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Full Length Research Paper

Opportunities and Challenges of Urban Farming in Ethiopia: Evidence from Vegetable Producers in Addis Ababa

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Abstract

In the context of productivity challenges confronting urban residents in developing nations like Ethiopia, a burgeoning trend is emerging whereby individuals are turning towards vegetable cultivation as a strategy to enhance food security. This research endeavor seeks to explore the barriers faced by vegetable growers and the promising prospects for urban agriculture in Addis Ababa, Ethiopia. Employing a blend of qualitative and quantitative methodologies, the study leveraged household surveys, focus group dialogues, interviews, and desk assessments to collect data. The selection of households for participation was executed through probability sampling. Examination of the household survey findings encompassed descriptive statistical analyses along with correlation and regression studies. The impediments associated with urban vegetable cultivation were scrutinized utilizing a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis in conjunction with a Force Field Analysis. The outcomes of the study underscore favorable inclinations among respondents towards vegetable cultivation. Most producers contribute to household food availability, earn supplementary income, and value the sector's accessibility without necessitating substantial financial investments. Nonetheless, notable challenges within vegetable production operations include land access constraints, pest and disease issues, and water scarcities. Correlation assessments unveiled a robust positive link between fertilizer and seed accessibility levels. Furthermore, binary logistic regression models identified certain age and employment groups as being more predisposed to engage in leafy vegetable cultivation compared to other demographics. The study proposes opportunities for expanding existing production capacities, notably through initiatives like household food gardens. Moreover, there exists potential for augmenting community food sovereignty by harnessing local insights on urban vegetable cultivation practices.

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1. INTRODUCTION

Urbanization stands out as one of the most significant forces shaping the twentieth century. Over half of the global population now resides in cities, a figure projected to reach 60 percent by 2030 (Bisaga *et al.,* 2019; WB, 2022). This rapid urbanization exerts considerable pressure on food supplies and urban environments, particularly in swiftly developing cities, leading to the emergence of intricate socioeconomic and demographic challenges (Burak *et al.,* 2017; Ranagalage *et al.,* 2021).

In the fight against urban poverty and food insecurity, numerous developing countries have embraced the adoption of urban agriculture as a strategy (Zezza and Tasciotti, 2010). Urban agriculture involves the cultivation, processing, and distribution of a wide range of goods, including food and non-food products, within urban or peri-urban regions (Mougeot, 2000).It primarily focuses on domestic food production and income generation, crucial for supporting the livelihoods of urban poor populations who allocate a significant portion of their income (60 to 80 percent) to food expenses (Egbuna, 2008; Mahteme and Akalewold, 2020). The potential of UA to enhance urban livelihoods is a topic of concern amid the simultaneous trends of escalating urbanization and urban food insecurity (Davies *et al.,* 2021).

In modern times, Urban Agriculture (UA) has become a pivotal source of household food, particularly in reducing the vulnerability of urban households in African cities (Arku *et al.,* 2012; Davies *et al.,* 2021). While many African governments historically focused on rural agriculture, there is a growing recognition of the importance of urban agriculture. Governments are establishing agencies to manage UA, emphasizing the need for policy and planning interventions to facilitate urban food production and exchange, acknowledging UA's integration into urban food systems (Mougeot, 2000; Alemayehu *et al.,* 2017; White and Hamm, 2017).

Up until approximately two decades ago, participating in agricultural practices within metropolitan settings across much of Africa was prohibited by legislation dating back to the colonial era (Foeken, 2004; Mahteme and Akalewold, 2020). Urban farmers encountered a multitude of obstacles, including land tenure uncertainties, crop and livestock theft, financial limitations, risks of eviction, and crop destruction, as elucidated by Foeken (2004).

In Ethiopia, UA serves as an avenue for urban households to diversify their employment, income, and dietary options while also facilitating the recycling and reuse of urban waste, thereby contributing to sustainable urban development (Amsalu, 2020). The predominant focus of UA activities in the country is on the production of high-value vegetable crops, which play a crucial role in poverty alleviation in Ethiopian towns and cities (Ashebir *et al.,* 2007). Despite its potential, the sector faces challenges

due to insufficient institutional and policy support (Amsalu, 2020).

Urban farmers in Addis Ababa primarily engage in cultivating vegetables for personal consumption and income generation (Yared *et al.,* 2019). According to the Addis Ababa Urban Agriculture and Farmers' Development Commission (AAFUADC) in 2021, the city is home to 106,280 registered urban vegetable producers, supplying approximately 60 percent of the city's vegetable consumption, particularly leafy vegetables (Dejen, 2020). Addis Ababa boasts favorable soil conditions, altitude, and year-round small rivers, which are tributaries of the Akaki River, serving as a vital source of irrigation water for most vegetable growers in the city (Assefa, 2016). Despite these advantages, the true impact of urban vegetable production on the lives of the urban poor in the city has not been comprehensively evaluated.

