Drivers of Urban Agriculture and their Influence on the Socio-Economic Status of the Urban Farmers in Uganda, A Case Study of Kampala and Mbarara Cities

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ABSTRACT: The study analyzed the influence of forms and drivers of urban Agriculture on the socio-economic status of the farmers in Kampala and Mbarara Cities. The specific objective of the study was to examine the influence drivers of urban agriculture on the socio-economic status of farmers. The study adopted a cross-sectional research design using multiple data collection methods. 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 drivers of UA and the socioeconomic status of the urban farmers in Kampala and Mbarara Cities. Household socio-economic status has substantially correlated with the drivers of the urban farmers and out of 9 items considered only 5 was significant which include access to capital (x^2 = 1.175, p< 0.047), access to agriculture extension services (x^2 = 3.634, p< 0.026), access to financial grants (x^2 = 5.190, p<0.001), access to markets (x^2 = 6.993, p< 0.001), value addition(x^2 = 3.718, p<0.014). The study confirmed a significant relationship between drivers of urban agriculture and the socio-economic status of urban farmers. Urban agriculture drivers like access to capital and financial grants, nature of market access and value addition had a significant influence on household socio-economic status.

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INTRODUCTION

Urban agriculture is the practice of growing crops and rearing animals in and around urban centres. Social economic status on the other hand describes the position of an entity about others. UA is carried out for subsistence, economics, recreation, and community building (Hallet et al 2016). According to Martin-Moreau, (2019), people in developed nations tend to engage in urban agriculture for purposes of recreation and community building more than economics or subsistence meanwhile (Hallet, et al.,2016), observe that people in the poorest nations tend to grow food primarily for subsistence and sale. Historical examples show that wars and economic depressions draw people into urban agriculture for subsistence, (Pauleit et al., 2019) whereas economic growth sees urban farms shuttered, built upon, or converted from farms to parks (Martin-Moreau,2019). In addition, currently, some farmers engage in urban agriculture to improve their diet through the inclusion of more freshly grown produce, and it improves their financial well-being through additional income gained by selling excess produce. Urban farmers engage in agricultural activities to enjoy fresh foods that have higher nutritious qualities mainly fruits, vegetables and eggs which otherwise would not necessarily be available for purchase.

Poulsen et al., (2015) reviewed 33 studies on UA in sub-Saharan Africa and compiled urban farmers' perceptions about UA. Evidence of the positive contribution of UA comes from, among other countries, Kenya, where 40% of surveyed urban farmers "think they would starve if they were stopped from farming" (Sangwan & Tasciotti 2013). They further revealed that in

Cameroon, urban farmers considered UA to be the most important source of calories for their households, and in Zambia, UA is considered a key tool for meeting shortfalls in household food requirements (Simatele & Binns 2008)

According to FAO (2019), Sub-Saharan Africa (SSS) is the poorest and most food-insecure region of the world and so it is here that understanding the role of UA is the most important (Townsend and Gautam 2021, Sassen, 2012 and Dodo, 2020). According to Amao, (2020), UA has the potential to increase access to nutrition for the urban poor (Ayerakwa et al., 2020), in particular through horticultural crops that are rich in important minerals such as zinc and iron, and vitamins, such as vitamin A, that are often deficient in African diets.

According to Ndiya (2019) African indigenous greens which are readily available at local markets and are easily grown in a relatively small space, play an important role in food security. Yeudal et al., (2007) document significant improvements in the health of children in Kampala, Uganda, who have access to food from urban plots. In addition, UA improves households' financial security and resilience in times of uncertainty via the possibility of selling fresh products in local markets.

However, there is little information available explaining what motivates farmers about their socio economic status. The drivers in terms of market access, access to extension services, access to credit services, access to capital, access to financial grants, access to a reliable source of water, access to electricity on the farm and value addition are not properly correlated to socio-economic status. Therefore this study addressed this missing link.

