STUDIA ECOLOGIAE ᴱᵀBIOETHICAE

STUDIA ECOLOGIAE ᴇᴛ BIOETHICAE

Effects of Urban Expansion and Dispossession on Household Food Security and Sustainable Livelihood of Displaced Preurban Farmers in Addis Ababa, Ethiopia

Skutki urbanizacji i związanych z nią wywłaszczeń na bezpieczeństwo żywnościowe gospodarstw domowych oraz sytuację bytową przesiedlonych rolników w Addis Abebie w Etiopii

Kejela Gnamura*, Michael Antwi, Belete Abenet

University of South Africa, South Africa

ORCID KG https://orcid.org/0009-0006-0657-7574; MA https://orcid.org/0000-0003-3896-4502; BA https://orcid.org/0009-0008-7767-9513 •
wabekbonk@gmail.com

Abstract: Urban expansion in Addis Ababa presents significant challenges, particularly for peri-urban farming communities facing displacement. This study investigates the critical link between land grabs, forced displacement, inadequate compensation, and food insecurity in households among displaced preurban farmers in the peripheries of Addis Ababa. Using a mixed-method approach, including the household food security index and the binary logistic regression model, we compare the food security status of displaced and nondisplaced households in the Lemmi Kura subcities of Addis Ababa and the Kura Jidda subcities of Sheger City. The findings demonstrate a substantial decrease in food security among displaced households, with significant reductions in food availability, access, utilisation, and stability. The logistic regression model reveals that displacement status, along with factors such as social capital and land security, significantly influences household food security. Specifically, displaced households had a 93.4% lower likelihood of food security compared to non-displaced households. Furthermore, the logistic regression model revealed that the displacement status (displaced = 1 and non-displaced = 0) had a negative coefficient (-2.717), indicating an inverse relationship between the displacement status and food security. Households that have experienced displacement are significantly less likely to have food security compared to nondisplaced households (p < 0.001). The results underscore the discrepancies between Ethiopia's urbanisation rhetoric and the realities faced by displaced farmers, advocating for policy reforms that align urban growth with food sovereignty and agrarian justice. By comprehensively addressing these issues, policy makers and urban planners can work toward more inclusive and sustainable urban development that preserves food security and livelihoods for vulnerable peri-urban communities.

Keywords: displacement, displaced peri-urban farmers, farmland grab, food security, urbanisation

Streszczenie: Proces urbanizacji wokół Addis Abeby stanowi poważne wyzwanie, szczególnie dla podmiejskich społeczności rolniczych zagrożonych przesiedleniem. Niniejszy artykuł analizuje związek między przejmowaniem ziemi, przymusowymi przesiedleniami, niewystarczającymi odszkodowaniami oraz brakiem bezpieczeństwa żywnościowego w gospodarstwach domowych rolników wysiedlanych z terenów podmiejskich Addis Abeby. Stosując podejście mieszane, w tym wskaźnik bezpieczeństwa żywnościowego gospodarstw domowych oraz binarny model regresji logistycznej, autorzy dokonują porównania bezpieczeństwa żywnościowego przesiedlonych i nieprzesiedlonych gospodarstw domowych na terenach podmiejskich Lemmi Kura na obrzeżach Addis Abeby oraz Kura Jidda na obrzeżach Sheger. Wyniki wskazują

na znaczny spadek bezpieczeństwa żywnościowego wśród przesiedlonych rodzin, przy znacznym zmniejszeniu zasobów żywności, dostępu do niej, a co za tym idzie jej wykorzystania oraz stabilności zaopatrzenia. Model regresji logistycznej ujawnia, że fakt przesiedlenia, w powiązaniu z czynnikami takimi jak kapitał społeczny i bezpieczeństwo nieruchomości, znacząco wpływa na bezpieczeństwo żywnościowe gospodarstw domowych. Konkretnie, w przypadku gospodarstw przesiedlonych, prawdopodobieństwo zapewnienia poziomu bezpieczeństwa żywnościowego było o 93,4% niższe w porównaniu z nieprzesiedlonymi gospodarstwami domowymi. Ponadto model regresji logistycznej wykazał, że status przesiedlenia (przesiedlony = 1 i nieprzesiedlony = 0) miał współczynnik ujemny (-2,717), co wskazuje na odwrotną zależność między statusem przesiedlenia, a bezpieczeństwem żywnościowym. Gospodarstwa domowe, które doświadczyły przesiedlenia, mają znacznie niższe prawdopodobieństwo zapewnienia sobie bezpieczeństwa żywnościowego w porównaniu z gospodarstwami domowymi nieprzesiedlonymi (p < 0,001). Wyniki badań wskazują na istnienie rozbieżności pomiędzy retoryką związaną z procesem urbanizacji w Etiopii, a rzeczywistością, z jaką borykają się przesiedleni rolnicy i stanowi głos na rzecz potrzeby zreformowania polityki urbanizacyjnej, która powinna zmierzać w kierunku dostosowania rozwoju miast do konieczności zapewnienia rolnikom bezpieczeństwa żywnościowego i sprawiedliwości agrarnej. Tylko poprzez kompleksowe podejście do kwestii urbanizacji, decydenci i urbaniści będą mogli działać na rzecz bardziej inkluzywnego i zrównoważonego rozwoju obszarów miejskich, który zapewni bezpieczeństwo żywnościowe i środki do życia społecznościom podmiejskim najbardziej narażonym na negatywne skutki zachodzących zmian.

Introduction

Addis Ababa, Ethiopia's rapidly expanding capital, captures the tension between urban development goals and the rights of agricultural communities. Over the past 30 years, the city's population has more than doubled, exceeding five million residents. Rapid population growth in Addis Ababa over the past thirty years can be attributed to several interrelated factors, including significant internal migration, economic transformation, and policy changes. Addis Ababa, the built-up area in Addis Ababa, has quadrupled from 1990 to 2023, with a notable increase of 224.7% in built-up areas from 1993 to 2023 (Yasin, Iguala, and Gelete 2025; Hailu, Assefa, and Zeleke 2024). Agricultural land has decreased significantly, with a reduction of 15.92% in agricultural land cover over two decades (Ayenachew and Abebe 2024). The urban expansion intensity index indicates that the growth of urban areas is faster than the overall city growth, reflecting a shift from agricultural to urban land use (Hailu, Assefa, and Zeleke 2024). Encroachment on peri-urban farmlands has led to a decline in food production,

contributing to food insecurity in the region (Taye, Teklemariam and Addis 2024).