Research shows that urban vegetable production specifically impacts the livelihoods of urban communities. In Ethiopia, particularly in Addis Ababa, there exists a dearth of comprehensive quantitative and qualitative data both nationally and locally. Consequently, policymakers and development stakeholders lack substantial evidence to comprehend the opportunities and challenges faced by producers in the region. Therefore, empirical evidence from Addis Ababa, the capital city of Ethiopia, is imperative to formulate practical strategies for future interventions aimed at ensuring the sustainable livelihoods of urban vegetable producers.

Furthermore, this research endeavours to lay down the groundwork for prospective inquiries into the topic, positioning it as a notable scholarly contribution. The primary objectives of the study are to pinpoint the critical determinants influencing the outcomes of urban vegetable cultivation and to suggest measures for fostering this practice while tackling prevalent challenges in the studied context. To achieve these aims, the study sets forth two fundamental research inquiries: Firstly, what hurdles are faced in the realm of urban vegetable production within the study area? Secondly, what benefits does urban vegetable farming offer in urban settings like Addis Ababa?

2. MATERIALS AND METHODS

Description of study area

This research was carried out in the Nifas Silk Lafto Sub-city, Addis Ababa, Ethiopia. The sub-city is located at the southwest (Figure 1) edge of Addis Ababa. The climate in the area is cool temperate type (Abraham, 2012). The main rainy season lasts from June to September and accounts for roughly 70 percent of total annual rainfall. The average annual temperature is 17.25 degrees Celsius**.** The main rainy season lasts from June to September and accounts for roughly 70 percent of total annual rainfall. The daily average temperature in the region ranges from 9.90 to 24.60 degrees Celsius, and the average annual rainfall is reported to be 1254 millimetres (Deshu *et al.,* 2021). The average annual

temperature is 17.25 degrees Celsius.

The Little Akaki River, along with its tributaries, runs through the sub-city, through which many smallholder vegetable producers grow a variety of vegetable products (Deshu et al., 2021). UA activities, particularly vegetable production, are common in the study area, including backyard farming, open spaces around houses, and riverside farming (Tewodros, 2007).

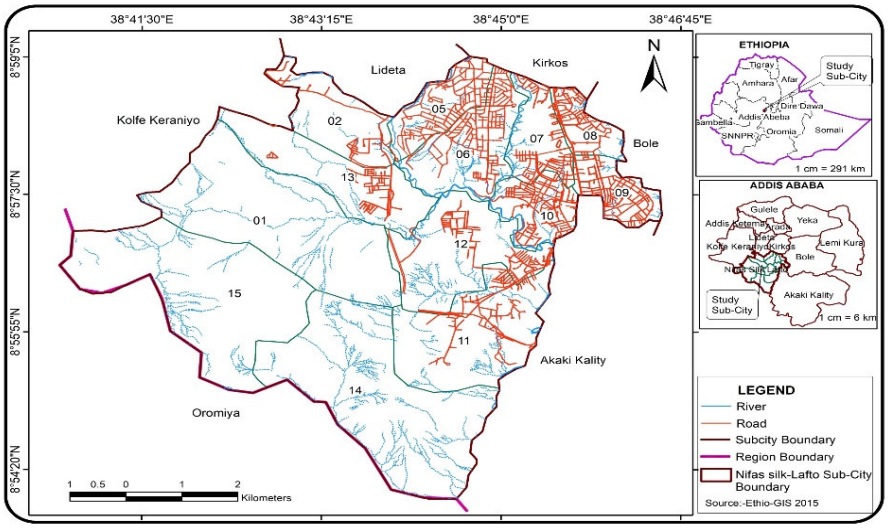


Figure 1: Map of Nifas Silk Lafto sub city, Addis Ababa, Ethiopia (Source: AACA, 2020)

Demographic and socioeconomic characteristics

The 2007 census revealed that Nifas Silk Lafto sub-city constitutes 10.42 percent of the total population of Addis Ababa, positioning it as the seventh most densely populated sub-city in the region. This area is characterized by a high incidence of poverty and a notable deficiency in electricity services, as reported by UN-Habitat in 2008. Residents of Nifas Silk Lafto face challenging living conditions, with poverty levels being a significant concern. The sub-city, situated alongside Bole and Gulelle sub-cities, is witnessing the emergence of informal settlements, often referred to as squatter settlements. These areas are proliferating, serving as a transitional zone between the urban center and the surrounding agricultural regions, highlighting the complex urban-rural dynamics at play in Addis Ababa.

Research design and approach

The research adopts a mixed research approach to address the research questions. This research design combines elements of both qualitative and quantitative research approaches to offer a more comprehensive and nuanced understanding of a central phenomenon. The underlying principle of this methodological approach is grounded in the belief that the integration of qualitative and quantitative approaches yields a more thorough comprehension of the research topics than either approach would achieve independently (Sami, 2016; Md-Shidur, 2017). This integration allows for a richer exploration of the vital phenomenon, providing a more holistic view that captures both the depth and breadth of the research inquiry.

