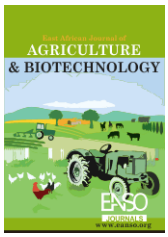

East African Journal of Agriculture and Biotechnology
eajab.eanso.org
Volume 7, Issue 1, 2024
p-ISSN: 2707-4293 | e-ISSN: 2707-4307
Title DOI: https://doi.org/10.37284/2707-4307

EAST AFRICAN NATURE & SCIENCE ORGANIZATION

Original Article

Analysis of the Influence of Forms of Urban Agriculture on the Socio-Economic Status of the Farmers in Kampala and Mbarara Cities, Uganda

Leonard Ninsheka[1], Edward Ssemakula[1], Christopher Tiyo[1], Rebecca Kalibwani[1] & Wilson Mugizi[2]*

[1] Bishop Stuart University, Mbarara, Uganda, P. O. Box 9, Mbarara, Uganda.
[2] Kyambogo University, P. O. Box 1, Kyambogo Uganda.
* Author for Correspondence Email: ninsheleo@gmail.com

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

Date Published:

08 June 2024

Keywords:

Urban Agriculture, Socio-Economic Status, Farmers, Uganda.

ABSTRACT

The study analysed the influence of the forms and drivers of urban agriculture on the socio-economic status of farmers in Kampala and Mbarara cities in Uganda. The study adopted a cross-sectional research design using multiple methods of data collection. A multistage cluster sampling technique involving simple random sampling to get both primary and secondary sampling units, snowball to get target respondents and purposive sampling for key informants and focus group members was used. Data were collected using social survey questionnaires for households, focus group discussions checklist (FGDs), key informant interview guides and observations, from a sample of 384 respondents. The study found a strong association between forms of urban agriculture and the socioeconomic status of the urban farmers in Kampala and Mbarara Cities. Subsistence forms (backyard, roadside and rooftop gardens), commercial forms (zero grazing, poultry, fish farms and crop farms), and tourist forms (demonstration sites) had a significant influence on household food and income security of urban farmers. The study established the lack of land, improved technologies and training as major obstacles and recommended the establishment of community networks, availing subsidies and credit and recruitment of extension personnel as interventions to help urban farmers.

APA CITATION

Ninsheka, L., Ssemakula, E., Tiyo, C., Kalibwani, R. & Mugizi, W. (2024). Analysis of the Influence of Forms of Urban Agriculture on the Socio-Economic Status of the Farmers in Kampala and Mbarara Cities, Uganda. *East African Journal of Agriculture and Biotechnology, 7*(1), 257-268. https://doi.org/10.37284/eajab.7.1.1975

CHICAGO CITATION

Ninsheka, Leonard, Edward Ssemakula, Christopher Tiyo, Rebecca Kalibwani and Wilson Mugizi. 2024. "Analysis of the Influence of Forms of Urban Agriculture on the Socio-Economic Status of the Farmers in Kampala and Mbarara Cities, Uganda.". *East African Journal of Agriculture and Biotechnology* 7 (1), 257-268. https://doi.org/10.37284/eajab.7.1.1975

HARVARD CITATION

Ninsheka, L., Ssemakula, E., Tiyo, C., Kalibwani, R. & Mugizi, W. (2024) "Analysis of the Influence of Forms of Urban Agriculture on the Socio-Economic Status of the Farmers in Kampala and Mbarara Cities, Uganda.", *East African Journal of Agriculture and Biotechnology*, 7(1), pp. 257-268. doi: 10.37284/eajab.7.1.1975.

IEEE CITATION

L. Ninsheka, E., Ssemakula, C., Tiyo, R., Kalibwani & W. Mugizi "Analysis of the Influence of Forms of Urban Agriculture on the Socio-Economic Status of the Farmers in Kampala and Mbarara Cities, Uganda", *EAJAB*, vol. 7, no. 1, pp. 257-268, Jun. 2024.

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

MLA CITATION

Ninsheka, Leonard, Edward Ssemakula, Christopher Tiyo, Rebecca Kalibwani & Wilson Mugizi. "Analysis of the Influence of Forms of Urban Agriculture on the Socio-Economic Status of the Farmers in Kampala and Mbarara Cities, Uganda". *East African Journal of Agriculture and Biotechnology*, Vol. 7, no. 1, Jun. 2024, pp. 257-268, doi:10.37284/eajab.6.1.1975.

