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Research Paper

Perceived Effects of Urbanization on Rural Farm Households in Adama District, Ethiopia

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Abstract

In Ethiopia, the rapid growth of urban areas has increased pressure on rural farmland owners. The study aimed at assessing the variations in perceived effects of urbanization on rural farm households based on their proximity to urban areas and identifying the socioeconomic factors that influence these variations. A multistage sampling technique was employed to select 397 households for the study, with 148 households located near the urban centre and 249 of them situated significantly further from the urban area. The ordered logistic regression model was utilized to analyze the perceived effects and the factors contributing to the variation of viewpoints. The results revealed a significant difference between the two categories of farm households regarding their perception of urbanization. Those located far away from urban centres perceived positive effects of urbanization on various aspects, including increased income diversification, agricultural production, creation of job opportunities, and community relationships, with an average mean value of 3.25 out of 5. On the other hand, farm households near urban areas perceived these effects negatively, with an average mean value of 2.47. Furthermore, the ordered logistic regression analysis results indicated that the distance from the urban centre, educational status of households, family sizes, and farmland sizes significantly impact the perception of urbanization among farm households near urban centres. Therefore, when planning urbanization projects, policymakers and stakeholders are suggested to consider the concerns and perceptions of rural farmers.

1. Introduction

In mid-November 2022, it was reported that the worldwide human population had reached 8.0 billion. Projections indicate that this figure is expected to rise to 9.7 billion by 2050, with a substantial portion concentrating in urban areas, especially in Asia and Africa (Coulibaly & Li, 2020). Particularly in Africa, the urban population has doubled over the past three decades and it is expected to continue growing in the coming decades (Sakketa, 2022). Factors contributing to this phenomenon include migrating working-age individuals from rural to urban areas and natural population growth in metropolitan areas. Although traditionally known as an agrarian nation, Ethiopia is recently experiencing rapid urbanization; its urbanization rate is projected to reach 60% by 2040, maintaining an average growth rate of 3.5% (Wegedie, 2018).

Urbanization has significant implications for rural farm households on their economic, social, and cultural facets (FAO, 2022). Rural farm households recognize urbanization as an opportunity for economic growth that transforms cities through knowledge innovation and enhances rural living standards (Tian *et al*., 2016; Coulibaly & Li, 2020). With the influx of urban

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dwellers, there is a growing demand for agricultural products, creating potential markets for farmers to sell their produce at higher prices (Warsaw *et al*., 2021). Urban expansion improves rural infrastructure, facilitating better transportation, healthcare, and education, improving overall quality of life and productivity (Talema & Nigusie, 2023). It diversifies economies, fostering non-agricultural sectors like tourism and manufacturing and reducing dependence on agriculture (Dadi et al., 2022; Satterthwaite et al., 2010). Thus, urbanization serves as a pathway from poverty to increased productivity by providing expanded job opportunities and improved quality of life (de Bruin *et al*., 2021; Cali & Menon, 2013; Dorosh & Schmidt, 2010).

On the other hand, the expansion of cities encroaches upon agricultural zones, resulting in land fragmentation and a reduction in farming land available for rural communities. Consequently, rural farm households also perceive urbanization negatively as it leads to involuntary acquisition and displacement from their farmland. This displacement not only separates them from their land but also creates institutional insecurity and disorder and hampers economic growth in the rural areas surrounding cities (Coulibaly & Li, 2020; Sargeson, 2013). Moreover, the clash between traditional farming practices and new technologies introduced by urbanization threatens the environment and livelihoods of rural farmers who rely on sustainable farming methods (FAO, 2022).

In Ethiopia, urban expansion has adverse effect on peri-urban farmers' economic performance (Weldearegay *et al*., 2021). Studies in Addis Ababa, emphasize that despite compensation, displaced farming households have limited income opportunities, engaging in low-income activities for survival rather than long-term improvement (Leulsegged *et al*., 2012). In Mekelle and Bishoftu, approximately 6,000 and 5,000 ha, respectively, of land of the nearby rural areas were compulsorily included into the towns' territory between 2005 and 2009 (Zemenfes & Serbeh-Yiadom, 2014). Urbanization and industrialization in Dukem Town encroach upon agricultural land owned by low-skilled and low-educated farmers, posing a challenge in securing stable employment opportunities beyond the farming sector (Diriba *et al*., 2020).

Adama city is the hub for the regional government's political, business, and economic affairs, making it the most significant urban center in the Oromia region. Consequently, the city boasts a more extensive and diverse range of infrastructure and economic activities compared to other towns of the region. Despite significant urban development and the shift from inner urban enclaves to the periphery, farming remains a crucial source of livelihood for households in the peri-urban areas (Abdulai *et al*., 2022). With respect to urbanization, several Studies have been conducted in smallholder peri-urban farmers surrounding Adama City (Bulti & Abebe, 2020; Shalo, 2014); however, none of them considered the implications of urbanization on the perceptions of surrounding rural farm households. Thus the aim of this study is to address this gap through comparative analysis, seeking to determine the perceived effects of urbanization on rural farm households considering their nearness to the urban center. The study also tried to identify the factors contributing to variations in perception among the rural farm households. By addressing the gaps, the study tried to provide valuable insights that can contribute to informed decision-making and policy development in the context of urbanization and its impact on rural farm households.