The research adopts a cross-sectional study design to examine urban agriculture, with a

specific emphasis on vegetable production in Addis Ababa. Within the city, urban agriculture activities can be delineated into two primary categories (Abrham, 2012):

Backyard and Core Urban Farming: This category encompasses vegetable cultivation in residential backyards, Utilization of open spaces around houses for farming purposes, Cultivation in low-lying areas within the central areas of the city and farming along riversides situated in the city core.

Peri-Urban Farming: The second category involves agricultural activities in peri-urban areas surrounding Addis Ababa, This includes farming practices in regions transitioning from urban to rural characteristics and Peri-urban farming often reflects a combination of urban and rural agricultural features.

In the study, the first category is designated as urban agriculture because it is predominantly situated within residential areas, offices, and other facilities that may or may not have designated farming spaces. This category includes farming activities in backyards, open spaces around houses, low-lying areas, and along riversides within the city core. The second category is characterized as a peri-urban area, situated away from the city core, consisting mainly of residential houses with relatively larger farming areas compared to the urban setting, as described by Tewodros (2007).

The research primarily concentrates on the first category, namely Urban Agriculture within the city core. The study seeks to explore the opportunities and challenges faced by urban vegetable farmers residing in the urban areas of the Addis Ababa metropolitan area.

2.1 Sampling procedure and sample size

According to the Addis Ababa Urban Agriculture Office, there are thirteen thousand, one hundred ninety-nine vegetable-producing households in the thirteen weredas (the smallest administrative unit in Addis Ababa) of Nifas Silk Lafto Sub-city. Using a simplified formula, the number of sample households was estimated to be around 388, assuming a 95 % level of confidence and a 5 % level of sampling error (Yamane, 1967).

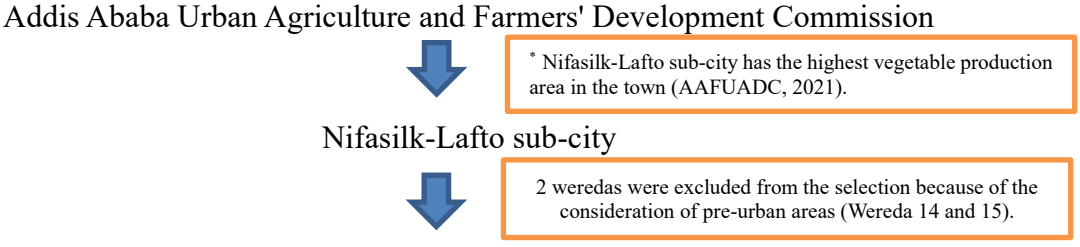
$$n = \frac{N}{1 + N(e)^2}$$

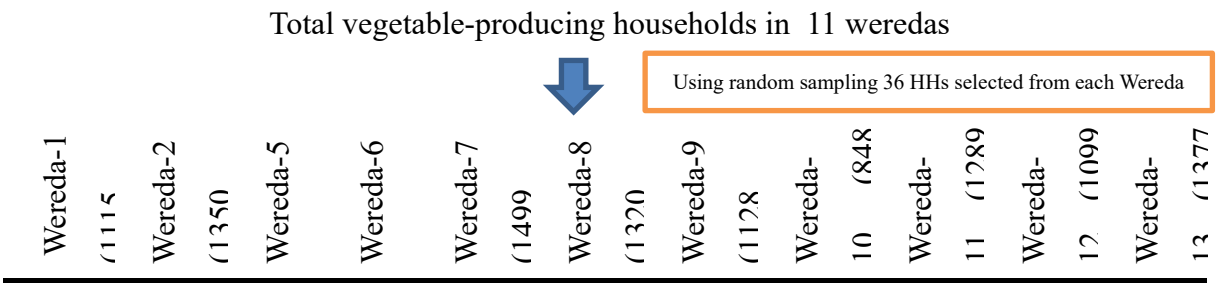
$$n=13,199/1+13,199(0.05)^2$$

$$n=388$$

Where N = stand for number of total vegetable-producing households in the sub-city, n = sample size and e = sample error, respectively.

Sampling technique





Data sources and data collection tools

To collect quantitative and qualitative data for this study, primary and secondary data sources were used. Household survey, interviews, focus group discussions, and field observations were used to collect primary data at the household level from Nifas Silk Lafto in urban vegetable producer areas. An intensive desk review of peer-reviewed journals, conference papers, government records, and research reports was used to collect secondary data from existing sources.

Three hundred eighty-eight vegetable producers participated in household surveys. Quantitative data were gathered through interactions with six experts functioning as urban farming extension officers at the wereda level in the Nifas Silk Lafto Sub-city. Additionally, two focus group discussions were conducted in November 2021, involving two groups of six participants each. These participants, predominantly well-known urban vegetable farmers, were strategically selected from different parts of the study area to contribute diverse perspectives.