INTRODUCTION

Urban agriculture (UA) is defined as the practice of growing crops and rearing animals for food, income, and medicine and environment management in and around the cities, towns & urban environments. It also includes the processing and marketing of such products (Thebo et al., 2014). This can be achieved through various technologies available for urban farmers to use in urban environments ranging from simple to complex based on available space, access extension guidance and the financial status of the farmers (Yuan et al., 2022). According to Mackay (2018), UA in Sub-Sahara Africa (SSA) encompasses a complex and diverse mix of production and marketing activities. The most common systems are i) backyard gardening (mostly subsistence); ii) open space crop cultivation for irrigated vegetables, flowers and ornamentals, seedlings, and rain-fed cereals (mostly market-oriented); and iii) the rearing of livestock, small ruminants, aquaculture, and poultry (both subsistence and market-oriented) and the recently adopted mode of farming which is agro-tourism among few urban farmers (Hein Pham et al., 2023) in Ugandan context. Urban production systems are usually very intensive and small-scale due to lack of farming space caused by competition from other sectors, especially housing (Van Veenhuizen, 2007).

In Uganda, urban farming is segregated into intensive commercial farms (poultry, piggery, rabbits, and green agriculture), subsistence farms (backyard farming) and agro-tourism farms (Lee-Smith et al., 2019). These farms are established with the aim of maximizing household expenditure and as a source of livelihood improving the socio-economic status (SES) of urban farmers. SES is represented by the combined measurement of the economic and social position of an entity compared to others in society (UBOS, 2006). Also, it refers to an individual's position within a hierarchical social structure (Abenawe 2022). This influences accessibility to resources, livelihood patterns, food & nutritional security, income, and ownership of property. A family will struggle to raise its status if it's low or fight to maintain it when it is threatened, and this fact is apparent to all societies (United Nations, 2020).

Literature relating to the effects of forms of UA on farmers' SES in Uganda is scanty (Hallet et al., 2016, Van. Tuijl et al., 2018). Information on various forms/types and drivers of urban farming in Uganda needs to be documented. The forms that are economically viable like Backyard gardening for vegetables and fruits, poultry keeping for eggs and meat, piggery for pork, and aquaculture for fish and mushrooms growing among others can be recommended for government support to promote them among urban farmers in order to improve their livelihood and boost their Socio-Economic status.

METHODOLOGY

The research used a cross-sectional study design using multiple methods of data collection. A semi-structured questionnaire was used for interviews and the household heads as the unit of analysis. Discussions with key informants were held using a prepared checklist. Field observations were made (field notes made and photos taken with the aid of a camera) on aspects such as the type of farming engaged in, level of technology being used on the farm, nature of housing both as farm structures and home, and availability of electricity and water. Discussions with urban agricultural experts seeking their professional opinions and secondary data sources were used to supplement household interviews and discussions with key informants and focus group discussions (FDGs)**.** The sample size comprising 440 respondents was distributed as 384 smallholder farmers, 48 key informants and 8 FGD participants. The study was conducted during the period of May 2022 and February 2023. The population of the study was

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

urban farm households located in Kampala and Mbarara cities study areas, and the study investigated analysis of the influence of forms of Urban Agriculture on the SES of urban farmers. The quantifiable data was analysed at three levels using Statistical Package for Social Scientists (SPSS version 25.0). Separate analyses on farmers' interest in farming "intensive commercial versus subsistence farming" for Kampala & Mbarara cities were done for comparison and reported at three levels: a) at Univariate level (using frequency counts and percentages); b) at bivariate (using Pearson's correlation) and c) at multivariate levels (using logistic regression analysis).

The Univariate analysis encompassed the descriptive summary for each variable. To study characteristics of farmers, techniques for summarizing data for continuous variables were used and these include Mean, variance and standard deviation while the frequencies and percentages were used for categorical variables**.** This was supported with qualitative data from FGDs and key informant interviews.

Bivariate Analysis: Cross tabulations were done to test any possible associations between each of the independent variables and the dependent variable. Statistical significance of the relationships was determined for the P-value (P<0.05) and all significant variables at this level were considered at multivariate level analysis. This was done using Pearson's chi-square test.

The chi-square test statistic (χ^2) used is of the form.

