**Review Article**

**Assessing the Effects of Urban Agriculture on Food Security and Sustainability in Ghanaian Cities**

**ABSTRACT**

Urban agriculture is gaining global recognition as a strategic response to rising urban food insecurity, environmental degradation, and socioeconomic vulnerability. This study critically assesses the role of urban agriculture in enhancing food security and promoting sustainability within Ghanaian cities, where rapid urbanization continues to strain food systems and livelihoods. Utilizing a systematic literature review of peer-reviewed articles, empirical studies, and policy documents from 2000 to 2024, the research identifies and synthesizes evidence across key thematic areas: food availability and access, dietary diversity and nutrition, household income, resilience during crises, and environmental and economic sustainability. Findings reveal that urban agriculture contributes significantly to food security by improving access to fresh produce, enhancing household nutrition, and increasing income, particularly among women and informal workers. Urban agriculture bolsters environmental sustainability through waste recycling, urban greening, and climate resilience. However, challenges such as land tenure insecurity, unsafe irrigation practices, weak institutional support, and limited policy integration persist. The study concludes that urban agriculture is a viable tool for advancing Sustainable Development Goals (SDGs 2, 11, and 13) in Ghanaian cities. It recommends integrating urban agriculture into urban planning, securing land rights for farmers, improving irrigation safety, enhancing financial and technical support, and institutionalizing it through multi-sectoral collaboration. Urban agriculture should be recognized not as a transitional activity but as a permanent, strategic component of Ghana's urban development framework.

**KEYWORDS:** Urban Agriculture, Effects, Food Security, Sustainability, Ghanaian Cities

**Introduction**

Urban agriculture, which involves the growing, processing, and distributing of food in or around cities, has garnered increased global attention amid the challenges of rapid urbanization, food insecurity, and environmental degradation (Orsini, 2020). As cities keep growing, especially in low- and middle-income countries, making available healthy and enough food for urban residents becomes increasingly vital. The Food and Agriculture Organization (Erwin, 2022) stresses the potential of urban agriculture for improving urban food systems, generating employment, improving household nutrition, and promoting environmental sustainability. In the face of global disruptions like climate change and supply chain volatility, urban agriculture is emerging as a more resilient and adaptive approach to sustainable urban development (Drechsel & Dongus, 2010).

In Sub-Saharan Africa, the contribution of urban agriculture is particularly emphasized given the region's high levels of urban poverty, food insecurity, and unemployment. Research has demonstrated that in most African cities, urban agriculture is a significant livelihood option and a major buffer to food emergencies (Mougeot, 2001; Ruhweza, 2020). It makes an important contribution to urban food supplies, especially for the urban poor, and is consistent with broader objectives of sustainable urban development. Nevertheless, problems such as insecurity of land tenure, infrastructural shortcomings in access to water, inadequate waste management systems, and policy weaknesses prevent full exploitation of the potential for urban agriculture in sub-Saharan African cities (Pillai, 2021).

Urban agriculture in Ghana holds a central role in food production, particularly in urban centers such as Accra, Kumasi, and Tamale. Given that more than 50% of the Ghanaian population resides in urban areas (Ghana Statistical Service, 2021), food security has emerged as a prominent concern in urban centers. There is evidence that urban agriculture in Ghana plays an important role in household food access enhancement, income generation, and urban greening (Obuobie et al., 2006; Kennard & Bamford, 2020). Yet, the sector is sidestepped in urban planning and policy discussions in spite of its role in the attainment of Sustainable Development Goals (SDGs), such as SDG 2 (Zero Hunger), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action) (UN-Habitat, 2020). Urban farming is often viewed as informal or temporary, with little institutional support, policy integration, or infrastructural provision. Land insecurity, water scarcity, waste contamination, and weak regulatory frameworks hinder the scale and impact of urban agriculture across cities (Obuobie et al., 2006 & Pillai, 2021). Research on how urban agriculture contributes directly to household food security and sustainable urban development in Ghana remains limited and fragmented. There is therefore a critical need to assess the impact of urban agriculture on food security and sustainability in Ghanaian urban settings to inform evidence-based urban policies that align with national development strategies and the Sustainable Development Goals (SDGs). This paper evaluates the effects of urban agriculture on food security and sustainability in Ghanaian urban cities.

1. **Literature Review**
	1. **Overview of Urban Agriculture in Ghana**

Urban agriculture in Ghana has emerged as a livelihood and food security strategy in the face of urbanization, food price inflation, and poverty (Akparibo et al. 2021). It involves crop cultivation and animal rearing in and around cities and towns, typically linked to informal livelihoods (Naazie et al., 2024). Practiced in city locations like Accra, Kumasi, Tamale, and Wa, urban agriculture is key to food, jobs, and sustainability (Bellwood-Howard et al., 2015). Its development shows a shift from its insignificance to a significant actor in urban food systems (Kuusaana & Eledi, 2015). Obosu-Mensah (2002) notes that the official attitude of Ghana towards urban agriculture was initially doubtful due to sanitation issues. However, with the recognition of its benefits, there has been increased institutional support.