Description of variables

The focus of the investigation in this research is vegetable production, covering both the opportunities and challenges inherent in the practices, serving as the dependent variable. Farmers' perceptions suggest that the opportunities associated with vegetable production significantly contribute to the well-being of households.

The study integrates explanatory variables that are anticipated to have an impact on urban vegetable producers, consequently influencing their practices in vegetable production. Drawing insights from a literature review and on-the-ground observations, ten potential explanatory variables were identified and scrutinized for their effects on production. These variables include aspects such as production frequency per year, seed, extension services, farm credit, pests and diseases, fear of eviction, fertilizer, water, unregulated movement of livestock, and theft. The study aims to delve into how these variables shape the dynamics of vegetable production within small urban holdings.

Data analysis

The qualitative data obtained through interviews, focus group discussions and field observations underwent analysis through SWOT (Strengths, Weaknesses, Opportunities, and Threats) and

force field analysis methods. This information was systematically organized, summarized, analyzed, and interpreted to complement and reinforce the findings derived from the survey.

On the other hand, the quantitative method entailed data collection and recording in numerical and/or categorical forms. The quantitative data underwent analysis through descriptive, correlation, and regression analyses to explore the relationships between the study variables and offer a comprehensive description of the prevailing challenges and opportunities faced by vegetable producers in the study area.

SWOT and force field analysis

The utilization of SWOT analysis within the framework of a participatory learning and action (PLA) tool was the initial step in outlining a challenging situation. This method aimed to identify internal strengths and weaknesses within a system, along with external factors that could either be leveraged for positive change (opportunity) or should be guarded against (threat). Various perspectives, including economic, environmental, and social considerations, were considered in examining the advantages, disadvantages, possibilities, and risks associated with the situation. Additionally, the economic and sociological aspects of the primary components of vegetable production in the region were examined.

The definition of key elements stated in the SWOT analysis:

River side: Vegetable production areas located near a river.

Manual weeding: refers to the practice of removing weeds from gardens by hand.

Own labour: refers to the personal effort or work.

Government initiatives: actions, policies, programs, or projects undertaken by a government.

Youth initiatives: refer to projects, programs, or actions led by young people.

Policy bottleneck: refers to a situation in which the development, implementation, or effectiveness of a policy is hindered or slowed down.

Soil infertility: refers to a condition in which the soil lacks essential nutrients.

Technical skill: refer to the specialized knowledge, abilities, and competencies.

Extension services: referred to as agricultural extension services, are programs and activities designed to provide farmers and rural communities with access to information, knowledge, technologies, and resources to improve their agricultural practices, productivity, and overall well-being.

Poverty reduction: refers to efforts and strategies aimed at reducing the extent and severity of poverty, with the ultimate goal of improving the well-being and living standards of individuals and communities.

Solid waste: refers to any discarded, useless, or unwanted material in a solid state.

Job creation: refers to the process of generating

new employment opportunities within an economy or a specific industry.

Provide fresh food: involves ensuring the availability, accessibility, and distribution of nutritious and perishable food items to individuals and communities.

Easily available food: to make nutritious and affordable food accessible to all members of a community.

Save money and time: Making food easily available at home and in the backyard can contribute significantly to saving both money and time.

Unregulated livestock movement: Unregulated animal movements have the potential to influence urban farming.

Land shortage: refers to a situation where the available land is insufficient to meet the demands or needs of a growing population or various competing land uses.

Water shortage: A shortage of sources of water occurs when the available natural water bodies, such as rivers, lakes, reservoirs, or groundwater, are insufficient to meet the demand for water in a particular area.

Land tenure: Land tenure refers to the relationship between individuals, communities, or institutions and the land they occupy, use, or control.

Fear of eviction: refers to the anxiety and apprehension individuals or communities may Experience due to the potential loss of their housing or land.

Theft: Theft, in a legal context, refers to the unlawful taking of someone else's property with the intent to permanently deprive them of it.

Input provision: generally, refers to the supply or provision of inputs needed for a specific process or activity.

Limited awareness: refers to a situation in which individuals, groups, or communities have a lack of knowledge or understanding about a particular topic, issue, or concept.

Pests and diseases: Pests and diseases are significant challenges in various contexts, including agriculture, public health, and ecosystems.

Market availability: refers to the presence and accessibility of a product, service, or resource in the marketplace.

Social interaction: refers to the dynamic exchange between individuals or groups in which they engage in communication, share information, express emotions, and influence each other's behaviour in the time of production.

Force Field Analysis, on the other hand, is a systematic examination of the forces influencing or hindering progress towards a specific goal. This process involves defining the desired state, identifying the factors propelling and hindering progress, and assessing and prioritizing these forces with input from stakeholders (Harry, 1967). Driving forces are those that impact a situation, pushing it in a particular direction and sustaining change, while restraining forces are those acting to hinder or diminish the impact of driving forces.