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\frac{(O_{ij} - E_{ij})^2}{E_{ij}} \qquad [1]$$

Where $\chi^2 = Chi - square$; Oij=the observed frequency in the ith row and jth column; Eij=the expected frequency in the ith row and jth column; Chi-square is tested at a 0.05 level of significance; i=1.r; j=1….c

Multivariate analysis was performed to assess which factor is associated with Farmers' Socioeconomic status (SES) more than the other. The Farmers Socio-economic status (SES) "Better income" "Ownership of property/assets & quality of housing" "Food and nutritional status" SES is a categorical variable with more than two categories and therefore the suitable model to analyse this kind of criterion variable is the multinomial logistic. Multinomial logistic regression analysis was used because it attempts to control for the possible confounding effect of independent variables on each other and thus finds the independent association for each predictor variable with the dependent variable. The model is given by.

$$\log\left(\frac{p_{ji}}{p_1}\right) = \alpha j + \beta j \times i \qquad [2]$$

Where: αj represents the constant; Pji represent the probability of the jth category; βj s represents regression coefficients, ×i s represents independent variables; P1is the probability of the base category

The relative risk ratios were interpreted as relative probabilities, which is the probability of falling in the jth category of social-economic status rather than the base category social-economic variable. Variables with a p-value of <= 0.05 were considered to be important in explaining the outcome of interest. Independent variables that were not significant at the bivariate level won't be considered at this level of analysis.

RESULTS AND DISCUSSION OF FINDINGS

The forms of urban agriculture considered in the study were categorized into three forms; (a) subsistence forms which include hanging gardens, Backyard gardens, roadside gardens, rooftop gardens and vacant plots (b) commercial forms which include; zero grazing, poultry, fish, piggery, Rabbits, and crop farms (c) Tourist forms which include; demonstration site and education/ training sites (Luehr, 2019). Frequency counts and percentages were calculated and used to interpret

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

the variables (*Table 1*). Analysis of the subsistence form of urban agriculture on the socio-economic status of urban farmers indicates that backyard gardens reported a fairly significant proportion of the respondents 64.6% and when disaggregated, it represents 62.5% and 66.5 for Kampala and Mbarara cities respectively. (*Plate 1*). This was supported by FDG and key informants' opinion who urged that backyard gardens should be encouraged and supported for urban families to promote the supply of fresh greens, mushrooms, herbs and vegetables to meet the family needs on a daily basis. This study concurs with Mugisha et al. (2016) and found that backyard gardens existed in the study areas in the form of food towers, pots, sacks, polythene bags and ridges. The main reasons advanced by many urban farmers for adopting these techniques are that they are easy to establish and manage, they don't need much space, they don't require special skill, and they are affordable. This study adds that the technologies employed by the urban farmers were convenient for urban agricultural practices and production.

Plate 1: Back yard/home garden taken from Kampala city

Source: Field data

Analysis of subsistence forms of urban agriculture on SES of urban farmers was done and the study further revealed a significant number of respondents (61.1%) undertook farming in vacant plots; disaggregated as 52.6% and 70% for Kampala and Mbarara cities respectively. The results show that there are more spaces and vacant areas in Mbarara city than in Kampala city. These areas have been put to use by the smallholders in various forms of urban farming in an effort to meet their needs (food, income and family necessities).

Given that there exists a ready market, the smallholders have been able to take advantage of and utilize the existing space in the production of a variety of products. This finding is in tandem with Van Veenhuizen (2002) who argued that *urban agriculture arises not only out* of *crisis situations but also exists because* of *nearness* to *urban markets.*

This was confirmed with the responses from FGD and Key informants' interviews, that vacant plots are a danger to city inhabitants as they harbour dangerous vermin like rats and snakes that find their way to family homesteads. This is in agreement with Garvin et al. (2013) who argued that vacant land poses a significant economic challenge for many cities as it may affect the health and safety of residents.

They further urged that community members should identify local health impacts and generate solutions to vacant spaces. The study established that utilizing these plots for agricultural productivity is the best option to put these idle spaces into production and also to lessen the potential dangers they pose.

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

Plate 2: Vacant plots gardens in Mbarara city


Source: Field data

Analysis of commercial forms of urban agriculture on SES of urban farmers was done and the study revealed a significant number of 64.5% of the respondents reported poultry farming as a form of agriculture practised in the two cities; disaggregated as 65.6% and 63.5% for Kampala and Mbarara respectively as illustrated in *Plate 3* below.