Urban agriculture involves irrigated vegetable production, home gardening, and farming in open spaces (Obuobie et al., 2006). In Ghana, it heavily involves waste recycling, particularly wastewater for irrigation, with environmental health and productivity implications (Cofie et al., 2003). Literature, such as that of Bannor et al. (2021) and Ayerakwa (2017), identifies household food security as the most important role of urban agriculture. Bannor et al. (2021) showed that it improved household food security in Ghana and India. Ayerakwa (2017) found that urban households combining both urban and rural agriculture had better food security compared to households depending on one source. This strategy highlights the significance of rural-urban connections in Ghanaian food systems.

Bannor et al. (2022) also confirmed that urban agriculture has the potential to reduce poverty through boosting household incomes. Adeoti et al. (2012) and Adeoti et al. (2011) also highlight the significant roles played by women in Ghana's urban agriculture, despite the constraints they encounter in accessing land and credit. Anaafo and Akolgo (2018) state that urban agriculture has the potential to counter the effects of climate change through improving microclimates and reducing floods through more vegetation. In Bolgatanga, Kuusaana et al. (2022) alert that rapid urbanization endangers agriculture through the loss of agricultural lands and advocate for policy measures to protect them.

* 1. **Food Security and Sustainability**

Urban farming is significant to food security and sustainability in Ghanaian cities amidst urbanization, climate change, and inequality (Dinko, 2017). Food security implies that everyone has stable access to sufficient, safe, and healthy food (FAO, 2008). Urban farming is at the heart of improving food availability, access, and utilization within urban regions (FAO, 2023 & Mwaijande, 2024). Bannor et al. (2021) discovered that urban agriculture enhances food security in urban families, as indicated by the Household Food Insecurity Access Scale (HFIAS). Hird (2022) adds that it enhances the accessibility of fresh food and promotes sustainable urban development through greening spaces. Khan et al. (2024) argue that urban farming has the potential to enhance malnutrition and food insecurity through the production of varied nutrient-rich foods. Vegetable cultivation is key for complementary market food in urban areas like Accra, Tamale, and Bolgatanga (Obuobie et al., 2006; Kuusaana et al., 2022). Sustainability of urban agriculture has environmental, economic, and social facets (Pearson et al., 2010). It is ecologically sustainable in the sense that it recycles waste and uses unutilized land; economically, it creates jobs and extra incomes for the urban poor (Drechsel & Kerait, 2014; Bannor et al., 2022). Socially, it builds cohesion among individuals, particularly through established groups (Adeoti et al., 2012; Adeoti et al., 2011).

* 1. **The Effects of Urban Agriculture on Food Security**

***Food Availability and Access:*** Urban farming raises the level of food availability in urban centers by enabling individuals to grow food within convenient access. This is vital in Ghana due to the fact that urbanization and population growth exert pressure on food supply. Mensah Ayerakwa et al. (2020) looked at urban agriculture in Techiman and Tamale and concluded that the households that practiced both urban and rural food production were more food secure than those who did not practice agriculture. Drechsel and Dongus (2010) identified that urban agriculture improves food security in sub-Saharan Africa as it supplies fresh vegetables and lowers the cost of food, especially among poor urban residents. Obuobie et al. (2006) noted that urban agriculture, and more especially vegetable farming, is a significant factor in maintaining the feeding of cities like Accra and Kumasi, with a high demand for fresh produce. Obuobie et al. (2006) indicated that the majority of urban vegetables in Ghana's big cities are locally produced, typically irrigated with wastewater. This local food system decreases the reliance on rural supply chains that are vulnerable to fuel costs, road infrastructure, and climatic conditions. Nearness of urban farms to consumers shortens supply chains, decreases transportation cost, and lessens post-harvest loss (Hird, 2022; Khan et al., 2024). This improves the availability of food, stabilizes local markets, and boosts urban food sovereignty.

***Dietary Diversity and Nutrition:*** Urban agriculture enhances diets by providing poor households with fresh, nutrient-dense foods (Global Panel, 2017, & Chege et al., 2021). In Ghana, local-level vegetable and legume production cuts down on nutritional shortages in staple-dependent urban settings that are carbohydrate-dense. Marzban et al. (2024) state that urban agriculture enhances "nutritional stability" by making fresh vegetables and fruits available throughout the year. Households in Accra and Kumasi that keep backyard and container gardens have more varied meals (Obosu-Mensah, 2002; Adeoti et al., 2012), which is essential for children and pregnant women who need varied nutrients. Khan et al. (2024) attest that vegetable-predominant urban agriculture diets reduce malnutrition and enhance health. Drechsel and Keraita (2014) found that in northern Ghana, having fresh vegetables available increased vitamin intake in farming households as opposed to non-farming households. Women-led urban farms are focused on domestic nutrition, and subsistence takes precedence over selling (Adeoti et al., 2011). Urban farming enhances food quality, quantity, and health effects.