Urban expansion significantly impacts small-scale farmers, leading to land expropriations and tenure insecurity. This phenomenon is particularly evident in peri-urban areas where urban growth encroaches on agricultural land, displacing farmers and disrupting their livelihoods. Urban expansion has resulted in extensive land expropriations, particularly in cities such as Addis Ababa and Shinshicho, where agricultural land has been converted for housing and infrastructure development (Gnamura, Antwi, and Abenet 2024; Ayenachew and Abebe 2024). Displaced farmers face severe livelihood insecurity, with studies indicating that displaced households are 92.3% less likely to achieve secure livelihoods compared to their non-displaced counterparts (Gnamura, Antwi, and Abenet 2024). The loss of agricultural land leads to economic displacement, forcing farmers to seek alternative income sources, which often exacerbates food insecurity (Tadesse and Baye 2024).

Rapid urbanisation has led to the displacement of indigenous households, with studies indicating that more than 223 families in peri-urban areas have faced significant socioeconomic challenges due to land expropriation (Nyamura and Ngwenya 2024). Protests against the Addis Ababa master plan highlight the community's resistance to displacement, which has been perceived as a threat to its cultural identity and rights (Abate 2023). The commoditisation of farmlands and grazing areas has been a central aspect of urban expansion, undermining existing customary land use practices and traditional values (Debelo and Soboka 2022). The government's approach to land management has often prioritised economic development over the rights of indigenous populations, leading to inadequate compensation and loss of cultural heritage (Bula 2020).

Rapid urban expansion in Ethiopia has created significant tenure insecurity among peri-urban farmers, as their land rights are often undermined by state-controlled land acquisition practices (Teklemariam and Cochrane 2021). There is a pressing need for reforms that prioritise responsible governance of land tenure, ensuring that the rights of local communities are respected and that compensation practices are fair and transparent. Implementing a rights-based approach could help safeguard the interests of affected populations and promote sustainable development (Dabala 2020).

The study had two hypotheses. These were:

- H1: There is a significant difference between the food security status of evicted and non-evicted pre-urban households.
- H2: Urban expansion-induced eviction significantly negatively affects the food security of peri-urban agricultural households.

Furthermore, this study bridges gaps in existing literature by examining how land grabs, forced displacement, and inadequate compensation drive household food insecurity in Addis Ababa. Through mixed-method analysis, it highlights the discrepancies between Ethiopia's urbanisation rhetoric and the realities of displaced farmers, advocating for reforms that align urban growth with food sovereignty and agrarian justice.

2. Materials and Methods

2.1. The study area

The study area focusses on the Lemmi Kura sub-cities of Addis Ababa and the Kura Jidda sub-city of Sheger City of Oromia, Ethiopia, with a particular emphasis on the impacts of urban expansion on local communities. The study covers specific localities within Lemmi Kura (Figure 1), including Woreda 14 (Yeka Abbado), Woreda 2 (Ayat), and Woreda 6 (Bole Arabsa), which have been significantly affected by urbanisation. Kura Jidda Woreda from the Kura Jidda sub city of Sheger city, Oromia region was included for comparative purposes, providing a point of reference from a different administrative region.

2.2. Research design

The research used a mixed-method approach, combining quantitative and qualitative approaches. The researcher has grouped the study samples into "treatment" and "comparison", or the "displaced" and "nondisplaced" groups of farming households. The sample frame is the total list of displaced households from treatment villages and nondisplaced households from comparison villages. The list of households was obtained from the Lemi Kura Sub-city Urban Agriculture and Rehabilitation Office and the Kura Jida Woreda Agriculture Office. A multistage random sampling technique was used to select sample households from both "treatment" and "comparison" villages.

The Taro Yamane formula is a widely recognised method for calculating the sample size in research, particularly when the population size (N) is known. This formula, expressed as

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

helps researchers determine the minimum sample size (n) required to achieve
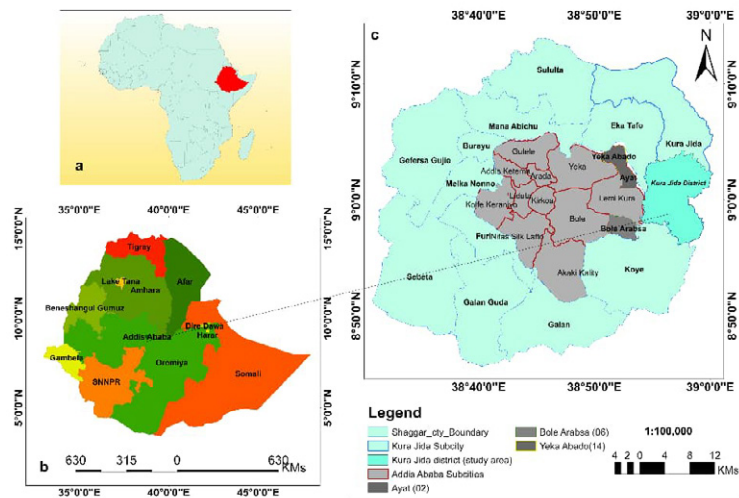
Figure 1. Map of the Study Area, Addis Ababa and Sheger Cities and Sub-Cities

reliable results while considering the margin of error e). The importance of an accurate sample size calculation cannot be overstated, as it directly influences the validity and generalisability of research findings.

Our sample size is calculated from the population size of 415 households receiving direct support, with a margin of error (0.05). Applying the formula, the sample size became n = 415 / (1 + 415(0.05)^2) = 203. To account for potential nonresponses, a 10% contingency was added, bringing the sample size to 223 for the displaced group. An equal sample size was selected for the nondisplaced comparison group, resulting in a total sample of 446 households.

2.3. Data collection

This study employed a mixed methods approach, combining quantitative and qualitative data collection techniques, to comprehensively examine the impacts of urban expansion on peri-urban livelihoods in Ethiopia. The data collection process was meticulously designed to ensure reliability, validity, and triangulation of information from multiple sources.

Quantitative data was collected through structured questionnaires administered to sample households in treatment (displaced) and control (nondisplaced) groups. The questionnaires covered household characteristics related to food security and sustainable livelihood capital outcomes.