3. RESULTS AND DISCUSSIONS

Benefits from vegetable production (SWOT and force field analysis)

Ethiopia boasts a diverse array of vegetable crops cultivated across various agro-ecological zones, catering to the livelihoods of both commercial and small-scale farmers who rely on them for income and sustenance. However, the variety of crops is somewhat limited, with production concentrated in specific areas. Urban vegetable production in Ethiopia spans from small-scale cultivation in backyards for personal use to larger-scale production for domestic markets, as noted by Kumilachew *et al.* (2014), Haile (2014), and Nimona (2017).

In the study area, vegetable production is integrated into a mixed farming system, where different crops are grown on the same plot or in rotation with others. Some vegetables are cultivated as sole crops or intercropped with other vegetables or cereals, depending on land availability and crop compatibility (AVRDC, 1990; Erana and Zelalem, 2020). Commonly grown vegetables include tomatoes, beetroot, chard, lettuce, carrots, cabbage, onions, kale, and pepper. This integration contributes significantly to food and nutrition security, as vegetables offer essential vitamins and minerals to supplement staple foods for a balanced diet.

The SWOT analysis findings (Table 1) reflect farmers' perspectives after a discussion where they identified challenges and crucial points. Farmers' perceptions of urban vegetable production situations differ, with the majority highlighting it as a source of income and food for their families.

According to focus group respondents, the production environment is favorable, allowing for two or three cultivation cycles per year. Additionally, a significant number of farmers operate along rivers, ensuring access to irrigation water. Government initiatives and an available labor force further strengthen production. The household heads emphasize market availability as a key advantage in the production process.

Additionally, the farming area in close proximity to the respondents' residences facilitated convenient access to food, resulting in cost and time savings. Nevertheless, the respondents identified challenges in production, especially a shortage of inputs and inadequate extension services. Anticipated future threats included issues such as land scarcity, limited water sources, and the risk of theft. It is emphasized that practitioners or farmers should remain vigilant about the sustainability of their practices by being aware of existing strengths and actively seeking external opportunities. In general, vegetable production emerged as a source of fresh, nutritious, and economical food, aligning with findings from Bolang and Osumanu (2019), Fortes *et al.* (2020), Banchamlak and Akalu (2022), and Bokelmann *et al.* (2022).

Table 1: A summary of major concerns raised in vegetable production (SWOT) analysis

strengths	weaknesses	opportunities	threats
- river side	- policy bottleneck	- poverty reduction	- unregulated livestock movement
- manual weeding	- soil infertility	- market availability	
- available market	- input provision	- solid waste	- land shortage
- own labour	- technical skill	- job creation	- watering sources
- social motivation	- extension services	- social interaction	- input provision
- awareness	- limited awareness	- provide fresh food	- land tenure
-government initiatives	- pests and diseases	- easily available	- pests and diseases
- youth initiatives		- save money and time	- fear of eviction
			- theft

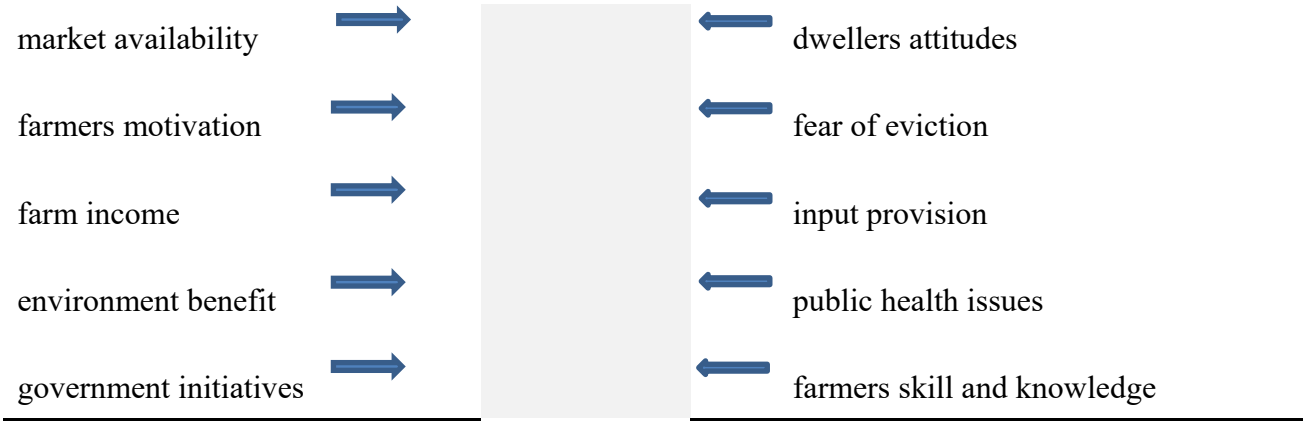
Source: Own survey: November, 2021

In the vegetable production system, various factors contribute to both positive and negative influences. However, the study conducted in the specified area (as indicated in Table 2) reveals numerous opportunities within the domain of vegetable farming. Notably, the primary driving forces in the sector include the availability of a skilled workforce, good environment, the motivation of farmers, and supportive government initiatives. The study underscores that, on the production front, producers find particular eagerness in making food readily available to households, generating additional income, and, particularly, the sector's accessibility without substantial financial investments.