2. Materials and Methods

2.1. Description of the Study Area

Adama district is located in the East Shewa Zone of Oromia Region, Ethiopia, and Adama City, the capital of the district, is at about 90 km southeast of Addis Ababa, the nation's capital. The geographic coordinates of Adama district are 8° 14′ 0″ to 8° 43′ 0″N and 39° 6′ 0″ to 39° 25′ 0″E (Figure 1). The total area of the district is 871.18 km^2. The region is situated within the Great Ethiopian Rift Valley and has an altitude range of 1415 to 2505 m above sea level. Adama district experiences an average annual rainfall of 844.20 mm, with a maximum monthly average of 259.8 mm in July. Like other parts of the country, June, July, August, and September are rainy period, while January, October, November, and December are the dry months. On average, May is the warmest month, while July is the coldest. The primary economic activities in Adama rural district are subsistence agriculture and petty trade.

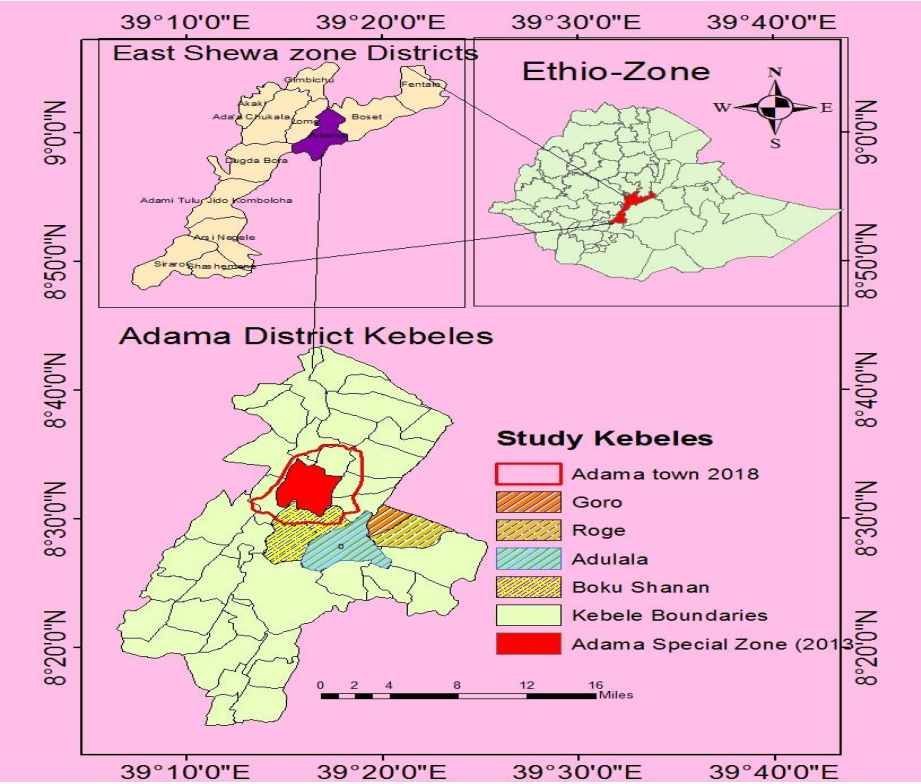

Figure 1: Location map of the study area, Adama City and district in Oromia Region

The district comprises of 37 rural kebeles and it had a population of 234,986 as of July 2022, with 118,403 males and 116,583 females, according to Ethiopian Statistical Service (ESS) statistics (EPP, 2022).

Adama city is located along the railway route to Djibouti. It is the largest urban center in Oromia region, providing numerous employment opportunities beyond traditional farming. According to ESS, the total population of the city in July 2021 was 435,222, with males accounting for 49% (212,991) and females accounting for 51% (222,231). This demographic distribution reflects a balanced gender ratio within the city. The major industries and sectors in Adama City include manufacturing, agriculture and agro-processing, construction, trade and commerce, services, energy, education, and training. The scale and diversity of infrastructure and economic activities in Adama City are relatively more extensive than the other urban centers of the region. These collectively contributed to the growth and prosperity of Adama City, establishing it as a dynamic center for business, employment, and economic opportunities.

Thus, the availability of employment opportunities in non-agricultural sectors has significantly increased. Furthermore, the city has rapidly expanded into the adjoining Adama rural district. This expansion is evident in incorporating four rural kebeles (local administrative units) into the city's administrative boundaries. These kebeles, namely Malka Adama, Daka Adi, Boku Shanan, and Dabe Soloke, have been included in the city's growth plan. This process of urbanization has had an impact on small-scale farmers residing in the rural areas near the city.

2.2. Research Design

The study used a cross-sectional survey to collect participant data at a specific time. Cross-sectional design was chosen for its inherent advantage, such as efficiency, contemporaneity, and the ability to explore multiple aspects of the subject matter simultaneously, contributing to the robustness and relevance of the research findings (Goczek *et al*., 2021; Setia, 2016). The cross-sectional design allowed for the simultaneous examination of multiple characteristics within a relatively short period. This efficiency in data collection is critical when studying perceptions of households, which may change over time. On the other hand, a descriptive and explanatory concurrent mixed research

design was employed to analyze the gathered data. This methodology integrates quantitative and qualitative data to comprehend the study topic comprehensively.

2.3. Sampling Size Determination and Data Collection Approaches

Survey questionnaires were distributed to farm households in Adama district, aimed explicitly at gathering quantitative data on the perceived effects of urbanization on these households. Before distributing the questionnaires, a consent letter was issued to the district head office to ensure compliance with ethical considerations. The rural kebeles, were categorized based on their proximity to the urban center, which has significant implications for the overall livelihoods of rural farm households (Jamshed *et al*., 2020; Sharma, 2016). Proximity to urban areas can influence various aspects of life for these households, including economic opportunities, access to services, and cultural and lifestyle changes. Therefore, understanding these differences is crucial in designing targeted interventions that address the specific needs and the associated challenges.