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 comprised 440 respondents 384 smallholder farmers, 48 key informants and 8 FGD participants. The study was conducted during May 2022 and February 2023. The population of the study was urban farm households located in Kampala and Mbarara cities study areas and the study investigated the analysis of the influence of drivers of Urban Agriculture on the SES of urban farmers. The quantifiable data was analyzed 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 the Univariate level (using frequency counts and percentages); b) at bivariate (using Pearson's correlation) and; c) at multivariate levels (using logistic regression analysis).

1. 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 by qualitative data from FGDs and key informant interviews.

2. 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;
$$\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$
………… 3.1 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……………………………………………

3. 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 analyze 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;

$$\log\left(\frac{p_{ji}}{p_1}\right) = \alpha j + \beta j \times i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\quad 3.2$$

Where: αj   represent the constant

Pji   represent the probability of the jth category

βj s represent regression coefficients, ×i s represent independent variables

P1is the probability of the base category

The relative risk ratios were interpreted as relative probabilities, that 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 was 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

The study was analyzed at three levels of analysis which included univariate, bivariate, and multivariate levels. At the univariate level 8 variables considered which include; access to markets, access to agriculture extension services, access to credit services, access to capital**,** access to financial grants, access to markets, having are liable source of water, access to electricity and value addition. Only 5 remained relevant as they registered the biggest percentage of respondents as far as motivation to engage in urban farming is concerned and they include; access to markets/Formal (76.6%),   access to credit services (52.6%), access to capital(76.6%), access to liable source of water (98.4%), access to electricity (87.5%). The results further reveal comparisons between cities which are well indicated in Table 1.

Table 1: Drivers of urban agriculture

Drivers of urban agriculture	**Response**	**Kampala (*n=192*)**	**Mbarara (*n=192*)**	**Total (*n=384*)**
Access to markets	Formal	169(88%)	125 (65.1%)	294 (76.6%)
	Informal	67 (34.9%)	23 (12%)	90(23.4%)
Access to agriculture extension services	Yes	36 (18.8%)	40(20.8%)	76 (19.8%)
	No	156 (81.2%)	152(79.2%)	308 (80.2%)
Access to credit services	Yes	104 (54.2%)	98 (51%)	202 (52.6%)
	No	88(45.8%)	94 (49 %)	182 (47.4%)
Access to capital	Yes	177 (92.2%)	117 (60.9%)	294 (76.6%)
	No	15 (7.8%)	75(39.1%)	90 (23.4%)
Access to financial grants	Yes	83(43.2%)	68 (35.4%)	151 (39.3%)
	No	109(56.8%)	124 (64.6%)	233 (60.7%)
A reliable source of water on your farm	Yes	188(97.9%)	190(98.9%)	378(98.4%)
	No	4(2.1%)	2 (1.1%)	6 (1.6%)
Access to electricity on your farm	Yes	173(90.1%)	163(84.9%)	336 (87.5%)
	No	19(9.9%)	29 (15.1%)	48 (12.5%)
Value addition	Yes	48(25%)	68 (35.4%)	116 (30.2%)
	No	144 (75%)	124 (64.6%)	268 (69.8%)

Source: Field data

At the bivariate level correlation analysis between urban agriculture drivers and the socio-economic status of the urban farmers was considered and was achieved through a Pearson correlation at a 5% level of probability. Only 5 remained significant at this stage; Access to capital, access to extension services, access to financial grants, access to markets and value addition (Table 2):

Table 2: Correlation matrix between drivers of urban agriculture and socio-economic status of the urban farmers

Variables	Socio-economic status	
Drivers of urban agriculture	Chi-Square	Sig.
Access to capital	1.175	.047
Access to agriculture extension services	3.634	.026
Access to credit services	.233	.629
Access to financial grants	5.190	.001
A reliable source of water on your farm	.018	.892