Conversely, the study identifies key barriers impeding the success of urban vegetable production in the investigated area. These obstacles include a lack of inputs, knowledge, and, significantly, the attitudes of producers. The study results align with previous research conducted by Steve *et al.* (2010), Galhena *et al.* (2013), Joosten *et al.* (2015), FAO (2017), and Bokelmann *et al.* (2022), all of whom have highlighted the significance of these factors as hindrances to production activities.

Table 2: Force field analyses showing the driving and hindering forces for the production

Driving Forces			Hindering Forces
food security initiative	→	**Present vegetable production**	← lack of improved farm equipment's
labour availability	→		← limited extension services



Source: Adapted from Lewin, 1951

The data from Table 3 highlights the distribution of extension services among local producers during the production phase. The breakdown of extension services is as follows:

Local Government Agents: Local producers receive the majority of extension services from local government agents, accounting for 72.7 percent of the total services. NGOs (Non-Governmental Organizations): NGOs contribute to extension services, providing 14.9 percent of the support to local producers. Private Agencies: Private agencies play a smaller role, offering 2.1 percent of extension services to local producers during the production process.

In addition to formal extension services, the findings indicate that a substantial portion of producers, specifically 76.3 percent, engage in sharing their experiences with one another regarding vegetable farming processes and practices. This high percentage suggests a strong culture of peer-to-peer knowledge exchange among local producers, emphasizing the importance of informal learning and community collaboration in the context of vegetable farming.

Table 3: Household access to extension services

Items	Frequency	Percent
Government	282	72.7
NGOs	58	14.9
privet sectors	8	2.1
knowledge sharing	296	76.3

Source: Own survey: November, 2021

The results are visually represented in Figure 2, illustrating the perceptions of vegetable producers. A significant 99.2 percent of respondents agree that vegetable production activities contribute to the provision of fresh food for their households. Similarly, 98.5 percent acknowledged it as a source of healthy food. Additionally, 91.0 percent of producers highlighted the environmental benefits of vegetable production, with 87.9 percent noting

its role in reducing household expenses. A substantial percentage (84.5%) recognized its contribution to food security, while 83.5 percent emphasized its provision of low-cost food and 81.1 percent its role in making food easily accessible.

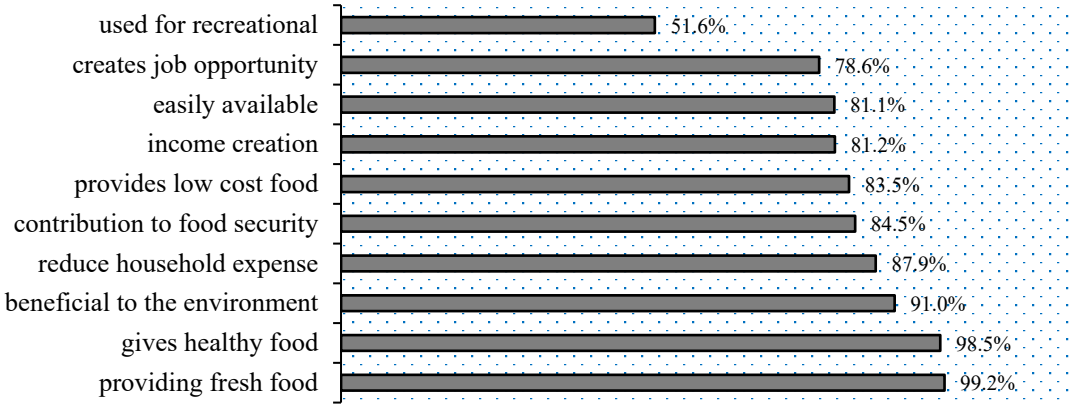


Figure 2: Respondent vegetable production opportunities (multiple replies are possible)

Moreover, 81.2 percent of households affirmed the vital role of urban vegetable production in generating income, and 78.6 percent appreciated its contribution to job opportunities. Additionally, 51.6 percent reported using the activity for recreation. These findings align with research conducted by FAO (2007), Walters and Midden (2018), Martin and Wagner (2018), and FAO (2022), indicating a consistent recognition of the positive impacts of vegetable production on various aspects of household well-being and sustainability.

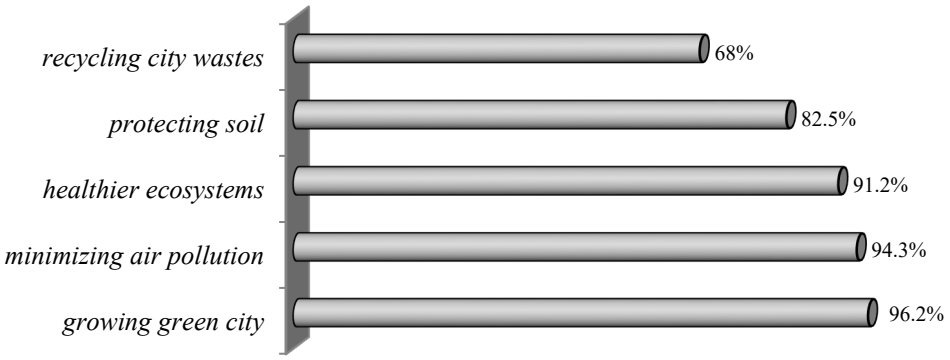


Figure 3: Perceptions of respondents regarding the environmental benefits of vegetable production.