***Household Income:*** Urban agriculture improves food security by way of household buying power (World Bank, 2020). Urban farmers typically market produce either for household use or reinvestment into farming (Maseko, 2024). Bannor et al. (2022) measured this using the Household Commercialization Index and poverty models. Commercialization of urban agriculture decreased household-level poverty substantially, as farm sale proceeds were utilized in buying different foods, payment of school fees, or accessing healthcare. This indirect pathway augments food availability through enhanced financial resilience. In Accra, Adeoti et al. (2012) and Tornyie (2011) found that urban agriculture, particularly by women, raises their incomes and purchasing power of food in off-seasons. It is common among informal sector employees whose employment is precarious and whose incomes are unpredictable. Kuusaana et al. (2022) state that Bolgatanga urban agriculture is a source of livelihood for landless youth and women, enhancing the livelihood of a region with few formal opportunities.

***Resilience During Crises:*** Urban agriculture is a key response during economic shock, pandemics, and climate crises (Dubbeling et al., 2019). For example, income drops and increased food insecurity were observed among some Ghanaian households during the COVID-19 lockdowns and supply chain interruptions. Asravor and Kwakwa (2024) reported a drastic decline in food security levels among Accra households, as the majority of households moved from high to very low food security. Urban agriculture, nonetheless, enabled some households to be stable because of food items produced within the home. Ayerakwa (2017) explained that urban agriculture helps buffer against price inflation, and households can still eat even if prices increase in the market. Against the backdrop of rising fuel costs, poor roads, and food shortages, urban agriculture consolidates the urban food supply. Anaafo and Akolgo (2017) and Cofie et al. (2003) cite its role in fostering climate resilience by localized production, particularly in flood zones or densely populated areas.

* 1. **The Effect of Urban Agriculture on Sustainability**

Urban agriculture not only contributes to food security but also supports broader dimensions of sustainability, environmental, economic, and social, especially in rapidly urbanizing Ghanaian cities (Tuffour, 2024). As Ghana experiences unplanned urban expansion, rising food demand, and climate vulnerability, urban agriculture has emerged as a multifunctional practice capable of promoting sustainable urban development (Owusu, 2024).

***Environmental Sustainability:*** Urban agriculture helps achieve environmental sustainability in several ways, including efficient use of land, increasing green areas, recycling urban wastes, and minimizing the environmental footprint of food systems (Ebissa et al., 2024). Urban farmers favor growing crops on marginal or idle land, including road medians, floodplains, and peri-urban areas, thereby making use of a minimum of land resources (Kuusaana et al., 2022; Anaafo & Akolgo, 2018). The other major environmental benefit of urban agriculture in Accra and Kumasi cities is the recycling of wastewater for irrigation. Although the activity poses public health concerns (Drechsel & Keraita, 2014), it promotes year-round farming, conserves freshwater resources, and enables nutrient recycling. As Obuobie et al. (2006) observe, urban vegetable production in Ghana using wastewater provides an affordable and available source of irrigation, boosting yields of crops in water-scarce urban areas. Urban agriculture reduces greenhouse gas emissions caused by shorter food supply chains and local food consumption (Hird, 2022; Khan et al., 2024). When incorporated into green infrastructure, for example, roof gardens or vertical farms, urban agriculture is also able to counter the urban heat island effect and enhance microclimates in cities, and play a role in climate change adaptation and mitigation.

***Economic Sustainability:*** Urban agriculture is a significant contributor to local economic development in Ghanaian cities. By providing income-generating opportunities, especially for informal workers, women, and youth, urban agriculture strengthens urban livelihoods and reduces poverty (Haug, 2014). According to Bannor et al. (2022), the commercialization of urban farming positively impacts household income and has the potential to lift families out of poverty.In Accra and Bolgatanga, urban farming activities, ranging from backyard gardens to small-scale commercial vegetable plots, serve as essential livelihood strategies, particularly for populations with limited access to formal employment (Kuusaana et al., 2022; Adeoti et al., 2011). Urban farmers sell their surplus produce in local markets, using the income to support food purchases, pay school fees, and invest in farm inputs, thereby reinforcing local economic resilience. Urban agriculture helps stabilize urban food prices by supplementing city food supplies, which is particularly critical during disruptions caused by fuel shortages, supply chain failures, or inflation (Maxwell et al., 2000).