Access to electricity on your farm	1.395	.238
Access to markets	6.993	.000
Value addition	3.718	.014

Source: Field data

At the multivariate level, the significant associations between independent variables (drivers of urban agriculture) and dependent variables (socio-economic status of the urban farmers) were calculated and determined using logistic regression at a 95% confidence interval and a 5% level of probability. The hypothesis that there is no significant relationship between the drivers' of urban agriculture and the socio-economic status of the urban farmer was rejected. The study revealed that household socio-economic status was significantly influenced by urban agriculture drivers like access to capital, access to financial grants, nature of market accessed and per unit value added to the products (Table 3).

Table 3 Parameter estimates for urban agriculture drivers and socio-economic status of the urban farmers

Socio-economic status of the farmers [a]						95% Confidence Interval for Exp (B)	
Household food and income security		B	Std. Error	Sig.	Exp (B)	Lower Bound	Upper Bound
	Intercept	.236	1.435	.869			
Access to capital	Yes	-1.230	.412	.029	.795	.524	2.205
	No						
Access to agriculture extension services	Yes	-.289	.361	.423	.749	.370	1.519
	No	0[b]	.	.	.	.	.
Access to credit services	Yes	.143	.296	.629	1.153	.646	2.059
	No	0[b]	.	.	.	.	.
Access to financial grants	Yes	2.041	.702	.012	1.960	.531	2.734
	No	0[b]	.	.	.	.	.
A reliable source of water on your farm	Yes	.011	1.265	.993	1.011	.085	12.054
	No	0[b]	.	.	.	.	.
Access to electricity on your farm	Yes	.704	.425	.097	2.022	.879	4.650
	No	0[b]	.	.	.	.	.
Market system	Formal	3.845	.694	.002	1.413	.794	4.511
	Informal	0[b]	.	.	.	.	.
Value addition	Yes	1.346	.581	.021	3.842	1.230	11.997
	No	0[b]					

Source: Field Data

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.

DISCUSSION OF FINDINGS

Results from descriptive statistics (Table 1) revealed that a large proportion of respondent 76.9% attributed their motivation to take up urban farming to access to markets for their farm produce. When disaggregated the results revealed 65% and 88.2% for Kampala and Mbarara cities respectively. The majority of farmers attributed the availability of a ready market as a strong motivating factor to start farming in crops, livestock and poultry production. Formal markets in urban centres are associated with the purchasing power of urban consumers mostly those with stable sources of income especially those in the middle class. They are likely to purchase from organized markets like supermarkets, shopping malls and groceries. Urban consumers are classified as established high income', 'established low income', 'newcomers middle income' and 'newcomers low income (Hemerijckx et.al. 2023). They further revealed that middle to high-income urban dwellers have a more local food shed in the form of supermarkets due to their broad participation drivers urban agriculture, while low-income newcomers rely heavily on retailers, market vendors and fixed street fruits and vegetable vendors, other consumers grow their food at home because they have access to productive land. They revealed that apart from retailers and supermarkets also they reported the existence of middlemen in the marketing of agricultural products helping producers to locate potential consumers that are farm-to-market strategies.