These results are in tandem with Katongole et al. (2011) who reported that poultry rearing is the most livestock activity in Kampala and Mbarara cities, followed by cattle, pigs, goats, sheep and rabbits that order (Kembambazi and Ssemakula 2020).

These findings are supported by FGD and Key informants' interviews who argued that poultry production is high in urban centres due to the readily available market for poultry products in terms of eggs and chicken meat. They argue that poultry production helps farmers to realize quick investment returns which are an important motivator for poultry farmers.

Also, there are fewer social tensions associated with keeping poultry in urban centres compared to other livestock. They further argued that urban dwellers are high consumers of these products in restaurants, bars, hotels and market outlets both informal and formal markets.

Urban consumers buy poultry products in big numbers during festive seasons, parties and other public and private functions. This argument is supported by Attai et al. (2022) who revealed that poultry production provides high-quality, affordable animal protein, a high chance for investment, job opportunities and a source of income for smallholders worldwide.

Plate 3: A local poultry unit with pullets in Mbarara City

Source: Field data

Analysis of commercial forms of urban agriculture on SES of urban farmers was done and the study further revealed a significant number of respondents 84.6% undertook crop farming; representing 81.8% and 87.5% of respondents for

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

Kampala and Mbarara respectively when disaggregated.

However hanging gardens, Roadside gardening, rooftop gardening, zero grazing, fish farming, demonstration sites and education centres have proved not to be significant because the respondents exhibited a lack of technical knowledge, and harassment of city authorities, as one of the bottlenecks the majority of urban farmers raised.

All this is represented in *Table 1* below which gives the data from the respondents about their minds as far as the various types of urban farming they are involved in is concerned, which is economically viable in relation to the technical knowledge, available resources and inputs at their disposal.

Table 1: Forms of urban agriculture

Forms of urban agriculture		Responses	Kampala (*n*=192)	Mbarara(*n*=192)	Total (*n*=384)
Subsistence forms (%)	Backyard gardens	Yes	120(62.5%)	128(66.7%)	248(64.6%)
		No	72(37.5%)	64(33.3%)	136(35.4%)
	Vacant plots	Yes	101(52.6%)	134 (70 %)	235(61.1%)
		No	91 (47.4%)	58 (30 %)	149(38.9%)
	Roadside gardens	Yes	47(24.5%)	62(32.3%)	109(28.4%)
		No	145(75.5%)	130(67.7%)	275(71.6%)
	Hanging gardens	Yes	50(26.1%)	22(11.5%)	72(18.7%)
		No	142(73.9%)	170(88.5%)	312(81.3%)
	Rooftop gardens	Yes	27(14.1%)	28(14.5%)	55(14.3%)
		No	165(85.9%)	164(85.5%)	329(85.7%)
Commercial forms (%)	Crop farms	Yes	157(81.8%)	168(87.5%)	325(84.6%)
		No	35(18.2%)	24 (12.5%)	59(15.4%)
	Poultry	Yes	126(65.6%)	122(63.5%)	248(64.5%)
		No	66(34.1%)	70(36.5%)	136 (35.5%)
	Zero grazing	Yes	58(30.2%)	96(50%)	154(40.1%)
		No	134(69.8%)	96(50%)	230(59.9%)
	Rabbit	Yes	33(17.2%)	60 (31.3%)	93(24.2%)
		No	159(82.8%)	132 (68.7%)	291(75.9%)
	Piggery	Yes	47(24.5%)	31 (16.1%)	78(20.3%)
		No	145(75.5%)	161(83.9%)	306(79.7%)
	Fish	Yes	18(9.4%)	31(16.1%)	49(12.7%)
		No	174(90.6%)	161(83.9%)	335(87.3%)
Tourist forms (%)	Education and training sites	Yes	81(42.2%)	84 (43.7%)	165(43%)
		No	111(57.8%)	108 (56.3%)	219(57%)
	Demonstration sites	Yes	15(7.8%)	44 (22.9%)	59(15.3%)
		No	177(92.2%)	148 (77.1%)	325(84.7%)

Source: Field data

Bivariate Analysis Between Forms of Urban Agriculture on the Socio-Economic Status of the Urban Farmers

At the bivariate level, significant associations between independent and dependent variables were assessed and analysed using Pearson Chi-squared (X^U)correlation at a 5% level of probability as in *Table 2* below.