Thus, in the sampling, a multistage sampling method considering kebeles in the rural district near and far from the urban center was used. The households rely primarily on agriculture for their income. Two rural kebeles (Boku shanan and Adulala) near the city and two (Roge and Goro) far from it were chosen using a simple random sampling method. These two categories were selected based on the similarity of agro-climatic and socioeconomic conditions. The remote rural areas were chosen for their anticipated lesser impact of urbanization. The city has experienced rapid expansion in the southeast, surpassing other directions. This expansion, coupled with increased agricultural production in that area justifies the selection of rural kebeles from the southeast as a solid foundation for the research focus.

The sample size was estimated using the Kothari (2004) formula, an established methodology, considering proportional representation, confidence level, and margin of error accounting for the total population. Accordingly, the sample size was estimated using:

$$n = \frac{Z^2.p.q.N}{e^2(N-1) + Z^2.p.q}$$

Where p (0.5) represents the proportion of individuals agreeing, and q is equal to 1 – p = 0.5. Z (=1.96) represents the value of the standard variate at a 95% confidence level, n indicates the sample size, e is desired level of precision of 5%, and N represents the total households (2,515).

Thus, the sample size was determined to be 333 and considering 20 % additional for nonresponse and data quality, the total number of rural household heads used for the study was 397. In proportion of their sizes, 249 households far from the urban area were taken as the control group and the remaining 148 farm households near the urban area as a treatment group.

Five-point Likert scale is a commonly used technique in survey research for measuring perceptions, satisfaction, and attitudes (Coelho & Esteves, 2007), due to its ease of use, ability to generate quantifiable responses, flexibility, and suitability for comparative and statistical analyses. Thus, five-point Likert scale items were constructed and attached to a scale ranging from strongly disagree to strongly agree, with the mid-point being neutral and upbeat and negative scores from 1 to 5.

Moreover, twelve Key Informant Interviews (KII) were conducted with diverse stakeholders and tailored to the composition of each platform. Kebele level administrators, development agents, religious leaders, teachers, and other experienced farm household heads were interviewed. The KII encompassed district and zonal-level agricultural and land management offices, municipal-level administration offices, and other relevant regional stakeholders. Data related to rural households' perception of urban expansion, specifically on agricultural production, agricultural land, food security, and social cohesion, were generated from key informants.

After collecting all the necessary data, the selected variables were analyzed. The findings are presented using descriptive statistics and narrative accounts. An ordered logistic regression analysis was utilized to identify the factors influencing households' perceived effects of urbanization on their welfare. Furthermore,

qualitative data obtained through KII was presented and interpreted to complement the quantitative findings.

2.4. Model Specification

The study employed ordinal logistic regression to assess the perception of rural farm households regarding urbanization. From the various models of ordinal logistic regression, the partial proportional odds model (PPOM) is the most commonly utilized. The interpretation of rural farm households' perception of urbanization under PPOM appears more rational and understandable. In cases where proportionality is violated, PPOM may be a preferable alternative (Long & Freese, 2014).

By exponentiating the odd proportional ratio, the odds of being at or below the given category is determined, and the factor associated with a higher probability of being in each category identified, increasing the power of the estimated regression coefficients (Long & Freese, 2014). The goal of the cumulative odds ratio is to simultaneously consider the effect of a set of independent variables across those possible consecutive cumulative splits to the data. Assuming an independent observation with p predictor variables, the response variable falls into k categories (1, 2…, k), where the k categories are ordinal.

If Y denotes the response variable, the cumulative distribution of Y is;

$$F_j(x_i) = P_r\left(Y \le j \middle| X_i = x_{i1}, \dots, X_{ip}\right); \quad j = 1,2, \dots, (k-1) \quad \dots\dots\dots\dots\dots (1)$$

Because they are k possible ordinal outcomes, the model makes k – 1 prediction, each corresponding to the accumulation of probability across successive categories.

Suppose $\pi\left(Y \le j \middle| x_1, x_2, \dots \dots . x_p\right) = \pi_j(x)$ represents the probability that the response falls in a category less than or equal to the j^{th} category $(j = 1,2, \dots \dots, K-1)$, then there are a collection of cumulative probabilities for each case. The final category has a cumulative probability of 1, 0.

Logistic regression is employed to estimate cumulative probabilities logistically, often known as cumulative logits;

$$\ln(Y'_j) = \ln\left(\frac{\pi_{j(x)}}{1-\pi_{j(x)}}\right) = \alpha_j + (\beta_1 X_1 + \beta_2 X_2 + \cdots \beta_p X_p) \dots\dots\dots\dots (2)$$

The cumulative logit associated with being at or below a particular category j can be exponentiated to arrive at the estimated cumulative odds and then used to find the estimated cumulative probability associated with being at or below category j. Hence, the regression equation for the proportional odds model is given as:

$$L_j(x_i) = \log\left(\frac{F_j(x_i)}{1-F_j(x_i)}\right) = \beta_{oj} + \beta_{1j}x_{1i} + \beta_{2j}x_{2i} + \cdots + \beta_{pj}x_{pi} \dots (3)$$

Where; $j = 1,2, \dots \dots, k$ catagories,

$x_{i1}, \dots \dots, x_{pi}$ . .are the values of the p predictor variables for the i^{th} observation'

β_0 is the intercept or constant and β_1, ….β_p is the coefficient

Finally, the proportional log-odds model was checked for suitability, goodness of fit, and robustness. The only difference is their intercepts or the cutoff points. Parallel regression lines were obtained for the various levels. The drawbacks of the proportional log-odds model are that it is essential to test this assumption using both the informal test of constant β coefficient and the formal test of parallel regression lines explicitly.