Secondly, descriptive statistics (Table 1) further, revealed that a fairly large proportion 52.3% of respondents revealed that availability and access to credit services triggered urban farming. When disaggregated, 53.8% and 50.9% were from Kampala and Mbarara respectively. They argued that accessing credit facilities triggers urban farming. Farming is capital intensive and the availability of funds to farmers is the big motivation to engage in urban farming. The majority of farmers indicated that the availability of agriculture loans from financial institutions is a big motivator for urban agricultural engagement. However, this contradicts reality on the ground where the majority of farmers fear loans because of the unfriendly loan terms. The repayment period for most agriculture projects is faced with many risks and instabilities, high interest rates and the seasonality nature of agriculture products. However, the government of Uganda through the Central Bank in October 2009 rolled out the agriculture credit financing scheme (ACF) in partnership with commercial banks, Uganda Development Banks Limited (UDBL), Micro Deposit Taking Institutions (MDIs) and Credit institutions all referred to participating financial institutions (PFIs) (Bamwine, 2016). Further, the scheme aims to facilitate the provision of medium and long-term financing to projects engaged in Agriculture and Agro-processing, focusing mainly on commercialization and value addition. Bank of Uganda revealed that loans under the ACF are disbursed to farmers and agro-processors through the PFIs at more favourable terms than are usually available under conventional loan schemes. The main aim of the scheme is to increase the production and productivity of agriculture at the farm level. The funding is intended to enable farmers both in rural and urban areas to access needed inputs such as seeds, fertilizers, and agrochemicals and acquisition of appropriate that aid production, post-harvest handling, processing and storage facilities targeting both domestic and foreign markets (UDB Handbook 2020). However, the majority of the respondents seem to be either not aware of this scheme or fear applying for the scheme because they are not sensitized about the availability of the scheme and target people. Therefore, there is a need to sensitize the farmers in urban areas to use this golden opportunity to improve their farms by taking up these loans to acquire modern technologies to increase their productivity.

Another driver of urban farming is the availability of financial capital (Table 1). In an analysis of access to financial capital's influence on urban agriculture, a large proportion 76.4% of the respondents indicated that access to financial capital is a big boost to their farming enterprises and when disaggregated 92.5% and 60.9% for Kampala and Mbarara respectively. Urban farmers indicated that they get this capital from their savings from other businesses. This was further reaffirmed by Wieliczko et al., (2020) who revealed that savings are a catalyst for capital creation and are the driving force behind economic growth. Rapsomanikis (2015) also stated that farmers are having off-farm employment to complement farm income and contribute towards food security and poverty alleviation; by combining their labour, land and capital assets such as irrigation structures, tractors, and other machines, livestock as productive assets. The same author further revealed that human capital is another important source of capital because it exploits farmers' knowledge, skills, health or values to directly influence the choice of agricultural productivity. Knowledge and skills help in handling inputs combination by farmers, as well as acquisition and assimilation of information and technology use. All of which if combined, will lead to successful urban agriculture projects. Further, lack of access to (affordable) capital for the poorer population involved in Urban agriculture hinders or shuts off Urban producers' ability to acquire materials, implements and equipment which may increase their turns on labour and investment or add value through better processing, storage and packaging (Cabannes, 2012). The study suggests that capital-intensive facilities used in urban agriculture should be subsidized by the government such that they are affordable to urban farmers. Even the government should try to give out handouts in terms of inputs to urban farmers as it did to their rural counterparts through government poverty alleviation programs like Operation Wealth Creation (OWC) and Parish Development Model (PDM).

Having a reliable source of water is another motivator to urban farming (Table. 1). Descriptive statistics revealed a large proportion 98.6% of the respondents acknowledged that having a reliable source of water on the farm was among the key factors that prompted urban agriculture; effectively when disaggregated, represented by 98.1% and 99.1% for Kampala and Mbarara respectively. A small proportion 0.4% did not cite the availability of having a source of water on the farm as an incentive for urban agriculture. This finding agrees with Turffour et al., (2023) who underscored the importance of water as an essential feature for agricultural activities on the farm; used for irrigation of crops in the dry season (Tuffour et al., 2023); mixing agrochemicals and for animals to quench their thirst. This is supported by Dhakal et al., (2015) who indicated that alternative irrigation systems using groundwater and recycled wastewater are widely accepted for urban and regional agriculture, forestry and recreational landscaping. The presence of water can make the urban farmer invest in new agronomies and take on new crops that have short gestation periods and production of odd-season crops. Government strategy towards the provision of water investments targeting urban farmers would be in the right direction and worthwhile.