The socio-economic status of farmers was used in the relationship as the dependent variable whereas forms of urban agriculture including subsistence, commercial and tourist farms were used as independent variables. Therefore, the socio-economic status of the urban farmers (in terms of income, food security and ownership of property) was found to have a significant relationship with forms of urban agriculture such as subsistence farms (x^2 = 15.615, p<0.001)**,** commercial farms

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

(x^2 = 18.907, p< 0.000) and tourist farms (x^2 = 7.784, p< 0.005)

This means that the various forms of urban agriculture have a positive influence on the socioeconomic status of farmers since they are cost-effective and easy to use by the farmers. Also, these forms don't require extensive landholdings, and some can survive with limited inputs. Therefore there is likely hood that farmers who practice these forms are more likely to register success in terms of their household food and nutritional security and income as well as ownership of property.

Table 2: Correlation matrix between forms of urban agriculture on the socio-economic status of the urban farmers

	Socio-economic status of the urban farmers	
Forms of urban agriculture	**Chi-Square**	**Sig.**
Subsistence farms	15.615	.001
Commercial farms	18.907	.000
Tourist farms	7.784	.005

Source: Field data

The Influence of forms of Urban Agriculture on the socio-economic status of urban farmers was analysed at a multivariate level using the logistic regression model *Table 3*. The purpose was to assess the influence of socio-economic factors as determinants in the adoption of urban farming techniques with the help of the following hypothesis that "there is no significant relationship between the different forms of urban agriculture and the socio-economic status of urban farmers". The coefficients generated reflected the probabilities of the outcome as a result of a unit change in the explanatory variables.

Table 3: Parametric estimates for the influence of forms of urban agriculture on the socioeconomic status of urban farmers

Farmers Socio-Economic Status (SES)		**B**	**Std. Error**	**Sig.**	**Exp(B)**	**95% CI for Exp(B)**	
Household food security and income						**Lower**	**Upper**
	Intercept	.496	1.508	.742			
Subsistence farms	Hanging gardens	.065	.045	.155	1.067	.976	1.166
	Backyard gardens	2.174	.765	.002	1.929	.817	2.055
	Roadside gardens	1.885	.749	.012	.152	.035	.659
	Rooftop gardens	2.277	.704	.001	.103	.026	.407
	Vacant plots	0[b]					
Commercial farms	Zero grazing	2.165	.973	.026	8.712	1.294	58.658
	Poultry farms	1.547	.558	.006	4.699	1.574	14.027
	Fish farms	1.378	.723	.047	3.967	.961	16.379
	Crop farms	1.346	.581	.021	3.842	1.230	11.997
	Piggery farms	.017	.015	.247	1.017	.988	1.046
	Rabbit farms	0[b]	.	.	.	.	.
Tourist farms	Demonstration sites	-1.203	.573	.036	1.300	.098	1.924
	Education and training sites	0[b]					

a. Dependent variable is Farmers Socio-Economic Status (SES)
b. The reference category is ownership of property
c. This parameter is set to zero because it is redundant.

Source: Field data

Results from *Table 3*, the pseudo-adjusted coefficient of determination showed that the model explained 80.66 percent of the variations in the probability. The coefficients explained the changes in the probabilities of the outcome as a result of a unit change in the explanatory

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

variables. Farmers' Socio-Economic Status (SES) was used as the outcome category in the equation. For subsistence farms, five variables were hypothesized and three remained statistically significant at a multivariate level including that is backyard gardens (P<0.002), roadside gardens (P<0.012) and rooftop gardens (P<0.001). In addition, six types of commercial farms were hypothesized and four were found statistically significant at the multivariate level including zero grazing (P<0.026), poultry farms (P<0.006), fish farms (P<0.046) and crop farms (P<0.026). Lastly, two types of tourist farms were hypothesized and only one demonstration site (P<0.036) remained statistically significant at the multivariate level.