Since there are j categories of ordered responses, j-1 binary logit regressions can be computed on the odds of being in a higher vs. lower category of y. If y is the ordered outcome, the log – odds of a response greater than j vs. less than j is:

$$\ln\left(\frac{Pr(Y_{i>j})}{Pr(Yi \le j)}\right) = a_{j-}\beta_j X, \; j = 1,2,3 \dots . . j-1 \dots\dots (4)$$

The quantity used is to estimate separate binary logit models for $j-1$ response variables. So, in all, we will have $j-1$ estimates of β_j. Therefore, the assumption of parallel regressions means:

$$\beta_1 = \beta_2 = \cdots = \beta_{j-1} = \beta \dots\dots\dots\dots\dots\dots\dots\dots (5)$$

To evaluate the variation in the regression, the coefficients were analysed. If the regression lines were dissimilar, it would indicate rejection of the hypothesis

of parallel regressions. Testing the assumption of parallel regression lines is achieved by employing the formal test of the parallel regression lines model developed by Long and Freese (2014), known as the Brant test. However, violating these assumptions may or may not significantly impact the results of the ordered logistic regression model, as the practical implications of such violations are generally minimal. The ordinal logistic regression model is employed to elucidate the variables that determine how each individual perceives urbanization.

Furthermore, it significantly impacts the multifunctional farming activities of rural farm households. To assess the perception of rural areas, the model utilized various estimation questions related to perception. These questions considered both the negative and positive effects. Specifically, they explore the implications of urbanization on household food security, income diversification, and non-farming job opportunities. The results were converted into mean values by aggregating them on the Likert scale. These mean values measure perception, with five independent variables encompassing socioeconomic and demographic factors.

3. Results

3.1. The Study Variables and Their Measurements

In the context of the ordered logistic regression model for analyzing perceptions, significant emphasis was placed on defining the dependent and independent variables. The dependent variable under investigation pertains to the perception of urbanization among rural farm households. Table 1 provides detailed information on the various socioeconomic and institutional factors considered independent variables. The perception of urbanization's effects within households is treated as an ordinal response variable derived from a categorical variable.

Table 1: Variables used in the model and measurements

Variables	Description of variables	Impact (+/-)
Perception	Perception of rural farm households on urbanization; categorical: 1- Strongly disagree, 2 - disagree, 3 - neutral, 4 - agree, and 5 - strongly agree	+/-
Group	Categories of sample rural kebeles based on distance: 1- Far from urban center (control), 2 - near urban center (treatment)	+
Age	Age of households in years; continuous variables	+
Sex	Categorical variable: 1 - male, 2 - female	+
Marriage	Marital Status of households; categorical: 1 - single, 2 - married, 3 - divorced, 4 - widowed	+
Family size	The family size of households in number; continuous variable.	-
Income diversification	Household income diversification; categorical: 1 - farm only, 2 - farm and unskilled, 3 - farm and skilled, 4 - farm and transfer payment	-
Education	Educational status of households; categorical: 1- illiterate, 2 - literate	+
Dependency ratio	The dependency ratio in number; continuous variable.	-
Tropical livestock	Tropical livestock units in number; continuous variable.	-
Land size	The land size of households in (ha); continuous variable.	-
Distance	The average distance (km) of households from the urban center; continuous variable.	+

The respondents exhibited significant heterogeneity in their demographic and socioeconomic characteristics, leading to divergent perspectives on expanding urban areas into surrounding hinterlands (Table 2). The household heads were predominantly married, accounting for 92%. The findings show the need for targeted initiatives to improve access to adult education in rural areas of the district. Despite a decrease in farming activities, due to urban expansion and farmland conversion, compared to non-farm activities, many of the respondents still relied on farming as their primary source of livelihood.

Table 3 presents the findings of rural farm households in the control and the treatment groups. The study analyzed the dependency ratio, which measures the percentage of family members who are not in the labor force (including children aged 0 to 14 and elderly individuals over 64) relative to those who are. The average dependency ratio among the households surveyed was determined to be 0.75. More specifically, the control group had a dependency ratio of 0.736, while the treatment group exhibited a slightly higher ratio of 0.785. Thus, larger families and higher dependency ratios correlate with higher household poverty levels.

Table 2: Summary of categorical independent variables

Independent Variables		Frequency	Percent
Group of Kebeles	Control	249	62.7
	Treatment	148	37.3
Sex	Male	341	85.9
	Female	56	14.1
Marital status	Single	9	2.3
	Married	365	91.9
	Divorced	8	2.0
	Widowed	15	3.8
Income diversification	Farm only	244	61.5
	Farm and unskilled	107	27.0
	Farm and skilled	8	2.0
	Farm and transfer income	38	9.6
Educational Status	Illiterate	257	64.7
	Literate	140	35.3

