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The Effect of Backyard Agriculture on Household Income in the COVID-19 Era in Southeast Nigeria

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Abstract

Poverty is a major menace in Nigeria, and the onset of COVID-19 complicated the issue by limiting people's economic activities and livelihoods. Thus, there is a need for households to engage in sustainable economic activities to cope with economic shocks. Backyard agriculture could play a critical role in enhancing household income, especially during economic shocks; yet there exists a dearth of empirical information on this. Hence the need for this study, which investigated the effect of backyard agriculture on household income in southeast Nigeria. The study employed a multistage sampling procedure to get to the respondents. The data collected from randomly selected 480 households were analysed using descriptive statistics, t-tests, and multiple regression. The study revealed that households that engaged in backyard agriculture had a higher income (₦130,125=USD 204.84) than households that did not engage in backyard agriculture (₦64,700=USD 101.85). Thus, there is a difference of ₦65,425 (USD 102.99) between the average income of households that engaged in backyard agriculture and households that did not engage in backyard agriculture. The t-test results indicate that the difference between their income was significant at 1%. The regression result further shows that backyard agriculture significantly increased the income level of households. Thus, backyard agriculture is a crucial tool to enhance household economic status and livelihood during health and economic shocks. Based on these, this study recommends the promotion of backyard agriculture among households to boost household income by the government through agricultural extension agents.

Keywords: backyard agriculture, COVID-19, economic shocks, income, urban households

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Introduction

Coronavirus disease (COVID-19), first discovered in Wuhan, China, has become a global pandemic (WHO, 2020). The disease, which severely affects the human respiratory system is very deadly and spreads fast thus, requiring immediate preventive measures (Hamzah et al., 2020). In this respect, and to contain its spread, the Nigerian government responded to the disease outbreak in several ways: Firstly, the Nigeria Centre for Disease Control (NCDC) enlightened the citizens on WHO-recommended COVID-19 preventive measures including social distancing, practising respiratory hygiene, frequent hand washing, avoiding touching one's eyes, nose, and mouth (NCDC, 2020); secondly, lockdown and movement restrictions were imposed on citizens, and markets were shut down. These measures established to contain the spread of COVID-19 created serious impediments to economic activities such as farming and agri-food systems, people's other livelihoods and hence food security and nutrition (FAO, 2021). Most of the Nigerian populace, therefore, became endangered by the economic shocks due to the interruptions of economic activities which affected millions of people. During the periods, people's income was reduced drastically, which subjected them to adverse poverty. This calls for people's engagement in a sustainable and accessible means of livelihood in the country.

Backyard agriculture is a major sustainable economic activity that can be practised anywhere with a small piece of land. It involves the production of food crops around the home for household consumption and for public consumption to get revenue. It involves the growth of common food crops such as maize, tomato, pepper, cassava, yam, cocoyam, and vegetables and rearing animals such as poultry, rabbit, snails, goat, and sheep in a small area of land around the home for immediate family food and financial needs. This form of agriculture allows landless people, tenants, and people who are interested in agriculture but constrained by time and resources to embark on small-scale farming at their homes. Backyard agriculture is, therefore, a microenterprise that serves as a means of generating income for unemployed people, additional income for low-income earners and an income booster for high-income earners (González-Félix et al., 2021; Oke, 2014). In this regard, backyard agriculture has been recognised to play vital roles in people's socioeconomic status, household economy and the whole nation's development because it helps in reducing poverty (Adeyemo, 2016; Achoja & Obodaya, 2019; Ovharheet al. 2020). Backyard agriculture has the advantages of low start-up capital, easy management and monitoring, use of household waste, and low risk of theft (Ovharhe et al., 2020). Despite the potential of backyard agriculture on economic activities especially during economic or health shocks like COVID-19, people's involvement in it is currently low, which could result from a lack of empirical evidence on the subject matter.

Therefore, it is pertinent to answer the following research questions: (i) Is there a significant difference in income between the households that engaged in backyard agriculture and those that did not during health or economic shocks? (ii) Does backyard agriculture have a significant effect on household income?

The previous studies (for example, Achoja & Obodaya, 2019; Adeyemo, 2016; Bushamuka et al., 2005; Galhenaet al., 2013; Igwe et al., 2014; Kortright & Wakefield, 2011; Kumar et al., 2021; Nwibo et al., 2018; Ojo, 2009; Olneyet al., 2009; Taylor & Taylor, 2014a; Taylor & Taylor, 2014b) on backyard agriculture were conducted before the COVID-19 pandemic. Furthermore, these studies focused on factors motivating or influencing engagement

in the home garden, the potential of the home garden on food security, and the impact of homestead production programs on women's empowerment and nutrition. Therefore, information on the effects of backyard agriculture on the income of households, especially during health shocks like COVID-19 is lacking in the literature. Hence the need for this study.