***Sustainable Development Goals (SDGs):*** According to the United Nations (2015),urban agriculture aligns with several Sustainable Development Goals (SDGs), including:

* **SDG 2 (Zero Hunger)** – By improving local food production and reducing malnutrition.
* **SDG 11 (Sustainable Cities and Communities)** – By creating greener, more inclusive, and food-secure cities (United Nations Environment Programme, 2021).
* **SDG 13 (Climate Action)** – Through its role in adaptation and mitigation strategies (Agritecture, 2021).

In Ghana, the integration of urban agriculture into urban sustainability strategies can help achieve these targets, particularly if challenges related to water quality, land use conflict, and institutional neglect are adequately addressed (Tuffour, 2024). Urban agriculture represents a promising path toward sustainable urban development. It simultaneously addresses food insecurity, promotes environmental health, stimulates local economies, and fosters community resilience. However, realizing its full potential requires integrated urban planning, secure land tenure, and targeted policy interventions that institutionalize urban agriculture as a legitimate and supported element of sustainable city systems (Salleh, 2020).

1. **Methodology**

A rigorous systematic literature review was employed to analyze peer-reviewed articles, books, and credible reports concerning the effects of urban agriculture on food security and sustainability in Ghanaian urban cities. Systematic review is a comprehensive, transparent method of identifying, evaluating, and synthesizing all relevant studies on a specific research question, using clearly defined methods and criteria (Higgins & Green, 2021). The review prioritized studies published between 2000 and 2024, focusing on empirical data, theoretical insights, and governance considerations. This comprehensive approach ensured an inclusive understanding of the multifaceted roles of urban agriculture on food security and sustainability in Ghanaian urban cities.

The review was conducted using a systematic and stringent process in an attempt to traverse extensive and multifaceted literature on the subject, as shown in Figure 1. Literature searching was performed against electronic databases including PubMed, Scopus, Web of Science, Science Direct, and Google Scholar. The keywords used were variations on the words "effects," "Urban Agriculture," "Food Security and Sustainability," and ‘’Ghanaian Urban Cities. The search was conducted only for English-language publications. Irrelevant studies, opinion pieces, and duplications were excluded. Relevant information from the selected studies was extracted, including principal findings, research design, and theoretical frameworks utilized. The data was synthesized thematically to identify emergent themes, patterns, and trends in the literature.

Thematic analysis was conducted to extract recurring patterns and categorize them into twelve core domains: Food Availability and Access, Dietary Diversity and Nutrition, Household Income, Resilience During Crises, Environmental Sustainability, Economic Sustainability, and Sustainable Development Goals. The implications of the literature reviewed were analyzed and interpreted to understand holistically the effects of urban agriculture on food security and sustainability in Ghanaian urban cities. The review's limitations were determined, including possible publication bias, weaknesses inherent in the studies chosen, and the extent of the literature search. The weaknesses were taken into account in the interpretation of the results. The paper concluded by recapitulating the principal findings from the literature reviewed, distilling the most prominent findings and implications. The reference list was given in the appropriate citation format to recognize the authors of the literature reviewed.

**Figure 1: PRISMA Flow Chart of Study Selection Process**

**Source: Authors’ Construct**

**3.1 Contextual Focus on Ghana**

Urban agriculture has become increasingly significant in Ghana’s rapidly urbanizing environment, particularly as the nation grapples with issues of food insecurity, youth unemployment, and unsustainable urban development. Ghana’s urban population is growing at an annual rate of approximately 3.3%, with over 56% of the population currently residing in urban areas (Ghana Statistical Service, 2021). This urban expansion often leads to pressure on food systems, land, water, and infrastructure, necessitating innovative strategies like urban agriculture to supplement food supply and enhance urban resilience.

Historically, urban agriculture in Ghana has been practiced in cities such as Accra, Kumasi, Tamale, and Sekondi-Takoradi, where it plays a vital role in supporting household livelihoods and improving food access (Bonye et al., 2021). Figure 2 shows the map of Ghana, showing the major cities. In Accra alone, over 60% of the vegetables consumed in the city are produced within the city limits (Hird, 2022). These farming activities are often integrated into the urban fabric, along drains, in open spaces, and on undeveloped plots, and are characterized by both informal and semi-formal production systems (Abdulkadir, 2012).

Urban agriculture contributes significantly to urban food security in Ghana by increasing the availability and accessibility of fresh produce, particularly for low-income populations (Obuobie et al., 2006). Amid high inflation and economic instability, particularly following the COVID-19 pandemic and recent global food price shocks, urban agriculture has emerged as a coping mechanism for urban dwellers facing rising food costs and unemployment (Suh et al., 2023). The Food and Agriculture Organization (Erwin, 2022) noted that urban and peri-urban agriculture in Ghana helps reduce household food expenditure and enhances dietary diversity among participating families.