Qualitative data was collected through Focus Group Discussions (FGD) and Key Informant Interviews (KII) to complement and triangulate the quantitative data. The FGDs were carried out in Woreda 2, 6, and 14 of the Lammi Kura Sub-City, with different semi-structured questionnaires developed for the displaced and nondisplaced groups.

2.4. Model specification for data analysis

2.4.1. Household Food Security Index (HFSI)

This study quantifies the Household Food Security Index (HFSI) based on the food security pillars, namely food availability, utilisation, access, and stability of food in displaced and non-displaced households before urbanisation. The HFSI was then calculated for each household using the models (2), (3), and (4) described below.

The Sustainable Livelihood Security Index (SLSI) model was adopted for the assessment of household food security. This instrument was also used to examine the disparities between the food security of displaced and non-displaced households.

The Household Food Security Index was established as follows:

$$Zindj = \frac{(Indicator\ j\ -\ Min\ j)}{(Max\ j\ -\ Min\ j)} \quad (2)$$

where Zindj = standard indicator j,

Max j and Min j = Maximum and minimum value of indicator j.

Then, the Household Food Security (HFS) for each indicator for each household was calculated by using the formula given below.

$$HFSj = \frac{\sum Zindj}{N} \quad (3)$$

where, HFSj = Household Food Security for an indicator j , Zindj = summated standardised score of all respondents for an indicator, N = number of households covered in the study. Once the Household Food Security Index for one indicator is constructed, the composite overall "Household Food Security Index (HFSI)" is calculated by using the formula given below.

$$HFSI = \frac{\sum WiHFSj}{\sum Wi} \quad (4)$$

where, HFSI= Household Food Security is the composite index of all food security pillars for the displaced or nondisplaced preurban households.

HFSj = Household Food Security

Wi = sum of the weight of all indicators.

The Household Food Security Index (HFSI), as shown in Table 1, incorporates six variables related to access, availability, utilisation, and stabilisation, representing the core dimensions of household food security.

Pillars of Food Security

Food security is a multifaceted concept that is fundamentally supported by four key pillars: availability, access, utilization, and stability. These pillars collectively ensure that individuals have sufficient, safe, and nutritious food to meet their dietary needs. Availability refers to the physical presence of food in a region, influenced by agricultural production, distribution systems, and trade dynamics. Access involves the economic and physical ability to obtain food, which can be affected by income levels and market conditions. Utilisation concerns the nutritional quality of food and the ability to prepare and consume it safely. Stability refers to the consistency of food availability and access over time, ensuring that food systems are resilient to shocks like economic downturns or natural disasters.

While the four pillars provide a foundational framework for understanding food security, some researchers argue for expanding this framework to include additional dimensions such as food sovereignty and

Table 1. Variables of the Household Food Security Index

Sl. No	Household Food Security Pillars	Response
1	Households able to eat sufficient food throughout the year (Utilization)	(yes=1, no=0)
2	Households eat enough/ adequate kinds of foods throughout the year (Utilization)	(yes=1, no=0)
3	Households eat adequate nutritious foods throughout the year (Utilization)	(yes=1, no=0)
4	Household members have daily meals three times (meal frequency 3 times=1, otherwise= 0) (Access to food)	(yes=1, no=0)
5	Households produce enough food for their family that would be enough throughout a year (Food Availability)	(yes=1, no=0)
6	Afford to buy enough food, if own farm produce is not enough (Access to food)	(yes=1, no=0)
	Total Household Food Security Score	
	Household Food Security Index	
	Dependent variable Category (Household Food Secured=1, if not secured=0). It is converted to dummy variable (1, if HFSi >=median score or Household not Food Secured = 0, if HFSi < median score)	

sustainability, which may better address contemporary challenges in food systems.

2.4.2. Binary logistic regression

The logistic regression model, described in the equation below, was used to examine how various variables influenced the likelihood that farmers were victims of urbanisation.

$$Ln\left(\frac{PX}{(1-PX)}\right) = \beta0 + \beta1X1i + \beta2X2i + \cdots \beta kXki \tag{5}$$

Subscript (i) refers to the (i)-th observation in the sample. (PX) signifies the probability of an event occurring for a given set of observed variables (X1i); (PX) also represents the probability of the household achieving food security (having a secured food) or not, βo denotes the intercept term, while β1, β2, …, βk) are the coefficients of the explanatory variables (X1, X2, … Xu).

Multicollinearity was assessed using the two-collinearity statistics variance inflation factor (VIF) and tolerance values. Finally, the researcher analysed the data using SPSS version 29.

Table 2 shows the explanatory variables that influence the food security of peri-urban farmers. The dependent variable is the probability that the farmer is food secure.

The dependent variables are economic capital secured/not secured and Food security (Food secured/not secured).

3. Results

3.1. Household food security of the displaced and nondisplaced households

The analysis of the Household Food Security Index (HFSI) data for displaced and nondisplaced households reveals significant disparities in food security dimensions, necessitating a deeper examination through an academic lens. The Food Security Index model, which typically encompasses dimensions such as food availability, access, utilisation, and stability, provides a structured framework for understanding these disparities. Figure 2 shows the detailed components of the composite food security index.

As shown in Figure 2, food availability is a critical dimension, reflecting whether households have access to sufficient food throughout the year. The data indicate a stark contrast between displaced and non-displaced households, with displaced households scoring only 0.1256 compared to 0.7982 for their non-displaced counterparts. This disparity suggests that displaced households face substantial challenges in maintaining a consistent food supply, highlighting their vulnerability to food insecurity.

Access to food is another crucial dimension that involves the capacity of households to acquire sufficient food through production or purchase. The ability to afford food when farm produce is insufficient illustrates this dimension. Displaced households scored 0.1076, significantly lower than the 0.7265 score for nondisplaced households. This gap underscores the financial constraints facing displaced households, limiting their ability to secure food through market purchases.

The dimension of utilisation assesses the nutritional adequacy of the food consumed, ensuring that it meets the dietary needs of the household. In this sense, displaced households recorded a score of 0.1211, compared to 0.5202 for non-displaced households. This finding indicates that displaced households do not only lack food quantity, but also nutritional quality, which can have adverse health implications.

Stability, the final dimension, considers the consistency of food availability and access over time. The ability of households to produce enough food for their families throughout the year serves as a proxy for this dimension. Here, displaced households scored 0.1121, in stark contrast to the 0.6996 score for nondisplaced households. The low stability score for displaced households suggests that they are particularly susceptible to fluctuations in food security, further exacerbating their vulnerability.

