to further illustrate the diverse, innovative and localised strategies employed by various African cities to integrate land use planning with urban food security initiatives. Each case study demonstrates unique approaches tailored to the city's specific urban and socio-economic contexts, highlighting how localised strategies can

Table 13.5: Summary of Localized Case Studies on Urban Food Security in Africa

City	Country	Initiative Description	Key Benefits	Reference
Accra	Ghana	Urban Food Plus project focuses on improving nutrient recycling to boost crop yields through biochar and fortified compost.	Enhances soil fertility and increases local food production, directly addressing food security.	Lydecker & Drechsel (2011)
Cape Town	South Africa	Urban Agriculture Policy supports urban farming through seed distribution, technical training, and marketing assistance.	Stabilizes local food markets, provides fresh produce, and strengthens urban resilience to food shortages.	Crush Frayne & McLachlan (2011)
Dar es Salaam	Tanzania	Introduction of micro-gardening practices using small containers, vertical gardens, and rooftop spaces to grow vegetables and herbs.	Optimizes limited urban space for food production, enhances food access and urban greening.	Bryld (2003)
Kampala	Uganda	Establishment of community food centers as hubs for food distribution and nutritional education, in collaboration with local NGOs.	Ensures consistent access to affordable and nutritious food, particularly for vulnerable urban populations.	Maxwell (2001)
Harare	Zimbabwe	Implementation of policies to protect and promote green belts for agricultural activities, balancing urban expansion with food production.	Maintains ecological balance and local food production capacity, despite urban pressures.	Gondo, Madigele, Mogomotsi, Tokwe, Jeremiah & Chirefu (2017)

effectively address the challenges of urban food insecurity. Table 13.5 summarises the initiatives, their key benefits, and the scholarly references supporting the descriptions provided. This comparative framework allows for a clearer understanding of the potential impacts of these initiatives. It offers insights into best practices that can be adapted by other urban areas facing similar challenges.

Challenges and Limitations of Implementing Land Use Planning for Food Security

While land use planning can be crucial in strengthening urban food security, several challenges and limitations must be considered. These challenges arise from various factors, including institutional barriers, resource constraints, conflicting priorities, and complex urban dynamics. Understanding and addressing these challenges is essential for successfully implementing land use planning strategies for food security. Box 2 summarises some of the key challenges and limitations of implementing land use planning for food security.

Box 2: Challenges and limitations of implementing land use planning for food security

Limited Institutional Capacity: Many cities lack the necessary institutional capacity and expertise to effectively integrate food security considerations into land use planning processes. The absence of dedicated departments or units focused on food-related issues can hinder the coordination, collaboration, and implementation of food-sensitive planning policies. Strengthening institutional capacity through training programs, knowledge exchange, and the establishment of cross-sectoral partnerships is crucial for overcoming this limitation.

Conflicting Land Use Priorities: Urban areas face competing demands for land, such as housing, industrial development, infrastructure, and open spaces. Balancing these competing priorities with food production and food access objectives can be challenging. Land use planning needs to navigate these conflicts and strike a balance between different land uses to ensure that competing development interests do not compromise food security.

Limited Agricultural Land Availability: In many urban areas, the availability of suitable land for agricultural purposes is limited. Urbanisation, land fragmentation, and competing land uses have reduced the amount of land available for food production. This scarcity of agricultural land poses a challenge to implementing land use planning strategies that promote urban farming and localised food production. Innovative solutions, such as vertical farming, rooftop gardens, and community gardens, can help overcome this limitation to some extent.

Socioeconomic Inequalities: Food insecurity is often closely associated with socioeconomic inequalities and marginalised communities. Land use planning interventions for food security should address these inequalities and ensure equitable access to land, resources, and opportunities for all urban residents. However, existing social disparities and unequal power relations can hinder the implementation of inclusive land use planning strategies. Addressing social inequalities and promoting inclusive participation in decision-making processes is crucial for overcoming this challenge.

Limited Financial Resources: Implementing land use planning strategies for food security requires financial resources for infrastructure development, capacity building, and program implementation. Many cities, particularly those with limited financial resources, may face constraints in allocating funds for food-related initiatives. Securing funding through public-private partnerships, seeking grants, and exploring innovative financing mechanisms can help address this limitation and support the implementation of food-sensitive land use planning.

Resistance to Change: Implementing new land use planning approaches that prioritise food security may face resistance from various stakeholders, including developers, property owners, and policymakers. Resistance to change, fear of disrupting existing land use patterns, and a lack of awareness about the benefits of food-sensitive planning can hinder the adoption and implementation of innovative strategies. Raising awareness, providing evidence-based arguments, and engaging stakeholders in dialogue and collaboration are essential for overcoming resistance and building support for food-focused land use planning.

Climate Change and Environmental Pressures: Climate change and environmental degradation pose significant challenges to urban food security and land use planning. Increasingly frequent extreme weather events, water scarcity, and soil degradation can impact food production and agricultural practices. Land use planning needs to incorporate climate change adaptation and mitigation measures, such as sustainable land management, water management strategies, and resilient infrastructure, to address the vulnerabilities and risks associated with climate change.