Subsistence Farms

The results reveal that Backyard gardens increased the log of the probability of a farmer's socio-economic status (SES) by 1.929. Farmers with backyard gardens are 1.9 times more likely to have food and income security compared to those that carried farming in vacant plots [AOR = 1.929; (95% CI: .817 - 2.055); P<002]. However, there was no statistical difference in food and income security chances for farmers with hanging gardens (P<0.155) and those doing vacant plot farming. In this case, the earlier stated null hypothesis that backyard gardens had no effect on farmer's socio-economic status was rejected. This can be attributed to the security of land tenure and security of the enterprises because in the backyard majority of farmers have full control over the land where they are carrying out farming and since it is near their home they can also offer protection of their enterprises against pests, diseases, vermin, wondering animals and thieves. The results resonate well with the findings by Kirungi et al. (2020) who established a significant effect of backyard farming and household food and income security. They found out that households practising backyard farming find it easier to meet their household food needs compared to none non-practising households. This means that excess food stuffs can be taken to market for income and the money spent on food stuffs saved for other domestic expenses. This implies that backyard farming if supported in urban areas can maintain the growth of food production and safeguard against interference in the food supply (Zezza and Tasciotti, 2010). These findings strengthen the argument for promoting urban agriculture as a tool to enhance food security and ameliorate poverty.

Unlike backyard gardens, roadside gardens decreased the log of the probability of a farmer's socio-economic status (SES) by .152 and were significant at P<005. Farmers who carried out a roadside garden form of urban agriculture were 152 times less likely to become food and income-secure compared to those who practised vacant plot farming [AOR = .152; (95% CI: .035 - .659); P<012]. However, there was no observed difference in food and income security status for farmers with hanging gardens and those practising vacant plot farming.

More so, the coefficient for rooftop gardens was positive and statistically significant, indicating farmers who carried rooftop gardening were .103 times less likely to become food and income-secure compared to those who practised vacant plot farming. This implies that an additional in rooftop gardens by a unit decreases the probability of household food and income security by .103 times [AOR = .103; (95% CI: .026 - .407); P< 001].

Commercial Farms

The coefficient for zero grazing was positive and statistically significant at a 5% level of significance, indicating farmers who carried zero grazing had 8.7 chances of being food and income-secure compared to those with rabbit farms. This was an indication a unit increment in zero grazing farms increased the probability of the log of household food and income security by 8.7 times [AOR = 8.712; (95% CI: 1.294 - 58.658); P< 026]. The results imply that farmers involved in zero grazing tend to be closer to their animals giving them maximum attention leading to high productive capacity from the animals. This is in agreement with research findings by Gerald (2000) who stated a positive relationship between

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

zero grazing and farmers' income since it increased farmers' profit margins. Further, the study recommended that farmers in urban areas should take up zero-grazing as an alternative source of household income.

Poultry farms as a form of urban agriculture increased the log of the probability of a farmer's socio-economic status (SES) by 4.7 and were significant at p< .005. Farmers who carried out poultry farming had 4.7 chances of becoming food and income-secure compared to those who practised rabbit farming [AOR = 4.699; (95% CI: 1.574 - 14.027); P< .006]. The earlier stated null hypothesis of no relationship between poultry farming and farmer's socio-economic status was rejected. This is attributed to the availability of a market for poultry products among the urban population in the form of chicken meat and eggs. The markets of poultry products in urban areas are found in restaurants, roadside chicken roasters, chapatti makers "rollex" and homes around the town. This argument is supported by Birhanu et al. (2021) who observed that poultry production plays a vital role in household nutrition and food security. Ngongolo et al. (2021) in their study in Tanzania, found out that chicken production contributed socially and economically through meat, manure, offerings, source of income, aesthetic value (beauty), provision of school fees, and source of employment. They further argued that chicken keeping is a very important sector in resource-constrained families as it provides for family proteins and income which support family health care, education, and other social needs The coefficient for fish farming was positive and statistically significant at a 5% level of significance, indicating farmers who carried out fish farming had 3.9 chances of becoming food and income-secure compared to those doing rabbit farming. An increment in fish farms by a unit was found to increase household food and income security by 3.9[AOR = 3.967; (95% CI: .961 - 16.379); P< .047]. This was attributed to the market for fish in urban areas compared to rabbit meat. Farmers in urban areas consume a lot of fish due to the nutritional benefits consumers get from eating them. Groot et al. (2023) results established that the majority of all interviewed households claimed fish to be their favourite source of animal protein.