Table 2. Explanatory Variables and their expected effects

Independent Variables	Description of Variables	Expected effect
X1	Gender of the head of the household (TypeHH) 1= Male, otherwise =0	+ve
X2	categorical age of the respondent (AgeRes) (age between 18-65= 1, otherwise =0	+ve
X3	Family members engaged in continuous productive activities (income-generating activities) (FamSize) continuous	+ve
X4	Literacy rate of wives (LevEdu) (Literate =1, illiterate=0)	+ve
X5	For the dependent variable of Food Security, Economic capital security (secured =1, Non-secured=0) is used as explanatory variable	+ve
X6	Social capital security (secured =1, Non-secured=0)	+ve
X7	Land tenure security (secured/grabbed =1, Non-secured/not grabbed=0)	+ve
X8	Human capital/resources security (secured =1, Non-secured=0)	+ve
X9	Physical capital security (secured/above moderate =1, Non-secured/below moderate=0)	+ve
X10	Infrastructural services security (have better access =1, have no or little access=0)	+ve
X11	ICT Security (have better access =1, have no or little access=0)	+ve
X12	Forced eviction (evicted=1, Non-eviction=0)	-ve
The dependent variable is ln(Px/(1-Px)): Px is the probability that the household is food secured = 1, otherwise=0		

The composite means Household Food Security Index, calculated as a simple average of these dimensions, underscores the general food insecurity faced by displaced households. With a mean score of 0.1166 compared to 0.6807 for non-displaced households, the data vividly portray the precarious situation of displaced households.

The Mann–Whitney U test revealed a significant difference in food security levels between displaced and non-displaced households. Specifically, the U value of 7519, combined with a Wilcoxon W value of 32495, indicates that there is a significant difference between the two groups. The Z value of -13.703 and the p-value of 0.000 (which is less than the commonly used alpha level of 0.05) indicate that the observed difference in food security between evicted and non-evicted households is statistically significant. The effect size was 0.6489, which implies
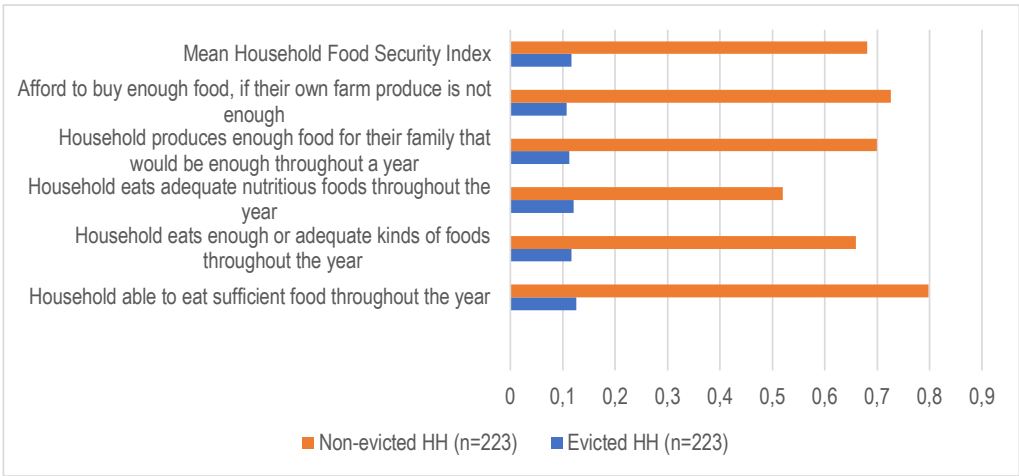

Figure 2. Household Food Security Index of Displaced and Non-displaced Households. *Source*: **Authors' data from the household survey of February-April 2024**

that the effect of eviction on household food security is very high. We have strong evidence to reject the null hypothesis; therefore, the null hypothesis is rejected. The evicted and non-evicted households have different household food security levels.

3.2. Food Security of the Pre- and Post-Displaced Household

Urban expansion and its displacement of peri-urban households have profound implications for food security and access to nutritious diets. This section interprets detailed data on the displaced household food security index in the Lemmi Kura sub-city, Addis Ababa, focusing on various indicators and comparing the "before" and "after" displacement cases. Figure 3 offers a comparative analysis of food security levels before and after displacement.

The above data, shown in Figure 3, reveal a severe decline in food security indicators, including ability to eat enough food throughout the year, access to a variety of adequate foods, and self-sufficiency in food production. Furthermore, affordability to purchase food has become a significant challenge for these households when production is not sufficient. The findings underscore the critical need for policies and interventions to address the food security crisis faced by peri-urban communities displaced by urbanisation. The detailed analysis of each indicator is summarised as follows.

Household ability to eat enough food throughout the year: The mean score after displacement is 0.1256, indicating a severe decrease in households' ability to eat enough food throughout the year. However, before displacement, the mean score was 0.9327, which means that almost all households were able to eat enough food throughout the year.

As regards eating the right types of food throughout the year, the mean score after displacement is 0.1166, reflecting a significant reduction in the variety and adequacy of the foods consumed. On the other hand, before displacement, the mean score was

0.8520, indicating that households had access to a variety of adequate foods.

Number of meals per day: The mean score after displacement is 0.8789 (88% of three meals per day), indicating that while the number of meals per day remains relatively high, it has still decreased. However, the mean score before displacement was 1.00, indicating that households usually had three meals a day.

Access to sufficient healthy and nutritious food throughout the year: The mean score after displacement is 0.0807, highlighting a drastic reduction in access to healthy and nutritious food. However, before displacement, the mean score was 0.8341, indicating that the households had previously had considerable access to nutritious foods.

For the production of enough food for the family, the mean score after the displacement period was 0.1121, indicating a significant decrease in the ability of households to produce enough food, while the mean score before the displacement period was 0.9013, reflecting that households were largely self-sufficient in terms of food production.

Affordability to Buy Enough Food when Own Production is Insufficient: the mean score after displacement is 0.1076, indicating that households struggle to pay for food when their production is insufficient. However, the mean affordability score before displacement was 0.7758, suggesting that households had the financial means to buy food when needed.

The data show a clear contrast in the levels of food security before and after displacement. The mean level of total food security decreased from 0.9288 before displacement to 0.3974 after displacement. This sharp decline underscores the adverse impact of land expropriation on households' ability to secure adequate food. The indicators most affected are access to healthy and nutritious food and the general ability to produce enough food for the family.