Despite these benefits, the practice faces numerous challenges, including land tenure insecurity, lack of institutional support, and environmental concerns such as contamination from wastewater used for irrigation (Amoah et al., 2007; Asomani-Boateng, 2002). Urban planning frameworks in Ghana have not sufficiently mainstreamed urban agriculture, often viewing it as a transitional land use that must give way to formal development (Owusu & Afutu-Kotey, 2010). This marginalization limits its scalability and sustainability.

Nevertheless, recent policy interest is growing. The Government of Ghana, through programs like Planting for Food and Jobs (PFJ), has acknowledged the role of agriculture, including urban and peri-urban farming, in enhancing food self-sufficiency (MoFA, 2021). Initiatives by local governments and NGOs, particularly in cities like Tamale and Accra, are increasingly incorporating urban agriculture into urban development strategies as a tool for climate adaptation, job creation, and social inclusion (Boatemaa et al., 2020). Given Ghana’s unique socio-economic and spatial dynamics, evaluating the effects of urban agriculture within its urban centers provides valuable insights into how urban agriculture can be harnessed to strengthen food security and support sustainable urbanization in sub-Saharan Africa.



**Figure 2: Map of Study Area**

Source: Authors’ Construct

1. **Analysis and Results**

Tables 1 and 2 summarize the themes of Food Availability and Access, Dietary Diversity and Nutrition, Household Income, Resilience During Crises, Dependence on Market Purchases, Environmental Sustainability, Economic Sustainability, and Sustainable Development Goals, with relevant articles organized under each theme. Each entry is summarized to provide key insights relevant to the effects of urban agriculture on food security and sustainability in Ghanaian urban cities.

**4.1 The Effects of Urban Agriculture on Food Security**

**Table 1: Food Availability and Access**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author(s)** | **Year** | **Objectives** | **Methodology** | **Key Findings** | **Relevance** |
| Drechsel & Dongus | 2010 | Benefits of urban agriculture in SSA | Literature review | Urban farming lowers costs and boosts access | Highlights urban agriculture in SSA urban food systems |
| Hird | 2022 | Benefits of peri-urban agriculture | Descriptive policy brief | Urban agriculture reduces transport costs and losses | Promotes local markets and food affordability |
| Khan et al. | 2024 | Urban agriculture’s role in food security and sustainability | Review article | Stabilizes urban markets, enhances local sovereignty | Provides broader evidence for urban agriculture |
| Mensah Ayerakwa et al. | 2020 | Role of urban/rural agriculture in household food security | Household surveys | Urban + Rural farming enhances food security | Shows urban agriculture’s role in food access in Ghana |
| Obuobie et al. | 2006 | Impact of irrigated vegetable farming in Ghana | Field data from Accra/Kumasi | Locally grown vegetables sustain the urban food supply | Emphasizes urban agriculture’s food role in large Ghanaian cities |

Source: Authors’ Construct

**Table 2: Dietary Diversity and Nutrition**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author(s)** | **Year** | **Objectives** | **Methodology** | **Key Findings** | **Relevance** |
| Adeoti et al. | 2012 | Gender and nutrition benefits of urban farming | Mixed methods | Women-led urban agriculture improves children’s diet | Gender-inclusive policy justification |
| Chege et al. | 2021 | Factors influencing nutritious food intake among the urban poor | Urban survey | Vegetable farming improves nutritional diversity | Demonstrates urban agriculture’s nutritional value |
| Global Panel | 2017 | Urban nutrition policies | Policy brief | Urban farming supports fresh, diverse diets | Underlines the nutritional value of urban agriculture among the urban poor |
| Marzban et al. | 2024 | Impact of urban agriculture on year-round nutrition | Narrative review | Urban agriculture supports seasonal stability in fresh produce availability. | Strong policy reasons to support urban agriculture |
| Obosu-Mensah | 2002 | Practices of urban cultivation in Accra | Qualitative study | Backyard gardening diversifies meals | Local evidence of diet benefit |

Source: Authors’ Construct

**Table 3: Household Income**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author(s)** | **Year** | **Objectives** | **Methodology** | **Key Findings** | **Relevance** |
| Adeoti et al. | 2012 | Gender and income benefits from urban agriculture | Mixed methods | Women use urban agriculture to sustain household food and income | Urban agriculture supports gendered income generation |
| Bannor et al. | 2022 | Impact of urban agriculture market participation on poverty | Econometric modeling | Urban agriculture commercialization reduces poverty | Validates urban agriculture for poverty alleviation |
| Kuusaana et al. | 2022 | Livelihood role for landless youth and women | Case study in Bolgatanga | Urban agriculture fills the gap in formal employment | Tool for socioeconomic inclusion |
| Maseko | 2024 | Subsistence use of urban spaces | Urban case study | Informal farmers support livelihoods | Reinforces UA in informal employment |
| Tornyie | 2011 | Integration of urban agriculture into sustainable city development | Urban planning case study | Urban agriculture stabilizes incomes in the off-seasons | Urban agriculture supports development planning |
| World Bank | 2020 | Economic benefits of urban agriculture in four cities | Case study | Farming revenue increases food purchasing power | Economic dimension of food security |