Table 3: Summary of Continuous Independent Variables

Continuous Variables	Group G	N	Mean	Std. Deviation
Age of households head (year)	Control	249	43.04	8.804
	Treatment	148	48.67	10.624
Educational status of household Head	Control	249	1.27	0.444
	Treatment	148	1.49	0.502
Family size of households head	Control	249	3.97	1.167
	Treatment	148	4.60	1.689
Adult equivalent of family size	Control	249	3.38	0.882
	Treatment	148	3.78	1.053
Dependency ratio of households	Control	249	0.74	0.377
	Treatment	148	0.79	0.357
Tropical livestock units	Control	249	4.93	4.804
	Treatment	148	0.47	2.005
Land size of households	Control	249	1.06	0.221
	Treatment	148	0.54	0.217
Average distance from urban center	Control	249	26.10	5.714
	Treatment	148	8.95	4.065

The average and the closest distance of the rural kebeles from the urban center were 27 and 9 km, respectively. The findings emphasize the significant distances that separated the two groups, which played a vital role in estimating the socioeconomic disparities contributing to the divergence in perceptions between them (Sharma, 2016).

3.2. Perceived Effects of Urbanization by Rural Farm Households

From Table 4, for the positive perception variables, farmers in the control group consistently rated them highly, with mean scores ranging from 3.02 to 3.46 on a scale of 1 to 5. The top three variables, ranked in descending order, were: urbanization creates job opportunities, maintains community relationships, and increases agricultural production. In contrast to the control groups, those nearby displayed comparatively lower mean scores. The variables that received higher rankings from this group were: urbanization helps maintain community ties, contributes to income diversification, and leads to job creation. Household heads living far from urban areas had more positive perceptions across all the four variables. The results highlight the differing perspectives on the effects of urbanization, particularly regarding job opportunities, community relationships, income diversification, and agricultural production. However, only 'urbanization maintains community relationships' obtained a score above 50%.

The variables associated with the positive impacts of urbanization received mean scores below the midpoint (2.5) for treatment groups. There were significant differences in the overall mean results regarding the positive effects of urbanization between the two groups. Households distant from urban centers had a more favorable perception of positive effects of urbanization against the less optimistic outlook on the positive effects by those near the urban center. Households near urban areas believed that uncontrolled urban expansion hinders their ability to improve their livelihoods and overall well-being. They perceive unplanned urban growth as a potential obstacle to their economic and social progress, affecting their quality of life.

Table 4: Distribution of control and treatment groups' perception of urbanization

Perception Statement	Distance Based Categories				t	df	Sig.
Positive	Controls		Treatment				
	Mean	Rank	Mean	Rank			
Urbanization increases income diversification rural households	3.02	4	2.41	2	6.195	395	0.000
Urbanization increases agricultural production	3.16	3	2.24	4	9.081	395	0.000
Urbanization creates job opportunities	3.46	1	2.26	3	11.188	395	0.000
Urbanization maintains community relationship	3.37	2	2.99	1	3.540	395	0.000
Mean	3.26		2.48		10.070	395	0.000
Negative							
Urbanization is a risk for rural farming households	2.90	5	3.39	2	-4.463	395	0.000
Rural households are not benefiting from Urbanization	2.90	5	3.11	4	-1.616	395	0.107
Urbanization pollutes the rural environment	3.45	2	3.07	5	1.207	395	0.228
Urbanization declines farmland	3.28	4	3.13	3	1.207	395	0.228
Urbanization causes food insecurity	3.32	3	2.91	6	3.443	395	0.001
Gov't policy gap on urbanization	3.60	1	3.41	1	1.355	395	0.176
Mean	3.24		3.17		0.741	395	0.459

Regarding the negative perception variables, the control and treatment groups recorded mean scores of 3.24 and 3.17, respectively. These mean scores exceed the midpoint value, indicating that both groups perceived unfavorable effects of urbanization. Both farm household classes recognize urbanization's detrimental impact on agricultural production. This impact arises from converting agricultural land into urban built-up areas, primarily driven by natural population growth and rural-urban migration. This transformation leads to the displacement, resulting in their marginalization and impoverishment as they are forced to abandon productive assets and sources of income. Haregeweyn *et al.* (2012) also arrived on similar consequences, indicating that rural households near urban areas experience the expropriation of agricultural land, the loss of permanent trees, and a decline in livestock population, all linked to reduced landholding sizes following urbanization. Thus, agriculture remains important for peri-urban farm households.

3.3. Inferential Statistics

The Chi-square analysis showed significant associations between the perception of rural farm households regarding the impact of urbanization and the various variables. The p-values corresponding to the variables sex, marriage, educational status and income diversification were 0.000, 0.062, 0.015, 0.000 and 0.006, respectively. These indicate that the relationship is unlikely to result from chance alone and instead suggests a meaningful and potentially causal connection. These findings provide valuable insights into the interplay between the covariate variables and perceptions or outcomes of the phenomenon being investigated.

The summary of perceptions about continuous variables (Table 5) to the urban center demonstrates a strong association between the dependent variable (perception) and the continuous variables. Such a robust association underscores the importance of these continuous variables in shaping the understanding of perceptions regarding urbanization.

Table 6 presents the findings of the ordered logistic regression analysis. The relationship between the variables was examined through both univariate and bivariate analyses. The results indicate that groupings between households, educational status of household heads, land size, family size, and distance from the urban center demonstrate a significant association. Specifically, the univariate analysis reveals that land size, family size, and distance from urban center are statistically significant. In the bivariate analysis, the two groups of households and household head educational status show a statistically significant association. These results suggest that the selected factors influence the perception of rural farm households regarding urbanization in their surroundings. However, sex, age, marital status, dependency ratio, and livelihood activities of farm households did not show statistical significance. Therefore, excluding the insignificant variables and proceeding with an ordinal logistic regression analysis using the variables that have statistical significance is recommended.