Crop farming increased the log of the probability of a farmer's socio-economic status (SES) by 3.8 and was significant at p<005. Farmers who carried out crop farming had 3.8 chances of becoming food and income-secure compared to those who practised rabbit farming [AOR = 3.842; (95% CI: 1.230 - 11.997); P< .021]. Crop farming is easy to manage since it can grow anywhere with appropriate modifications. It can grow in small confinements like buckets, tins, polythene, sacs, hanging gardens, rooftops.

Tourist Farms

The coefficient for demonstration sites was negative but statistically significant at a 5% level of significance, indicating farmers training through demonstration sites had 1.3 fewer chances of becoming food and income secure compared to those that trained through education and training sites. A unit change in the number of demonstration sites was found to negatively affect household food and income security by 1.3[AOR = 1.300; (95% CI: .098 - 1.924); P< .036]. Farmers study better when studying in their own environment than in education training institutes. This is partly because they are stressed when brought to the formal school setting. As it's with adults, they study better when seeing and participating in demonstrations.

Results from FDGs indicated that there is a need to promote more informal training centres through government support to private individual farmers who are interested in making their farms' demonstration centres of improved urban farming technologies. In addition, they also argued government to establish public demonstration centres in urban environment where improved technologies are developed and tested for willing farmers.

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the study confirmed a strong association between forms of urban agriculture and the socio-economic status of the urban farmers in both Kampala and Mbarara Cities. Subsistence farms (backyard, roadside and rooftop gardens), commercial farms (zero, poultry, fish farms and crop farms), and tourist farms (demonstration sites) had a significant influence on household food and income security of farmers.

Based on the findings, the study made the following recommendations. Lack of access to land is one of the major obstacles to urban farming. So, farmers should be encouraged by city authorities under the production department to use a variety of options (buckets and sacks for crop growing) and urban farmers be guided on types of crops and soil/nutrient types. There is a need for urban farmers to develop community networks such as community urban farming or urban market gardening on a cooperative basis. This enables urban farming communities to negotiate urban farmers' concerns including agro-produce prices. These networks can help to realize economies of scale thereby reducing production and marketing costs. There is a need to establish policies and guidelines to regulate and promote urban farming and to provide services that promote urban farming, as part of the wider urban planning.

Agriculture technologies are needed to effectively deal with the problems of using recycled urban organic waste and wastewater and should be promoted to enable the adoption of safer agricultural practices. Such technologies include the biological treatment of wastewater for irrigation purposes, the use of improved seeds and animal breeds. There is a need to train farmers on aspects such as pests and disease control, use of household organic waste as manure, use of high-yielding varieties, irrigation, and marketing of commercially viable crops, particularly vegetables.

ACKNOWLEDGMENT

Special thanks go to my co-authors of this article which include for the tireless and invaluable guidance, positive criticisms and suggestions towards the completion of this article. In a special way, I would like to extend appreciation to Ndejje University and Bishop Stuart University management for creating an enabling environment under the RUFORUM GTA studentship grant that has seen me reach this far. In the same spirit, my gratitude goes to the Carnegie Corporation of New York for funding my research. My heartfelt gratitude goes to my family for giving me the foundation which has brought me this far

Declaration of Conflict of Interest

The authors do hereby declare no conflict of interest for this research and publication

REFERENCE

Abenawe. C, (2022) Social Economic Status in Selected Secondary Schools in Ibanda District Uganda. Department of Education Kampala International University, Uganda. AA Journal of Education 8(1):73-89

Attai. Y. A, Md. Rahman. T, Md. Hossain.J, Basiouni. S, Khafaga.A, Shehata. A. A, Hafez.A.H (2022) Poultry Production and Sustainability in Developing Countries under the COVID-19 Crisis: Lessons Learned. https://doi.org/10.3390/ani12050644

Birhanu.M.Y, Osei-amponsah.R, Obese.F.Y, (2021) Smallholder poultry production in the context of increasing global food prices: roles in poverty reduction and food security. DOI: 10.1093/af/vfac069

Garvin. E, Branas. C, Keddem.S, Sellman. J, Cannuscio. C, (2013). More than just an eyesore: local insights and solutions on vacant land and urban health. J Urban Health: 90(3):412-26doi: 10.1007/s11524-012-9782-7. PMID: 23188553; PMCID: PMC3665973

Gerald.K, (2000) Economics of peri-urban zero grazing in Uganda. The case of Mpigi