The above analysis provides compelling evidence of the significant negative impact
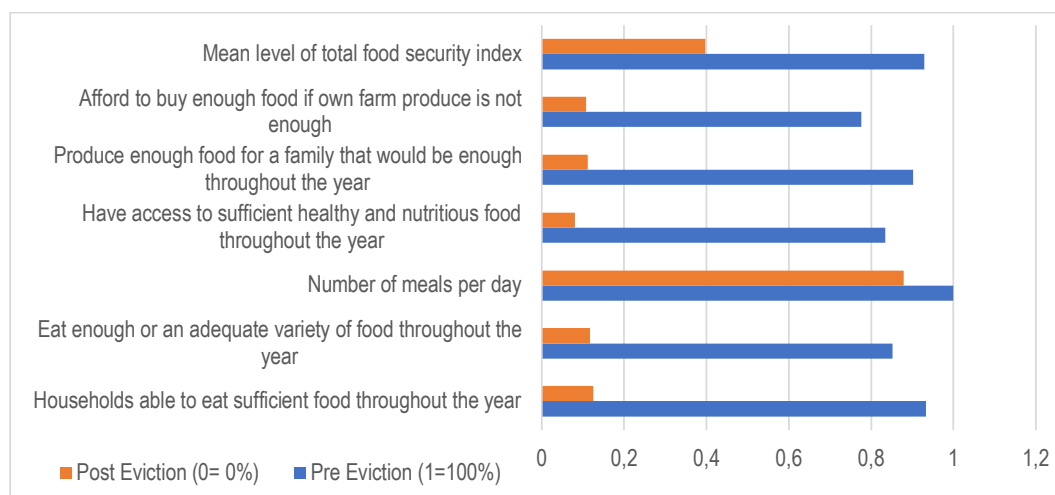
Figure 3. Comparative Food Security Indexes during Pre- and Post-Displacement (Table 2 is replaced by Figure 3). *Source:* **Own survey February 2024**

of eviction on household food security in the Lemmi Kura sub city. The decline in all food security indicators after eviction highlights the need for urgent policy interventions to support displaced families. Strategies to improve access to food, enhance food production capacity, and provide financial support are essential to mitigate the adverse effects of land expropriation on food security.

The data in Figure 3 shows that the loss of agricultural land and assets significantly impacts the food security of displaced households, leading to food insecurity and dependence on market purchases for their food needs.

Historically, the farming communities in the Lemmi Kura sub city of Addis Ababa had the autonomy to choose their food and drink, which allowed them to support others within their community. This self-sufficiency led to a secure food environment. However, the current shift toward purchasing all food items has compromised this food security, putting current food security at risk (KII 5).

Before evictions, the farming communities of the research area were largely self-reliant, even providing mutual assistance when not all members were food secure. Post-eviction, they became dependent on external support,

reflecting a significant change in their ability to support themselves (KII 8).

According to a key informant of this research, several factors contribute to food insecurity in peri-urban areas, such as lack of innovation and subsequent unemployment, loss of agricultural land, loss of assets during evictions, and displacement of livestock due to urbanization. Reduced agricultural land directly decreases food production capacity, jeopardizing food security (KII1).

The ownership of agricultural land is crucial to producing crops that ensure food security. The loss of this land prevents people from guaranteeing their food supply, thereby endangering their livelihoods (KII1). The confiscation of agricultural land has led to a significant loss of livelihood and assets. Without land, individuals cannot raise livestock or grow crops, exacerbating their challenges to economic and food security (KII 4). Evicted households in peri-urban areas are currently facing severe food crises. These crises manifest as unstable access to adequate and healthy food, financial difficulties, and other related challenges (KII 3).

After being displaced from their land, villagers often face unemployment or are forced to work in informal employment.

This transition results in a substantial decrease in income and an increase in malnutrition due to reduced food availability (KII 5). Households that have not been evicted can harvest crops from their land, thus enjoying more reliable food security. In contrast, evicted households face increased food insecurity, lacking the means to produce food (KII 2).

The qualitative insights from focus group discussions and interviews provide a deeper understanding of the lived experiences of evicted households. The loss of self-sufficiency and increased dependence on market purchases for food represent a fundamental shift in livelihood strategies that can have long-lasting impacts on household food security and resilience.

3.3. Level of Household Food Security during the Pre and Post-Displacement

The research employed a survey data collection method, focusing on key indicators of food security, which include adequate quality of meals, healthiness and variety of foods, frequency of meals, food production, and affordability.

The findings of the current research, shown in Figure 4, clearly illustrate a dramatic decline in food security among displaced households after displacement. Before displacement, a substantial majority (80.27%) of the households were food secure, with 66.37% being fully food secure. This changed drastically after displacement, with the mean level of food security falling to 8.07%.

As shown in Figure 4, before displacement, approximately 80.27% of the respondents were at a good or fully food-secure level, meeting all food security indicators. However, after displacement, approximately 79.82% of the respondents fell into the category of severe food insecurity, unable to meet any of the food security indicators.

The substantial decrease in food security after displacement highlights the severe consequences of land expropriation for the livelihoods of households in the Lemmi Kura sub-city. The loss of agricultural land, which was the main source of food production and income, resulted in reduced adequacy of meals, reduced variety and healthiness of food, and a decrease in the frequency of meals.

This study underscores the critical impact of land expropriation on household food security in the Lemmi Kura sub-city. Displacement led to a drastic decline in food security levels, and most households became food insecure. Policymakers must consider the severe implications of such actions for the well-being of affected communities and develop strategies to mitigate these adverse effects. Ensuring access to alternative livelihoods and food sources for displaced households is essential to improve food security and overall well-being.

3.4. Impact of displacement on household food security of pre-urban farming households

The following analysis aimed to identify the key factors that influence food security, represented by the dichotomous variable "Food Security Level", using variables of indicators of sustainable livelihood security.