Table 5: The mean (St. Dev.) distribution of respondents' profile on the continuous variables

Variables	Summary of all Perception					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Family size	4.95 (1.82)	4.75 (1.77)	4.29 (1.33)	3.82 (1.10)	4.80 (1.98)	397
Land size	0.78 (0.20)	0.85 (0.31)	0.93 (0.34)	0.85 (0.34)	0.57 (0.29)	397
Distance	15.65 (7.17)	20.89 (8.85)	24.06 (10.56)	19.30 (9.80)	10.40 (9.65)	397

Table 6: Ordered logistic regression

Mean dependent var.	3.204	SD dependent var	1.033
Pseudo r-squared	0.123	Number of obs	397
Chi-square	124.739	Prob > chi2	0.000
Akaike crit. (AIC)	905.262	Bayesian crit. (BIC)	941.118

Perception	Coef.	St.Err.	t-value	p-value	95% Conf	Interval	Sig
Group	-4.358	.516	-8.44	0	-5.37	-3.346	***
Education	-.589	.218	-2.70	.007	-1.016	-.162	***
Family size	-.149	.073	-2.05	.041	-.292	-.006	**
Land size	-1.402	.488	-2.87	.004	-2.358	-.446	***
Distance	-.157	.022	-6.99	0	-.201	-.113	***
Constant	-14.358	1.272	.b	.b	-16.85	-11.866	
Constant	-13.463	1.246	.b	.b	-15.906	-11.02	
Constant	-11.692	1.197	.b	.b	-14.039	-9.345	
Constant	-7.505	1.147	.b	.b	-9.753	-5.257	

**** p<.01, ** p<.05, * p<.1*

3.4. Ordered Logistic Regression Model Result

Before analyzing the results of the ordered logistic regression on the selected variables, it is crucial to verify the satisfaction of three key assumptions: the categorical nature of the dependent variables, adherence to the proportional odds model, and the absence of significant multicollinearity, indicating minimal correlation among the independent variables. In this context, the first assumption is met, as rural farm households' perception of urbanization is categorical and evaluated on a five-point scale.

Evaluating multicollinearity, which refers to the interrelationships among the independent variables, is a prerequisite for conducting ordered logistic regression. Tolerance and the variance inflation factor (VIF) are used to assess multicollinearity. Tolerance represents the variability in a particular independent variable that the other independent variables do not explain. On the other hand, VIF is calculated as the reciprocal of the tolerance value, providing an alternative measure of multicollinearity. A cutoff VIF value of 10 indicates a tolerance value below 0.1 and a VIF value above 10 would indicate severe multicollinearity, thus violating the assumption of the regression model (Hair et al., 2014). The tolerance and VIF values indicate tolerance values above 0.1 and VIF values below 5 (Table 7). The analysis confirms the absence of multicollinearity concerns among the independent variables.

Table 7: Multicollinearity Test

Variables	VIF	1/VIF
Group	4.88	0.205
Distance	4.68	0.214
Land Size	2.73	0.366
Family Size	1.14	0.874
Education	1.08	0.928
Mean VIF = 2.90		

The covariates, which include categories of rural kebeles (groups), educational status, family size, landholding size, and average distance of households from the urban center, showed a 5% statistical significance level through the multivariable Proportional Odds Model (POM). This highlights their essential role as critical determinants in the analysis of rural households' perceptions regarding the impacts of urbanization. On the other hand, gender, age, dependency ratio, and other socioeconomic variables of household heads did not demonstrate a statistically significant impact.

Goodness-of-fit statistics were used to assess the adequacy of the model in describing the data. In the present model, the Chi-Square is 124.739 with a P-value of 0.000, indicating a well-fitting model. Conversely, a significance value below 0.05 in the goodness-of-fit statistic suggests a poor fit. In this case, the chi-square value of 861.942 with a p-value of 1.00 indicates that the model adequately fits the data (p>0.05). The model summary presents the Pseudo R-Square, where pseudo indicates that it does not precisely explain the variation

but is an approximate measure of variation in the criterion variable. In this instance, the Nagelkerke Pseudo R-Square of 0.292 signifies a 29.2% improvement in outcome prediction compared to the null model based on the provided predictors.

One of the main assumptions of the proportional odds model for ordered logistic regression is that the effects of the predictors on the odds of falling into a higher versus lower category on the dependent variable are the same across categories. The insignificant test result suggests that the assumption of proportional odds is met, meaning the effects of the independent variables on the cumulative probability of falling into a higher category do not vary across categories on the same dependent variable.

In Table 8, a significant test statistic indicates a violation of the parallel regression assumption (p = 0.000). Given this violation, it is essential to thoroughly reassess the data using a more comprehensive PPOM analysis.

Table 8: Test of parallel lines

Model	-2 Log Likelihood	Chi-square	df	Sig.
Null hypothesis	873.739			
General	730.813	142.926	15	0.000

The PPOM can estimate less constrained models than the parallel lines models estimated by Ologit, which often face assumption violations. The default setting in STATA (GOLOGIT2), produces results similar to a series of Binary Logistic Regression (BLR) models and can be interpreted similarly. Both techniques involve incorporating a more significant number of parameters compared to POM, which presents a fundamental challenge. These approaches remove the parallel line requirement for all variables, even if only a subset violates the assumption (Williams, 2006). Consequently, the study utilized the AUTOFIT option with GOLOGIT2 to implement the PPOM. This allowed for the relaxation of the parallel line constraint exclusively for variables where the assumption was not justified while maintaining the parallel line constraint for variables that adhered to the assumption (Lelisho et al., 2022; Williams, 2006).