Source: Authors’ Construct

**Table 4: Resilience During Crises**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author(s)** | **Year** | **Objectives** | **Methodology** | **Key Findings** | **Relevance** |
| Asravor & Kwakwa | 2024 | Food insecurity pre- and post-COVID lockdown in Ghana | Household survey | Urban agriculture helped mitigate food insecurity during the pandemic | Urban agriculture cushions economic shocks |
| Ayerakwa | 2017 | Urban agriculture’s role during inflation | Urban household study | Urban agriculture helps buffer price shocks | Proves urban agriculture’s inflation resilience |
| Anaafo & Akolgo | 2017 | Climate resilience of urban agriculture | Field and literature review | Urban farming reduces vulnerabilities in flood-prone areas | Builds long-term adaptive capacity |
| Cofie et al. | 2003 | Urban agriculture and environmental sanitation | Review and conference study | Urban agriculture can contribute to resilient urban ecosystems | Connects urban agriculture to sustainable city planning |
| Dubbeling et al. | 2019 | Urban agriculture as a climate change and disaster risk strategy | Field analysis | Urban agriculture provides food during crises and boosts resilience | Important for disaster recovery and adaptation |

Source: Authors’ Construct

**4.2 The Effect of Urban Agriculture on Sustainability**

**Table 5: Environmental Sustainability**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author(s)** | **Year** | **Objectives** | **Methodology** | **Key Findings** | **Relevance** |
| Anaafo & Akolgo | 2018 | Mitigation/adaptation role of urban agriculture  | Review and field analysis | Reduces ecological pressures and supports local food systems | Urban agriculture as a climate strategy |
| Drechsel & Keraita | 2014 | Wastewater irrigation risks and benefits | Risk-based review | Enables year-round farming, conserves water | Key for urban water conservation |
| Ebissa et al. | 2024 | Environmental impact of urban agriculture | Urban case evaluations | Urban agriculture increases green cover and recycles waste | Links urban agriculture to ecological sustainability |
| Hird | 2022 | Peri-urban farming and carbon emissions | Descriptive brief | Shorter supply chains reduce GHG emissions | Urban agriculture in the mitigation policy |
| Kuusaana et al. | 2022 | Resource-efficient farming in Bolgatanga | Case study | Uses marginal lands and recycled water for farming | Demonstrates circular economy principles |
| Obuobie et al. | 2006 | Irrigation practices and outputs | Field study | Wastewater use boosts yield and nutrient cycling | Efficient resource reuse |

Source: Authors’ Construct

**Table 6: Economic Sustainability**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author(s)** | **Year** | **Objectives** | **Methodology** | **Key Findings** | **Relevance** |
| Adeoti et al. | 2011 | Income and food stability via gendered urban agriculture  | Mixed methods | Women use urban agriculture to generate income and supplement food | Dual benefit for nutrition and economy |
| Bannor et al. | 2022 | Commercialization and poverty reduction | Econometric analysis | Increases income and reduces poverty | Urban agriculture’s role in poverty alleviation |
| Haug | 2014 | Urban agriculture's role in the urban informal economy | Policy review | Provides income to informal workers, especially women | Urban agriculture as an economic stabilizer |
| Kuusaana et al. | 2022 | Economic value of urban farming in Northern Ghana | Field study | Urban agriculture as a livelihood strategy for marginalized communities | Promotes inclusive growth |
| Maxwell et al. | 2000 | Urban livelihoods and food price stability in Accra | IFPRI study | Urban agriculture helps stabilize food prices | Useful during inflation and market shocks |

Source: Authors’ Construct

**Table 7: Sustainable Development Goals (SDGs)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author(s)** | **Year** | **Objectives** | **Methodology** | **Key Findings** | **Relevance** |
| Agritecture | 2021 | Urban agriculture's connection to multiple SDGs | Thematic review | Urban agriculture addresses food, social, and climate goals simultaneously. | Multisector sustainability solution |
| Salleh | 2020 | Resilience-building through urban agriculture | Theoretical framework | Urban agriculture fosters food security and urban sustainability | Urban agriculture is a resilience and sustainability pathway |
| Tuffour | 2024 | Institutional support for urban agriculture in urbanization | Empirical analysis | Institutional neglect limits urban agriculture’s full potential | Call for policy support and integration |
| United Nations | 2015 | Defining the SDGs globally | Policy declaration | Urban agriculture aligns with SDGs 2, 11, and 13 | Global development alignment |