The study results shown in Table 3 summarise the key results of the logistic regression analysis on the impacts of independent variables on household food security from the perspective of the sustainable livelihood security framework and urbanisation-induced displacement of peri-urban farmers. Dependent variable Category (Household Food Secured=1, if not secured=0). It is converted to dummy variable (1, if HFSi >=median score or Household not Food Secured = 0, if HFSi < median score)

In Table 3 above, the logistic regression analysis identifies several key predictors of food security among households. In particular, displacement status, social security, land security, ICT security, and SLSI scores emerge as significant factors. These findings underscore the multifaceted nature of food security, which is influenced by socioeconomic, educational and infrastructural dimensions. The logistic regression output
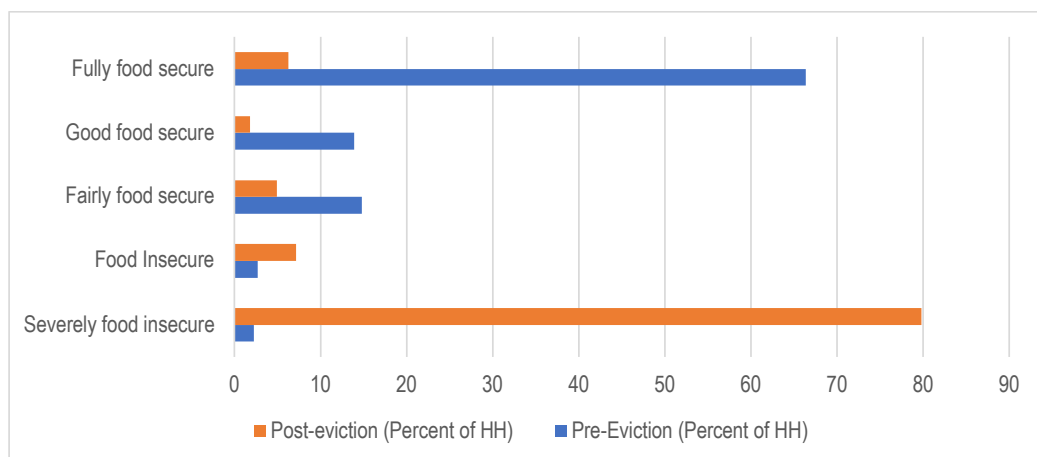
Figure 4. Perceptions of the respondents on their status of household food security during pre and post-displacement (n=223). *Source*: **Own survey, February 2024.**

provides information on the significance and impact of each predictor variable on food security as follows.

Displacement status: Households that have been displaced are significantly less likely to have food security (B = -2.717, p < .001, Exp (B) = 0.066). Displaced households are significantly less likely to have food security, with an odds ratio of 0.066. This means that displacement drastically reduces the likelihood of food security, highlighting the vulnerability of those displaced households. It also implies the need for targeted interventions to support those displaced households. Displacement is a significant negative factor that requires policies to prevent it and support affected households.

Land tenure security: Significant (p = 0.010), with greater land tenure security associated with greater food security (Exp (B) = 2.555). Households with better land tenure security are approximately 2.55 times more likely to achieve food security. Secure tenure and access to land resources play an essential role in ensuring food production and availability. Land security is essential for food production and stability, supporting land tenure policies.

Specifically, the logistic regression coefficient for displacement (Displacement Category (1)) is -2.717, with a standard error

of 0.66. The Wald chi-square test yields a value of 18.790, which is highly significant (p < .001). The odds ratio (Exp (B)) is 0.066, with a 95% confidence interval ranging from 0.019-0.226.

The negative coefficient (-2.717) indicates an inverse relationship between displacement status and food security. Specifically, households that have experienced displacement are significantly less likely to have food security than those who have not been displaced.

The odds ratio (0.066) suggests that the odds of being food secure for displaced households are 93.4% lower than those for non-displaced households. In other words, displaced households have approximately 1/15th the odds of being food secure compared to nondisplaced households.

The p-value (<0.001) indicates that the relationship between displacement status and food security is highly significant, which means that the probability that this relationship occurs due to random chance is extremely low. This strong statistical significance underscores the robustness of the status of displacement as a predictor of food security.

The 95% confidence interval for the odds ratio (0.019-0.226) does not include 1, further confirming the significant impact

Table 3. Explanatory Variables Influencing Food Security of Displaced Peri-urban Farming Households

	B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I. for EXP(B) Lower	
							Lower	Upper
Peri-urban Displacement	-2.717	0.627	18.79	1	**0.00**	**0.066**	0.019	0.226
Gender Household Head	-0.398	0.485	0.672	1	0.412	0.672	0.259	1.74
Age Category	-0.66	0.448	2.169	1	0.141	0.517	0.215	1.244
Family size category	-0.34	0.354	0.924	1	0.336	0.712	0.356	1.423
Family member engaged	-0.026	0.396	0.004	1	0.947	0.974	0.448	2.115
Marital Status Category	0.217	0.498	0.19	1	0.663	1.242	0.468	3.295
Wife Educational Level	0.988	0.508	3.783	1	0.052	2.687	0.992	7.274
Household Head Educational Level	0.523	0.419	1.558	1	0.212	1.686	0.742	3.832
Economic Security	0.327	0.334	0.96	1	0.327	1.387	0.721	2.671
Social Security	0.928	0.372	6.236	1	**0.013**	**2.53**	1.221	5.241
Land Security	0.938	0.364	6.643	1	**0.010**	**2.555**	1.252	5.213
Physical Capital Security	-0.2	0.466	0.184	1	0.668	0.819	0.329	2.041
Human Security	0.179	0.229	0.614	1	0.433	1.197	0.764	1.875
Infrastructural Service Access Security	-0.267	0.417	0.411	1	0.522	0.765	0.338	1.733
Information Communication Technology (ICT) Security	-1.018	0.45	5.127	1	0.024	**0.361**	0.15	0.872
Sustainable Livelihood Security Index (SLSI)	3.281	0.499	43.19	1	0.000	**26.606**	10	70.789
Total expropriated farmland	-0.078	0.139	0.311	1	0.577	0.925	0.704	1.216
Constant	-0.697	0.744	0.876	1	0.349	0.498		

Source: Own data analysis from the February 2024 survey.

of displacement on food security. The narrow range of the confidence interval enhances the reliability of the estimated odds ratio.

5. Discussion

5.1. Household food security of the displaced peri-urban farming households

The findings indicate that non-displaced households have a significantly higher mean rank for food security (301.28) than displaced households (145.72). This suggests that, in general, nondisplaced households experience higher levels of food security compared to those who have been displaced.

The logistic regression analysis identified critical factors influencing household food security and revealed several significant predictors. Specifically, the displacement status

(displaced = 1 and non-displaced = 0) had a negative coefficient (-2.717), indicating an inverse relationship between displacement status and food security. Households that have experienced displacement are significantly less likely to have food security compared to nondisplaced households (B = -2.717, S.E. = 0.627, Wald = 18.790, df = 1, Sig. < 0.001, Exp (B) = 0.066).