The findings showed in Figure 3 highlight the positive impacts of vegetable production on the city ecosystem. 96.2 percent of the respondents explicitly confirmed and agreed that urban farming contributes to the expansion of green spaces in cities. Furthermore, respondents recognized its role in reducing air pollution (94.3%), promoting healthier ecosystems (91.2%), protecting soil (82.5%), and facilitating the recycling of city waste (68.0%). These results

are in line with previous studies conducted by Heather (2012), Ortolo (2017), Walters and Midden (2018), Aubry and Manouchehri (2019), and Manga *et al.* (2021), which consistently found a significant positive effect of vegetable production on enhancing city environments.

Factors affecting the practices of urban vegetable production

As per Figure 4, a significant majority of respondents (83.0%) have reported facing challenges related to limited access to land. Additionally, 60.1 percent of respondents express concerns about pests and diseases influencing their vegetable farming activities. Other notable challenges include difficulties in accessing water (50.0%), inability to secure farm credit (46.4%), fear of eviction (43.2%), and limited access to seeds (44.1%). Respondents also highlighted additional challenges affecting their vegetable farming, including unregulated livestock movement in cities (32.7%), shortages of fertilizers (31.4%), flooding (29.5%), theft (30.2%), and a lack of extension services (27.5%).

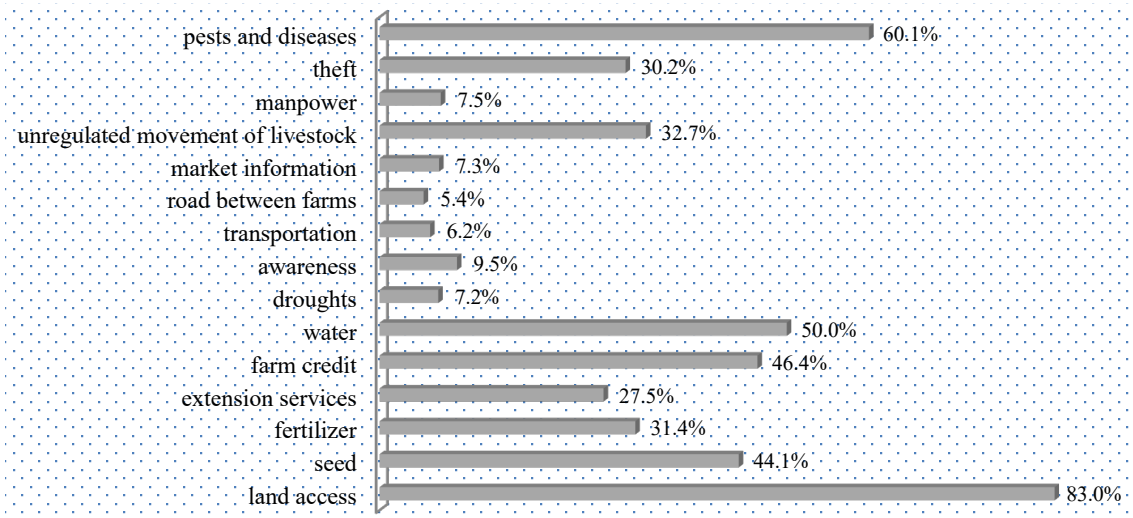


Figure 4: Factors that affect the practices of vegetable production in total HHs

These findings support with the results of Adebayo *et al.* (2018), underscoring the prevalence of these challenges in the context of vegetable farming. Other factors such as awareness, droughts, labor shortages, transportation challenges, poor road conditions between farms, limited market information and linkage, and land infertility were reported to have

relatively minor effects on vegetable farming according to respondents.

Table 4: The correlation of factors that affect the vegetable production (Spearman)