Lastly, access to electricity on the farm is another motivator for urban farming (Table 1). Analysis of access to electricity by the respondents revealed that, a big proportion 87.1% of the respondents stated that access to electricity on the farm initiated urban agriculture for some households; represented by 89.6% and 84.5% for Kampala and Mbarara respectively. Mbarara. Only a small proportion 12.9% disagreed that having electricity on farms did not initiate urban agriculture. Most urban farms need access to electricity mostly in livestock and poultry projects to feed livestock and poultry at night to maintain their production capacity. Even further, electricity is needed for agro-processing and value addition (Shirley et al., 2021). According to Sackey and Nock,

(2022) an electrified agriculture sector would not only lead to a drastic reduction in economic and food poverty, but it would also boost economic growth in Sub-Saharan Africa. Electrifying the agricultural sector could include activities the provision of such services as pumped irrigation, electrifying grain processing, feed processing, and other hand activities. The presence of electricity enables venture into more undertakings in agro-processing and new inventions and supply of fresh products. With farmers well connected, it's possible to do online marketing and supply.

At the bivariate analysis level correlation results of the relationship between urban agriculture drivers and the socio-economic status of the urban farmers revealed that only 5 variables remain significant at this level (table 2). With access to capital, access to agriculture extension services, financial grants, access to markets, and value addition had significant values ($p<0.05$).

This implies that given the intensive nature of urban agriculture enterprise there is need for support to urban farmers in terms of capital, guidance from extension officers, availing financial grants access to markets and value addition to enable urban farmers to grow their urban agricultural business.

At multivariate analysis, the significant associations between independent variables (drivers of urban agriculture) and dependent variables (socio-economic status of the urban farmers) were calculated and determined using logistic regression at a 95% confidence interval and a 5% level of probability as in Table 3.

Results of the logistic regression model for urban agriculture drivers and the socio-economic status of the farmers were analyzed. The coefficients explained the changes in the probabilities of the outcome as a result of a unit change in the explanatory variables. Farmer's socioeconomic status (SES) was used as the outcome category in the equation. Eight variables were hypothesized as "there is no significant relationship between the drivers' urban agriculture and the socio-economic status of the urban farmer" and only four remained statistically significant at the multivariate level including access to capital, access to financial grants, market system and value addition Table 3.

The coefficient of access to capital ($p< 0.29$) was found to have a positive association with farmer's socio-economic status at 5 per cent. Access to capital increased the log of the probability of farmers improving their household food and income security by .795. Farmers with access to capital had .795 chances of improving food and income security compared to those with no access to capital (Table 3). The stated null hypothesis that there was no significant association between access to capital and farmer's socio-economic status is rejected.

Similarly, access to financial grants presented showed a positive correlation and increased the probability of farmers improving household food and income security by 1.960. Farmers with access to financial grants had 1.9 chances of improving food and income security compared to those with no access to financial grants Table 3. The stated null hypothesis that 'there was no significant association between access to capital and farmer's socio-economic status' was also rejected.

In addition, the coefficient for market system or nature of market was positive and statistically significant, indicating farmers who accessed formal markets had 1.4 more chances of increasing food and income security compared to those that accessed informal markets Table 3. The stated null hypothesis that there was no significant association between the marketing system and farmer's socio-economic status is thus rejected.

Lastly, value addition was positive and increased the log of the probability of household food and income security by 3.8. Farmers who value addition opportunities were 3.8 times more likely to have food and income security compared to those who never added value Table 3. However, this finding was not statistically significant. For the stated null hypothesis, there was no significant association between value addition and the farmer's socio-economic status was rejected.

CONCLUSION

The study confirmed a significant relationship between drivers of urban agriculture and the socio-economic status of urban farmers. Urban agriculture drivers like access to capital and financial grants, nature of market access and value addition had a significant influence on household socio-economic status. The hypothesis that there is no significant influence between the drivers of urban agriculture on the social economic status of urban farmers was rejected.

DISCLOSURE

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