The odds ratio (0.066) suggests that the odds of being food secure for displaced households are 93.4% lower than for nondisplaced households. This strong statistical significance underscores the robustness of displacement status as a predictor of food security.

Similar research by Leifheit et al. (2020) found that displacement negatively impacts food security, and displaced households

show a significant decrease in food security status. Cutts et al. (2022) also reported that displacement increases food insecurity among families with young children.

The variable of land capital security in the logistic regression analysis shows that households with better land security, including those having better farmland, are approximately 3.88 times more likely to achieve food security, B = 1.357, S.E. = 0.317, Wald = 18.332, df = 1, Sig. < 0.001, Exp (B) = 3.883). Similarly to our findings, Thamaga-Chitja et al. (2025) concluded that secure land ownership significantly reduces food insecurity, with studies indicating a 50% reduction in food insecurity among households with land rights. Land tenure security, such as Certificates of Customary Right of Occupation (CCRO), leads to higher agricultural yields and lower production costs, enhancing food security. Households with secure land rights are more likely to invest in modern farming techniques, further improving their food production capabilities (Usika et al. 2024).

5.2. Household food security before and after displacement

The descriptive analysis of the study results reveals a dramatic decline in food security among post-displaced households. Before displacement, a substantial majority (87.44%) of households were food secure, with 66.37% being entirely food secure, which changed drastically after displacement, with the mean level of food security dropping to 21.08%.

Before displacement, approximately 90% of the respondents had an excellent level of food security, meeting all food security indicators. However, after displacement, approximately 80% of the respondents fell into the category of severely food insecure, failing to meet any food security indicators. The substantial decrease in food security after displacement highlights the severe consequences of land expropriation on the livelihoods of households in the Lemmi Kura sub-city. The loss of agricultural land, a primary source of food production and income,

resulted in a reduced adequacy of meals, the variety and healthiness of food, and a decreased frequency of meals.

These results are in agreement with the existing literature that underscores the adverse effects of displacement on food security (FAO 2017). According to a study on the impact of land acquisition for large-scale agricultural investments in Ethiopia, land expropriation significantly reduced the status of food security of displaced households. Large-scale agricultural investments (LSAI) in Ethiopia have significantly negatively impacted food security for local communities, particularly Anuak in Gambella (Guyalo et al. 2022).

The research results clearly show a stark contrast in food security levels before and after displacement. The mean level of the food security index decreased from 0.9288 before displacement to 0.3974 after displacement. This sharp decline underscores the adverse impact of land expropriation on the ability of households to obtain adequate food. The indicators most affected are access to healthy and nutritious food and the ability to produce enough food for the family. These findings align with existing research that points to the detrimental effects of displacement on food security and livelihoods (FAO 2017).

The participants of the FGD described that they are facing severe food crises, as they could no longer rely on their production and were forced to buy everything from the market, which has become increasingly unaffordable.

Before evictions, peri-urban communities were largely self-reliant, providing mutual aid even when not all members were food-independent. Post-eviction, they have become dependent on external support, reflecting a significant change in their ability to support themselves (KII 8). The major factors contributing to food insecurity in the peri-urban evicted communities were loss of agricultural lands, asset loss during evictions, displacement of livestock due to urbanisation, and lack of innovation and subsequent unemployment.

According to the participant in the FGD (KII 1), the reduction in agricultural land directly decreases the ability to produce food, thus jeopardising food security. Owning agricultural land is crucial to producing a variety of crops that ensure food security. The loss of such land prevents individuals from guaranteeing their food supply, which endangers their lives (KII 1). The confiscation of agricultural land has led to a significant loss of livelihood and assets. Individuals can only raise animals or grow crops on land, so loss of land exacerbates economic and food security challenges (KII 4).

Households in peri-urban areas are currently facing severe food crises. These crises manifest as unstable access to adequate and healthy food, financial difficulties, and other related challenges (KII 3). After being displaced from their land, villagers often face unemployment or are forced into informal work. This transition results in a substantial decrease in income and an increase in malnutrition due to reduced food availability (KII 5).

Households that have not been evicted can harvest crops from their land, thus enjoying more reliable food security. In contrast, evicted households face increased food insecurity, lacking the means to produce food (KII 2).

The transition from traditional agriculture to market-based food procurement, coupled with the impacts of urbanisation and land loss, has significantly compromised food security in peri-urban communities. These changes have led to greater dependence on external support, loss of livelihoods, and increased food insecurity, particularly among evicted households. Addressing these issues requires targeted policies protecting agricultural land and supporting displaced communities to rebuild food security.

These qualitative insights are consistent with the findings from other regions. For example, in Uganda, land evictions have been shown to negatively impact household food security due to the loss of agricultural land and assets, leading to dependence on less secure food sources and market purchases.

Conclusions and Implications for Policy

The study found that evictions disrupted households' agricultural livelihoods, causing severe negative economic and social consequences. For instance, many evictees, who were previously self-sufficient, are now compelled to purchase food and other essentials from the market, causing financial strain and exacerbating poverty.

The quantitative analysis also reflects a significant difference in economic security between the evicted and non-evicted households. Furthermore, the odds ratio analysis for eviction status is 0.273, indicating that evicted households are approximately 72.7% less likely to achieve economic security than non-evicted households, which emphasises the adverse impact of eviction on economic security, highlighting the need for policies that prevent evictions and improve the economic stability of affected households.

The study concludes that the quantitative results also indicated that non-evicted households have significantly higher food security levels than evicted households. The study results reject the null hypothesis (Ho) in favour of the alternative hypothesis (H1), suggesting that eviction substantially negatively impacts food security. The effect size of 0.6489 further emphasises the high impact of eviction on household food security.

Furthermore, the logistic regression coefficient for the eviction status is -2.717 (p < .001), with an odds ratio (Exp(B)) of 0.066, indicating that evicted households are significantly less likely to be food secure compared to non-evicted households, highlighting the critical impact of eviction on food security and underscoring the need for targeted interventions to support evicted households. These findings emphasize the severe consequences of land expropriation, which disrupted the primary sources of food production and income, leading to diminished meal adequacy, reduced variety and healthy food, and decreased meal

frequency. This dramatic decline in food security levels highlights the critical need for targeted interventions to support displaced households.