Addressing these challenges requires a multidimensional and integrated approach involving various stakeholders, including government agencies, civil society organisations, and local communities. Overcoming institutional barriers, promoting inclusive participation, securing adequate resources, and adapting to dynamic urban contexts are essential for successfully implementing land use planning strategies that strengthen urban food security.

Policy Implications and Recommendations

The findings of the study on the role of land use planning in strengthening urban food security in Africa have several policy implications that can guide policymakers, urban planners, and stakeholders in their efforts to address food security challenges. The policy implications are based on understanding the current food security situation in Africa, the factors contributing to food insecurity in urban areas, and the linkages between land use planning and food security. Here are some key policy implications:

- *Integration of Food Security in Urban Planning Policies:* The study highlights the importance of integrating food security considerations into urban planning policies. Policymakers should recognise that food security is not solely an issue of agriculture but is influenced by various land use decisions, including housing, infrastructure, and transportation. Urban planning policies should address food security by incorporating provisions supporting urban agriculture, prioritising access to fresh and nutritious food, and promoting localised food production systems.
- *Strengthening Multi-sectoral Collaboration:* Addressing food security challenges requires collaboration among multiple sectors, including agriculture, health, environment, and urban planning. Policymakers should promote interagency collaboration and coordination to ensure land use planning initiatives align with food security objectives. Multi-sectoral partnerships can facilitate the exchange of knowledge, resources, and expertise, leading to more effective and integrated approaches to urban food security.
- *Capacity Building for Land Use Planners:* The study highlights the importance of enhancing the capacity of land use planners in addressing food security issues. Policymakers should invest in training programs and capacity-building initiatives to equip planners with the necessary knowledge and skills to integrate food security considerations into their work. This includes understanding the principles of urban agriculture, sustainable land management practices, and

innovative approaches to land use planning that support food production and distribution.

- *Supporting Small-Scale and Urban Agriculture:* Policy interventions should aim to support small-scale and urban agriculture initiatives, as they significantly enhance food security in urban areas. Policymakers can provide incentives, such as access to land, financial support, and technical assistance, to individuals and communities engaged in urban agriculture. This can include establishing community gardens, supporting rooftop farming, and facilitating the development of local food markets and distribution networks.
- *Strengthening Land Tenure and Access:* Secure land tenure and access to land are essential for promoting sustainable food production in urban areas. Policymakers should prioritise measures that ensure secure land tenure for urban farmers and provide mechanisms to access land for agriculture. This can include land use regulations that protect agricultural land from conversion, land leasing programs, and land banking initiatives that allocate suitable land for urban agriculture.
- *Encouraging Participatory Planning Processes:* Incorporating the perspectives and knowledge of local communities in the land use planning process is critical for addressing food security challenges effectively. Policymakers should promote participatory planning processes that engage residents, farmers, and other stakeholders in decision-making. This can be achieved through public consultations, community workshops, and the establishment of platforms for dialogue and collaboration, enabling the integration of diverse perspectives and local context in land use planning strategies.

Conclusion

This chapter explored the critical role of land use planning in bolstering urban food security across Africa, providing a unique lens through which to view the intersection of urban development and food systems management. Through an

extensive review of secondary literature complemented by detailed case studies, the chapter highlighted innovative practices from cities like Accra, Cape Town, Dar es Salaam, Kampala, and Harare. Each example illustrates tailored approaches to integrating food security concerns into urban planning frameworks, showcasing both successes and ongoing challenges.

The analysis confirms that effective land use planning can significantly enhance urban food security by facilitating sustainable agricultural practices, supporting local food systems, and ensuring equitable access to food resources. The varied strategies employed across different urban contexts emphasise the importance of context-specific planning that considers local environmental, socio-economic, and cultural dynamics. The success stories from the case studies provide valuable lessons on the benefits of integrating urban agriculture, micro-gardening, and community food centres into urban landscapes. Moreover, the discussion highlights a crucial policy implication: the need for a cohesive strategy encompassing multi-sectoral collaboration between government entities, private sector participants, and community organisations. Such collaboration can drive the development and implementation of comprehensive land use policies that are responsive to the challenges of urban food security and adaptive to the changing urban dynamics.

As urban populations continue to grow and as challenges such as climate change and economic disparity impact food systems globally, the insights gained from this study are more relevant than ever. The chapter suggests pathways for urban planners and policymakers to forge resilient urban environments that can withstand and adapt to the complexities of contemporary food security challenges. The study contributes to the academic discourse on urban planning and food security. It acts as a call to action for integrating sustainable land use strategies into the heart of urban development agendas. By doing so, cities across Africa—and indeed the world—can move towards creating more sustainable, inclusive, and food-secure urban futures.

In light of the limitations inherent in a desktop review and the need for ongoing research, future studies should aim to incorporate primary data collection, engaging directly with urban planners, policymakers, and the communities they serve. Such research would enrich our understanding of the practical implications of these policies and enhance the development of more targeted, effective urban planning strategies. Comparisons across continents could further elucidate global best practices and foster a more robust dialogue on urban food security in the 21st century.

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