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

District, master's Thesis, Nairobi University –Kenya

Gloot.J. J, Broeze. J, Castelein. R. B (2023). Food and nutrition security in Kibera (Nairobi, Kenya) with a focus on protein and amino acids. Wageningen Food & Biobased Research

Hallett, S., Hoagland, L., and Toner, E. (2016). Urban agriculture: environmental, economic, and social perspectives. J. Horticult. Rev. 44, 65–120. DOI: 10.1002/9781119281269.c

Katongole. C. B, Nambi-Kasozi. J, Lumu. R., Bareeba. F, Presto. M, Ivarsson. E, Lindberg. J. E, (2011) Strategies for coping with feed scarcity among urban and pen-urban livestock farmers in Kampala, Uganda .*Journal of Agriculture and Rural Development in the Tropics and Subtropics* 113(2):165-174

Kembambazi L and Ssemakula.E, (2020) The Effect Peri- Urban Farming on Food Security among Smallholder Farmers in Mbarara Municipality.Bishop Stuart University, Mbarara, Uganda.

Kirungi.M, Sseremba.G, Tugume.K.J, Murongo.M.F, Ssekandi.J, Mwine. T.J, (2020 Contribution of backyard farming to food and income Security: Case of Kampala Metropolitan.

Lee-smith.D, Prain.G, Cofie.O, Van Veenhuizen.R, Karanja.N, (2019) Urban and peri-urban farming systems.Feeding cities and enhancing resilience, DOI: 10.4324/9781315658841-16

Luehr.G, (2019) Intra-urban agriculture in Nanjing, China: Practices, motivations, and challenges. Master's Thesis University of Waterloo.

Mackay.H (2018) Mapping and characterizing the urban agricultural landscape of two intermediate-sized Ghanaian cities. Agriculture and Double Burden Malnutrition in Urban Africa, Department of Geography and Economic History, Umeå University, 90187, Umeå, Sweden https://doi.org/10.1016/j.landusepol.2017.10.031

Mugisha, I.O., Molly, A., Muyinda, M., Gafabusa, R., Kituuka, G., Kyampeire,B., Atim, J., Nampeera, M., Nafula. R., Sseruwu, G., Kabanyoro, R., and Akello,B.O. (2016.) A farmers' guide to home gardening: how to establish and manage homegardens. NARO-Mukono Zonal Agricultural Research and Development Institute,Uganda.

Ngongolo. K, Chota. A, (2021). Chicken production, flock size, management systems, and challenges in the Dodoma region in Tanzania. Poult.Sci.100:101136.

Thebo, A.L. Drechsel, P. Lambin, E.F. (2014) Global assessment of urban and peri-urban agriculture: irrigated and rainfed croplands. Environ Res Lett 9:114002. DOI: 10.1088/1748-9326/9/11/114002

Uganda Bureau of Statistics (UBOS) (2006). Uganda National Household Survey (UNHS) 2005/2006 (40p). Kampala: Uganda Bureau of Statistics.

UN (2020) Recovering better: economic and social challenges and opportunities. A compilation of the High-level Advisory Board on Economic and Social Affairs Published by the United Nations, Department of Economic and Social Affairs, New York, New York 10017, United States of America.

Van veenhuizen. R, (2002) The Economics of Urban Agriculture. *Urban Agriculture magazine.* ETC-RUAF

Van Veenhuizen. R, (2007) Profitability and Sustainability of Urban and Peri-Urban Agriculture. *Agricultural Management, Marketing and Finance Occasional Paper*. FAO, Italy-Rome,

Van.Tuijl, E. Hospers, G.J. Van Den Berg, L. (2018) Opportunities and Challenges of Urban Agriculture for Sustainable City Development. European Spatial Research and

 This work is licensed under a Creative Commons Attribution 4.0 International License

Article DOI : https://doi.org/10.37284/eajab.7.1.1975

Policy 25(2):5-22. DOI: 10.18778/1231-1952.25.2.01

Yuan.G.N, Gian Powell B. Marquez. GP.B, Deng.H, Iu.A, Fabella.M, Salonga. R.B, Ashardiono.F, Joyce A. Cartagena.J A, (2022) A review on urban agriculture: technology, socio-economy, and policy.[Heliyon 8(11), Article e11583] https://doi.org/10.1016/j.heliyon.2022.e11583

Zezza. A. and Tasciotti. L. (2010) Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries.

 This work is licensed under a Creative Commons Attribution 4.0 International License