The results reveal a chi-square statistic of chi2 (6) = 8.69 with a p-value = 0.1919 for land size and the average distances of rural households from urban centers. This non-significant test statistic suggests that the final model does not violate these specific variables' proportional odds or parallel lines assumption. However, for the kebele categories (p-value = 0.00002), EDU (p-value = 0.00153), and FSIZE (p-value = 0.00768), the parallel lines assumption was violated. The proportional odds constraint is released for all variables, regardless of whether the assumption is violated by only one or a few of them. The interpretations of the effects of the constrained variables remain broadly consistent with those in the earlier logit model. The variations from the previous model primarily involve degree (Long & Freese, 2014). The result implies that categories of kebeles, educational status, and family size influence the perception of rural farm households regarding urbanization in their hinterlands. Accordingly, as shown in Table 7, the findings reveal that all variables included in the model achieved statistical significance with a p-value less than 5%.

The estimate presented in Table 9 illustrates the probability of a case surpassing a certain category on the dependent variable. The sign of the variables' coefficients is interpreted within linear regression. Positive coefficients suggest that higher explanatory variable values increase the likelihood of the respondent belonging to a higher category of Y rather than a lower one and the negative coefficients indicate that higher explanatory variable values raise the probability of being in the lower category. When analyzing the odds ratio, a value greater than 1 indicates that respondents have a higher agreement level than the reference lower category. Conversely, if the odds ratio is less than 1, respondents have a lower level of agreement on the issues relative to the reference category. An odds ratio of 1 implies that subjects in that category express the same level of agreement as the reference category.

Table 9: Generalized Linear Model Estimates using Perception Status as a response with five ordered categories

Parameter		β	Std. Error	Hypothesis Test			Exp.(β)	95% Confidence Interval for Exp. (β)	
				Wald Chi2	df	Sig.		Lower	Upper
Threshold	Perception = 1	-3.680	.6634	30.771	1	.000	.025	.007	.093
	Perception = 2	-2.779	.6523	18.149	1	.000	.062	.017	.223
	Perception = 3	-.993	.6395	2.408	1	.121	.371	.106	1.298
	Perception = 4	3.192	.6942	21.149	1	.000	24.345	6.245	94.905
Group = 1		4.331	.5072	72.917	1	.000	76.026	28.134	205.444
Group = 2		0[a]	.	.	.	.	1	.	.
Education = 1		.473	.2222	4.535	1	.033	1.605	1.038	2.482
Education = 2		0[a]	.	.	.	.	1	.	.
Family size		-.178	.0751	5.626	1	.018	.837	.722	.970
Land size		-1.447	.4869	8.832	1	.003	.235	.091	.611
Distance		-.147	.0232	40.233	1	.000	.863	.825	.903

The findings revealed significant differences between the two groups. Specifically, the coefficient and odds ratio for the control group were 4.331 and 76.026, respectively. This indicates that the control group, tends to have a more positive perception of urbanization's effects than those living nearby. Moreover, the odds ratio suggests that households far from urban areas are 76.026 times more likely to view the benefits of urbanization in their surroundings than households near urban areas. The results suggest that farm households near urban areas are more likely to express dissatisfaction with the urbanization taking place in their vicinity. The findings also reveal diverse perceptions among rural farm households regarding the impact of urbanization on their well-being.

The analysis examined the correlation between the educational status, illiterate and literate, of household heads and their perspectives on urbanization. Significant differences were found between the two groups, as indicated by the coefficient and odds ratio for illiterate households, which were 0.473 and 1.605, respectively. This indicates that illiterate households were 1.605 times more likely to fall into a higher perception category, expressly agreeing or strongly agreeing with urbanization, than literate households. Thus, illiterate farm households are more likely to view urbanization as having positive effects on their well-being than educated ones. As a result, the perspectives of rural farm households on urban expansion and its impact on their welfare vary based on their level of education.

The study also examined the impact of family size, treated as a continuous variable, on households' perceptions of urbanization within the study area. The findings indicated a significant influence of family size on households' perceptions. As family size increases, the negative coefficient (-0.178) and odds ratio less than 1 (0.837) suggest a higher likelihood of households with larger family sizes falling into a lower perception category (disagree or strongly disagree) regarding the effects of urbanization. The result suggests that rural households with larger family sizes tend to view urbanization negatively in their surroundings. Furthermore, the descriptive analysis revealed that households near urban areas (mean 4.6, SD 1.167) had a higher average than those located farther away (mean 3.97, SD 1.689). Thus, households with larger family sizes near urban areas demonstrated a more negative impact of urban expansion than those situated far from the urban center.

The results of the multivariable ordinal logistic regression analysis, presented in Table 9, demonstrate that the size of households' land significantly impacts their perception of the effects of urbanization, with a significance level of 5%. As the landholding size increases, the negative coefficient (-1.447) and odds ratio less than 1 (0.235) indicate a higher likelihood of falling into a lower perception category regarding the effects of urbanization. Consequently, households with smaller farmland sizes were more likely to agree positively with urbanization's effects than those with relatively more extensive farmland.

The study unveiled a significant correlation between households' proximity to the urban center and their perceptions of urbanization. In rural households, as the distance increases, the negative coefficient (-.147) and odds ratio less than 1 (.863) signify a higher probability of being categorized as having a lower perception regarding the impact of urbanization. These findings emphasize the diversity in farm households' perceptions of urbanization, which are influenced by their proximity to the urban center.