Correlations

			land	seed	fertilizer	farm credit	watering of crops	unregulated	Theft	Pests and diseases	Fear of eviction
Spearman's rho	land	Correlation	1.000								.*
		Sig. (2-tailed)	.								
	seed	Correlation	.393**	1.000							.
		Sig. (2-tailed)	.000	.							
	fertilizer	Correlation	.327**	.654**	1.000						
		Sig. (2-tailed)	.000	.000	.						
	farm credit	Correlation	-.008	-.060	.096	1.000					
		Sig. (2-tailed)	.874	.238	.059	.					
	watering of crops	Correlation	-.204**	-.346**	-.244**	.212**	1.000				
		Sig. (2-tailed)	.000	.000	.000	.000	.				
	Unregu. Move. of livestock	Correlation	-.245**	-.473**	-.334**	.262**	.380**	1.000			
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.		
	Theft	Correlation	.101*	.325**	.338**	.024	-.228**	-.116*	1.000		
		Sig. (2-tailed)	.048	.000	.000	.639	.000	.022	.		
	Pests and diseases	Correlation	.075	.108*	.115*	.157**	-.148**	-.029	.346**	1.000	
		Sig. (2-tailed)	.139	.033	.024	.002	.003	.564	.000	.	
	Fear of eviction	Correlation	.232**	.318**	.400**	-.039	-.267**	-.240**	.287**	.154**	1.000
		Sig. (2-tailed)	.000	.000	.000	.450	.000	.000	.000	.002	.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

In Table 4, Spearman's correlations were conducted to explore the relationships between the level of fertilizer and seed access in terms of factors affecting vegetable production. The analysis revealed a strong positive correlation (r =0.65) between the level of fertilizer and seed access. Importantly, this correlation was statistically significant (p<0.000), indicating a robust association between the two variables. Specifically, the r-value (r=0.654) confirmed that the positive correlation observed between fertilizer level and seed access is unlikely to have occurred by chance, further emphasizing the significance of this relationship in influencing vegetable production.

Table 5: Binary logistic regression estimates for determinants of leafy vegetable production in the households

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	2.033	8	.980

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	26.112	6	.000
	Block	26.112	6	.000
	Model	26.112	6	.000

Variables in the Equation

							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
gender	1.898	1.196	2.519	1	.113	6.674	.640	69.579
age	1.338	.527	6.444	1	.011	3.811	1.357	10.708
academic	-.221	.434	.259	1	.611	.802	.342	1.878
marital_status	.947	.533	3.158	1	.076	2.577	.907	7.323

employment	1.310	.447	8.565	1	.003	3.704	1.541	8.905
family_size	.964	.659	2.140	1	.143	2.622	.721	9.536
Constant	-18.745	4.671	16.102	1	.000	.000		

a. Variable(s) entered on step 1: gender, age, academic, marital_status, employment, family_size.

Omnibus Tests of Model Coefficients used to test the model fit. If the model is significant this shows that there is a significant improvement in fit as compared to the null model; hence, the model is showing a good fit (Table 5).

The Hosmer and Lemeshow Test is also a test of model test. The Hosmer and Lemeshow statistic indicates a poor fit if the siginifcance value is less than 0.05. Here, the model adequately fits the data. Hence, there are no differences between the observed and predicted model (Table 5).

The odds of the age category with p-value of 0.011 offering leafy vegetable production are 3.811 times higher than those of other categories not offering leafy vegetable production. Confidence Interval (CI): 95% CI of 1.357 to 10.708. This means that we are 95% confident that the true odds ratio falls within the range of 1.357 to 10.708.

The odds of the employment category with p-value 0.003 offering leafy vegetable production are 3.704 times higher than those of other categories not offering leafy vegetable production. Confidence Interval (CI): 95% CI of 1.541 to 8.905. Similar to the first case, this means that we are 95% confident that the true odds ratio falls within the range of 1.541 to 8.905.

For age and employment categories, the odds ratios are greater than 1, suggesting a positive association between these categories and the likelihood of offering leafy vegetable production. The confidence intervals provide a range within which we can reasonably estimate the true odds ratio with 95% confidence. In practical terms, these results imply that households within certain age categories and employment categories are more likely to engage in leafy vegetable production compared to other categories (Table 5).

4. CONCLUSION and

RECOMMENDATIONS

The aim of this research was to explore the opportunities and challenges encountered by urban vegetable producers in Addis Ababa, Ethiopia, shedding light on the importance of vegetable production as a means of livelihood in the area. The results underscore several positive aspects of vegetable farming, such as improved access to fresh and nutritious food, reduced household expenses, contributions to food security, provision of affordable food, and generation of income for households.

Nevertheless, the study also pinpoints various obstacles that impede the optimization of output and desired outcomes in urban vegetable production. These hurdles encompass limited access to pest and disease control, water scarcity, inadequate farm credit, fear of eviction, seed shortages, lack of fertilizers, theft, restricted extension services, and unregulated livestock movement within the city.

In response to these challenges, the study recommends that the Addis Ababa city administration, urban agricultural offices, and other stakeholders play a pivotal role in enhancing opportunities and mitigating constraints for improved urban vegetable production. Proposed strategies include bolstering workforce capacity, advocating for supportive policies by sharing compelling narratives with policymakers and planners, and reinforcing input provision and extension services through collaborative efforts among engaged and efficient stakeholders.

By addressing these challenges and implementing the suggested strategies, there is potential for further advancement of urban vegetable production in Addis Ababa, ultimately benefiting producers in the study area. The study furnishes valuable insights for policymakers, planners, and stakeholders to devise and execute initiatives that bolster and promote the sustainability of urban vegetable production in the region.

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