Source: Authors’ Construct

**4.3 Effects of Urban Agriculture on Food Security**

***Food Availability and Access:*** Urban agriculture improves food availability in cities, as documented in Ghana and sub-Saharan African literature. Mensah Ayerakwa et al. (2020) noted that urban-rural farming households are much more food secure compared to non-farming households. Drechsel and Dongus (2010) confirm that urban agriculture raises the availability of fresh vegetables for poor urban residents in sub-Saharan Africa. Obuobie et al. (2006) support these results, illustrating that vegetable production in Kumasi and Accra addresses high fresh produce demand and lowers dependency on often disrupted rural supply lines. Hird (2022) and Khan et al. (2024) highlight the potential of urban agriculture in shortening supply chains, lowering transport costs, and enhancing post-harvest handling. Hird focuses on the importance of situating farms near consumers, while Khan et al. put this in the perspective of urban sustainability. They supplement one another, corroborating the role of urban agriculture in increasing food supply and access in the cities.

***Dietary Diversity and Nutrition:*** Literature on dietary diversity highlights the health benefits of urban agriculture. The Global Panel (2017) stresses the need for mixed, nutrient-rich diets, as monotonous, high-carbohydrate diets are typical for poor urban households. Chege et al. (2021) provide evidence that vegetable intake is significantly enhanced by urban farming. Marzban et al. (2024) contribute to this argument with "nutritional stability," whereby urban agriculture ensures access to fruits and vegetables year-round, stabilizing diets. Obosu-Mensah (2002) and Adeoti et al. (2012) illustrate that backyard and container gardening in Accra, Ghana, has enriched meal diversity and nutrition, especially in female-headed households. Adeoti et al. argue that women-headed farms prioritize home consumption, which affects the nutrition of the households. Literature agrees and points out that urban agriculture makes a significant contribution to improving the urban population's diet through diversity, quality, and year-round availability.

***Household Income:*** Urban agriculture is a significant source of household income, with certain subtle differences in focus. The World Bank (2020) views it as a means of financial empowerment through reinvestment and food access, prioritizing its contribution to formal urban economies. Maseko (2024) examines urban subsistence farming as a coping mechanism for people with few job options. Bannor et al. (2022) provide quantitative evidence that demonstrates urban farming is a factor that reduces poverty among involved households. Adeoti et al. (2012) determined that women farmers in Accra use urban agriculture revenues for household expenses and food in off-seasons. Tornyie (2011) agrees, demanding the incorporation of urban agriculture into urban planning. Kuusaana et al. (2022) is about Bolgatanga urban agriculture with a focus on its role in landless youth and women's empowerment. Together, the studies illustrate that urban agriculture enhances household income via market participation, savings, and poverty reduction in different socio-economic contexts.

***Resilience During Crises:*** Urban agriculture is particularly important in times of crisis, effectively reducing economic, health, and climate impacts. Dubbeling et al. (2019) outline its role in climate adaptation and disaster risk initiatives. Asravor and Kwakwa (2024) also found that urban agriculture helped some Accra households maintain access to food during the COVID-19 lockdown, despite declining food security levels elsewhere. Ayerakwa (2017) supports this by showing that urban agriculturalist households were more capable of resisting inflation in food prices, using self-production to cushion against price volatility. Anaafo and Akolgo (2017) speak about long-term climate resilience through localized food production to stabilize susceptible urban zones. Cofie et al. (2003) observe that urban agriculture improves sustainability and reinforces household resilience as well as urban stability. These views agree that urban agriculture is not a purely economic or food solution, but a key driver to constructing urban resilience.

**4.4 Effects of Urban Agriculture on Sustainability**

***Environmental Sustainability:*** Environmental sustainability is a key aspect of urban agriculture, according to the literature. Ebissa et al. (2024) describe how urban agriculture enhances green space, waste recycling, and minimizes the environmental impact of urban food systems. Kuusaana et al. (2022) show that urban farmers in Bolgatanga use marginal lands and wastewater for irrigation, which raises the efficiency of resources. Anaafo and Akolgo (2018) view urban agriculture as a tool for climate change mitigation and adaptation, focusing on its role in local food systems and reducing ecological pressure. Drechsel and Keraita (2014) and Obuobie et al. (2006) highlight the public health risks of wastewater irrigation but emphasize its role in year-round farming and nutrient recycling. Hird (2022) notes that peri-urban agriculture curtails greenhouse gas emissions via shorter supply chains and local consumption. Despite some health risk concerns, the literature heavily supports the environmental benefits of urban agriculture with regard to waste management, green infrastructure, and emissions reduction.