The study concludes that research indicators such as access to sufficient, healthy and nutritious food, production of enough food, and affordability to buy food when own production is insufficient saw significant declines. These results align with existing research that points to the detrimental effects of displacement on food security and livelihoods. The findings highlight the urgent need for policymakers to consider the severe implications of land expropriation on household food security and to develop strategies to mitigate these adverse effects. Ensuring access to alternative livelihoods and food sources for displaced households enhances food security and overall well-being.

The findings of this study underscore the need for comprehensive policy interventions to mitigate the negative impacts of displacement and promote the economic security of affected populations. These interventions should include:

Compensation in the form of shareholding: to address the lost inter-generational resources of displaced farmers, policymakers should compensate them with in-kind shareholding from private investments, real estate and government housing projects through Public-Private Partnerships.

References

Abate, Gutema Gizachew. 2023. "Conservation and Indigenous Peoples' Struggles for Livelihoods: Suba Park (Ethiopia)." *Environmental Conservation* 50 (4): 251–258. https://doi.org/10.1017/s0376892923000218.

Ayenachew, Yeshitla Agonafir, and Birhanu Girma Abebe. 2024. "The Dynamics of Urbanisation, Land Use Land Cover Changes, and Land Expropriation in Addis Ababa, Ethiopia." *Frontiers in Environmental Science* 12 (August 2024). https://doi.org/10.3389/fenvs.2024.1439954.

Bula, S. Wayessa. 2020. "They Deceived Us: Narratives of Addis Ababa Development-Induced Displaced Peasants." *International Journal of Sociology and Anthropology* 12 (3): 67–75. https://doi.org/10.5897/ijsa2020.0862.

Cutts, Diana B., Stephanie Ettinger de Cuba, Allison Bovell-Ammon, Chevaughn Wellington, Sharon M. Coleman, Deborah A. Frank, Maureen M. Black, et al. 2022. "Displacement and Household Health and Hardships in Families with Very Young Children." *Pediatrics* 150 (4). September 19, 2022. https://doi.org/10.1542/peds.2022-056692.

Dabala, Abiyot Mogos. 2020. "Large-Scale Land Acquisition and Human Rights at the Crossroads: Quest for a Rights-Based Approach to Land Administration in Ethiopia." *Journal of Sustainable Development Law and Policy* 10 (2): 184. https://doi.org/10.4314/jsdlp.v10i2.3.

Debelo, Asebe Regassa, and Teshome Emana Soboka. 2022. "Urban Development and the Making of Frontiers In/from Addis Ababa/Finfinne, Ethiopia." *Journal of Asian and African Studies* (January, 2022): 002190962110696. https://doi.org/10.1177/00219096211069647.

Food and Agriculture Organisation of the United Nations. 2017. *The State of Food Security and Nutrition in the World 2017: Building Resilience for Peace and Food Security.*

Gnamura, Kejela, Michael Antwi, and Belete Abenet. 2024. "The Impact of Urban Expansion on Peri-Urban Farmers in Addis Ababa." *Journal of Agribusiness and Rural Development* 74 (2): 451–465. https://doi.org/10.17306/j.jard.2024.00012r1.

Guyalo, Amanuel K., Esubalew Abate Alemu, and Degefa Tolossa Degaga. 2022. "Impact of Large-Scale Agricultural Investments on the Food Security Status of Local Community in Gambella

Region, Ethiopia." *Agriculture & Food Security* 11(1): 1–28. https://doi.org/10.1186/s40066-022-00381-6.

Hailu, Tadesse, Engdawork Assefa, and Tesfaye Zeleke. 2024. "Urban Expansion Induced Land Use Changes and Its Effect on Ecosystem Services in Addis Ababa, Ethiopia." *Frontiers in Environmental Science* 12 (November). https://doi.org/10.3389/fenvs.2024.1454556.

Leifheit, Kathryn M., Gabriel L. Schwartz, Craig E. Pollack, Kathryn J. Edin, Maureen M. Black, Jacky M. Jennings, and Keri N. Althoff. 2020. "Severe Housing Insecurity during Pregnancy: Association with Adverse Birth and Infant Outcomes." *International Journal of Environmental Research and Public Health* 17 (22): 8659. https://doi.org/10.3390/ijerph17228659.

Nyamura, K Gemtessa, and Bongani Ngwenya. 2024. "Exploring the Consequences of Land Expropriation on the Food Security of Peri-Urban Indigenous Communities in Addis Ababa." *International Journal for Multidisciplinary Research* 6 (2). https://doi.org/10.36948/ijfmr.2024.v06i02.17102.

Tadesse, Birhan, and Fentew Baye. 2024. "The Impact of Land Expropriation on Changing Livelihoods: The Case of Displaced Peri-Urban Farmers in Kon and Gashena Towns, Ethiopia." *Heliyon* 10(11): e31942. https://doi.org/10.1016/j.heliyon.2024.e31942.

Taye, Chali, Dereje Teklemariam, and Endalew Addis. 2024. "Effect of Drivers of Urban Expansion on Food Security in Moderating Role of Governance Response." *International Journal of Management and Fuzzy Systems* 10 (1): 17–34. https://doi.org/10.11648/j.ijmfs.20241001.12.

Teklemariam, Addiswork, and Logan Cochrane. 2021. "The Rush to the Peripheries: Land Rights and Tenure Security in Peri-Urban Ethiopia." *Land* 10 (2): 193. https://doi.org/10.3390/land10020193.

Thamaga-Chitja, Joyce M., Nthabeleng Tamako, and Temitope O. Ojo. 2025. "Implications of Land Ownership Heterogeneity on Household Food Security: A Case Study of Urban Farming in Pietermaritzburg, KwaZulu-Natal Province." *Land* 14 (2): 236. https://doi.org/10.3390/land14020236.

Usika, Gerald, Sameel J. Kabote, and Justin K. Urassa. 2024. "Land Tenure Security and Households' Food Security Nexus: Implications for an Improving Land Governance in Iringa District, Tanzania." *African Journal of Empirical Research* (May 4, 2024). https://doi.org/10.51867/ajernet.5.2.28.

Yasin, Kalid Hassen, Anteneh Derribew Iguala, and Tadele Bedo Gelete. 2025. "Spatiotemporal Analysis of Urban Expansion and Its Impact on Farmlands in the Central Ethiopia Metropolitan Area." *Discover Sustainability* 6 (1). https://doi.org/10.1007/s43621-024-00749-7.