4. Discussions

The results of this study are consistent with established theories in urban and rural sociology and spatial assimilation. According to the perspective of Environmental Psychology, the positive outlook of rural households situated at a distance can be attributed to factors such as a cleaner environment, reduced congestion, and a calmer atmosphere compared to those in urban proximity (Gifford, 2014; Parsons, 1991). Therefore, distance strikes a harmonious balance between the benefits of urbanization and the preservation of rural attributes.

The study's findings are also consistent with spatial assimilation theory (Massey & Denton, 1985). According to this theory, individuals and households far from urban centers may view urbanization positively as they adapt to urban lifestyles while retaining some rural characteristics. The advantages of urbanization, such as economic opportunities and improved infrastructure, may outweigh potential drawbacks, resulting in an overall positive perception. Similarly, the findings align with the peripheral model of urbanization, which emphasizes the growth of urban areas on the outskirts, where rural and urban elements coexist (Kentor, 1981).

Another finding indicates a negative perception of urbanization among rural households as the educational status of household heads increases, particularly when compared to illiterate household heads. Economic and sociocultural theories aligned with this finding (Rodríguez-Pose & Hardy, 2015). According to economic disparities theory, as education levels rise, individuals become more aware of the economic disparities between urban and rural areas. This awareness could lead to a negative perception, especially if they perceive limited economic opportunities or unequal distribution of resources in urban areas. Similarly, sociocultural theories suggest that as education levels increase, rural individuals may become more aware of the potential loss of cultural identity associated with urbanization (Stephens *et al*., 2012). However, the finding also diverges with modernization and development theory (Holsinger, 1987). The authors argue that higher levels of education should result in a more positive perception of urbanization. The perspective suggest that educated people are more likely to view urbanization as a sign of progress and advancement, offering improved opportunities for education, healthcare, and employment. Several empirical pieces of evidence support the ideas presented in modernization and development theories (Demissie & Legesse, 2013; Iqbal *et al*., 2020). Thus, farmers with higher levels of education are more inclined to pursue non-farm self-employment and formal wage labor to diversify income.

Moreover, a correlation has been identified between family size and the perception of urbanization, with larger family sizes associated with a more opposed viewpoint (Headey & Hodge, 2009). This is consistent with existing literature referring to potential disruptions in traditional rural lifestyles. Prior evidence suggests that larger household sizes are linked to lower family well-being, despite the presence of alternative livelihood options like non-farm self-employment and formal wage labor (Kibrom *et al*., 2023; Wegedie, 2018).

Similarly, there is a significant association between increasing landholding sizes and a negative perception of urbanization. This finding aligns with the theory of economic dependence on agriculture (Vlasek, 1979), which suggests that households with more considerable farmland perceive urbanization negatively because they rely on agriculture for their economic livelihood. The households may be concerned that urbanization will result in the loss of agricultural land, which would directly impact their income and overall well-being (Factura *et al*., 2022). These empirical studies emphasize that urbanization often involves the conversion of nearby rural land to accommodate the expansion of urban centers.

5. Conclusion and Recommendations

The study aimed to investigate whether there are differences in the perceived effects of urbanization on rural farm households based on their proximity to urban areas and to identify socioeconomic factors contributing to the variations in perception. The results indicate distinct variations in perceptions of urbanization between households near urban areas and those further away. Rural farm households located further from urban centers generally perceive urbanization positively, attributing it to increased income diversification, improved agricultural production, job creation, and strengthened community relationships. However, those near urban areas tend to have a negative perception. Key determining factors contributing to these differing views include distance from the urban center, educational status of households, family sizes, land holding sizes, and categories of rural kebeles based on their distance.

Based on the findings, the concerned body is suggested to formulate interventions considering the diverse perceptions of urbanization among rural farm households, contingent upon their proximity to urban centers. Customizing programs and initiatives to address households' specific concerns and preferences in different locations can enhance their effectiveness. Recognizing the influence of educational status on perceptions, targeted educational campaigns on the benefits and challenges of urbanization can be implemented. This can contribute to a more informed understanding among rural communities and potentially mitigate negative perceptions. In addition, development initiatives may prioritize participatory approaches, involving residents in decision-making processes related to urbanization. This inclusive strategy can foster a sense of ownership, address specific needs, and build trust between practitioners and rural farm households.

Further study may focus on longitudinal studies to track changes in perceptions over time, allowing for a deeper understanding of the dynamic nature of attitudes toward urbanization. This would provide valuable insights into the factors influencing shifts in perspectives within rural communities. Further research could also explore similar studies in different geographic contexts or cultural settings to determine the generalizability of the findings. Comparative analyses contribute to a broader understanding of how regional and cultural factors influence perceptions of urbanization. Moreover, researchers may adopt interdisciplinary approaches, integrating perspectives from sociology, environmental psychology, and urban planning to comprehensively analyze the complex interplay of factors shaping rural farm households' perceptions of urbanization. Policymakers are suggested to consider spatial variation, such as proximity to urban areas, to consider rural farm households' unique needs and concerns. This approach ensures that interventions are tailored to communities' specific challenges in different geographical contexts. Emphasizing the potential benefits, such as improved infrastructure and economic opportunities, can contribute to a more positive overall perception. Balancing urban development with preserving agricultural practices and rural qualities requires comprehensive and collaborative land-use planning strategies.

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