***Economic Sustainability:*** The economic sustainability debate foregrounds urban agriculture's informal and formal impacts. Haug (2014) considers it a balancing force in the informal economy, particularly for youths and women with little access to formal employment. Similarly, Kuusaana et al. (2022) highlight urban farming as being essential for marginalized groups in Ghana's savannah regions. Bannor et al. (2022) show that the commercialization of urban agriculture significantly reduces poverty in the household, meaning that it can switch from subsistence to economic activity that can be scaled. Adeoti et al. (2011) link urban agriculture to income and nutrition, especially in female-headed households. Maxwell et al. (2000) situate these findings in Accra's urban economy, where urban agriculture is found to supplement food demand and food price stability. These writings confirm that urban agriculture improves economic resilience and sustainability with good policies and access to markets.

***Sustainable Development Goals (SDGs):*** Urban agriculture is aligned with the UN Sustainable Development Goals (SDGs) both in theory and in practice. The UN report of 2015 identifies some of the areas to which urban agriculture can contribute as Zero Hunger (SDG 2), Sustainable Cities (SDG 11), and Climate Action (SDG 13). Agritecture (2021) presents urban agriculture as a solution for nutrition, environment, and social challenges, facilitating integrated development. Salleh (2020) illustrates urban agriculture's contribution to community resilience and food security, promoting multiple sustainability objectives. Tuffour (2024) speaks of institutional weaknesses that discourage the incorporation of urban agriculture into sustainability policy. He advocates for planning and policy change to integrate urban agriculture into city systems. These sources validate the role of urban agriculture in achieving SDGs and support the consideration of urban agriculture in development policy.

1. **Summary of Findings**

The paper revealed that urban agriculture improves urban food security in Ghana by increasing food availability, dietary diversity, and income earning. Farming households, through container gardens or gardens, had better access to fresh and nutritious food, which translated into higher caloric and micronutrient intake. Studies conducted in Techiman, Tamale, Accra, and Kumasi showed that non-farming households were more food secure than farming households. Urban agriculture also decreased reliance on unpredictable food markets, allowed households to cope with economic shocks like COVID-19 and inflation, and boosted informal employment, especially for women and youth. Urban agriculture increased sustainability by improving green cover, the reuse of resources, and the low carbon footprints of food supplies. It maintained local economies and kept family incomes stable, thus being inclusive of poor, marginalized communities. Urban agriculture has the potential to contribute to global development goals like SDG 2 (Zero Hunger), SDG 11 (Sustainable Cities), and SDG 13 (Climate Action). Yet, it is constrained by a lack of policy support, tenure insecurity of land, water safety concerns, and a lack of integration in urban planning.

1. **Conclusion and Recommendations**

Urban agriculture is critical to food security and sustainability in Ghana's urban areas. It enhances access to fresh vegetables, improves diets, supplements incomes, and creates resilience during emergencies. Urban agriculture alleviates urban food insecurity and environmental problems, fosters greener cities, lowers dependence on imported food, and brings economic and nutritional gains to marginalised individuals. Urban agriculture in Ghana, as much as it plays a role, is hindered by structural problems that limit its prospects, which include inadequate access to land, lack of water quality control, inadequate integration in urban planning, and inadequate policy support.

To fully benefit from urban agriculture, the following recommendations are made:

1. *Integrate Urban Agriculture into Planning*: City councils need to designate and zone areas for urban farming, including rooftops and vacant lots, by amending land use policies to allow agriculture.

2. *Secure Land Tenure for Urban Farmers:* Governments and municipal authorities should grant tenure security to urban farmers, particularly women and youth, to stimulate long-term investment in sustainable practices.

3. *Enhance Water Safety:* To minimize health risks from wastewater use, introduce safe irrigation methods, provide treatment technologies, and educate farmers.

4. *Enable Capacity Development and Finance:* Urban farmers need training in sustainable agriculture, business, and food safety. Poor and informal producers need better access to finance and inputs.

5. *Strengthen Support and Coordination:* A multi-sectoral approach, bringing together the Ministry of Food and Agriculture, local government, health officers, and urban planners, is essential. The creation of urban agriculture departments in metropolitan assemblies can ensure effective implementation.

6. *Raise Awareness and Participation:* Urban residents need to be sensitized to the advantages of urban agriculture via campaigns, school gardens, and community projects to promote local food production.

7. *Monitor and Evaluate Impact: Continuous research and data collection are essential to assess the social, economic, and environmental impacts of urban agriculture, which will inform policymaking.*

Urban farming should be viewed as a long-term component of Ghana's development rather than a temporary solution. With adequate investment and regulation, it can enhance food security, boost economic development, improve ecological health, and strengthen climatic resilience.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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