This study contributes to the body of knowledge on the role of backyard agriculture in enhancing household income, especially during health shocks. The study compared the income of households that engaged in backyard agriculture and those that did not and showed if the observed differences in the income were due to engagement in backyard agriculture. This study is highly relevant considering the current economic situation in Nigeria and other developing countries as it will serve as the reference point for policymakers to enhance the economic status of households and lower the high level of poverty in the country. Understanding the impact of backyard agriculture on income will motivate and promote more participation in backyard agriculture by households.

This paper contains four sections. The next section focused on the methodology adopted in this study. This was followed by the section that presented the findings of the study and its discussion. The last section was on the conclusion and policy recommendations.

Methodology

Study Area

This study was conducted in southeast Nigeria. The region is made up of five states: Enugu, Anambra, Ebonyi, Imo and Abia states. It shares an international border in the east with Cameron and borders the Atlantic Ocean to the south. The study area is between latitudes 04º15ˈN and 07º00ˈN and longitudes 05º34ˈE and 09º24ˈE.

Sampling Techniques

A multistage sampling technique was used for this study. Enugu, Ebonyi, and Anambra States were randomly selected from the 5 States in Southeast Nigeria in the first stage. After this, four urban local government areas (LGAs) were randomly selected from each of the three selected states to make twelve LGAs. The third stage involved a random selection of two communities from each LGA. The last stage involved a random selection of ten households that practice backyard agriculture and ten others that did not practice backyard agriculture in each of the 24 communities. This gives a total of four hundred and eighty households (240 backyard agriculture households and 240 non-backyard agriculture households).

Data Collection

Primary data used for this study were collected using structured questionnaires. The questionnaire contains information on the socioeconomic characteristics of the households, and their decision to engage in backyard agriculture.

Data Analysis

Descriptive statistics, t-tests, and multiple regression were used to analyse the data.

Descriptive Statistics

Descriptive statistics such as mean, frequency, and percentage were used to describe the socio-economic characteristics of the household heads, and the present household income.

T-test

A t-test is a statistical tool that uses the average value of two different data sets or groups to check whether a significant difference exists between them. The independent samples t-test statistic was employed to compare the income of households that engaged in backyard agriculture and those that did not. The *t* statistic was used to test whether the means of the income of households that engaged in backyard agriculture and those that did not are significantly different or not. It is estimated as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{X1X2}\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where

t = t-test value

$\bar{X}_1$ and $\bar{X}_2$ are the mean values of group 1 (households that engaged in backyard agriculture) and group 2 (households that do not engage in backyard agriculture) compared.

S_{X1X2} is the standard deviation of the two groups.

n_1 and n_2 = number of households (n_1 = households that engaged in backyard agriculture, and n_2 = households that do not engage in backyard agriculture).

Multiple Regression

The multiple regression model is a statistical method used for analysing the relationship between a continuous dependent variable and one or more independent variables, which can also be called predictors. It was employed to examine the effect of backyard agriculture on household income. Some control variables, such as age, education, household size, and credit, are also included in the model. It was used following previous similar studies (for example, Kwaghe et al., 2009; Mafimisebi, 2008; Mukaila et al., 2021a; Mukaila et al., 2021b; Nzabakenga et al., 2013; Purnamadewi & Firdaus, 2018; Viera et al., 2017). Three

functional forms were employed in the study due to the nature of the data to get the model with the best fit. The selection of the best model was based on their coefficient of multiple determination (R-squared), the sign of the coefficients based on a priori expectations, the number of significant variables, the significance of the F value, and the mean squared error of the regression. The models are expressed as:

Linear form

$$Y_i = \beta_i X_i + \beta_i \gamma_i + \varepsilon$$

Semi-log form

$$logY_i = \beta_i X_i + \beta_i \gamma_i + \varepsilon$$

Double log form

$$logY_i = \beta_i logX_i + \beta_i log\gamma_i + \varepsilon$$

Where Y_i is the household income (in Naira), β_0 is the constant, β_i are the regression coefficients of the predictors, X_i is the variable of interest (backyard agriculture), γ_i are the control variables (age, educational status, household size, and credit), log is the logarithm of the variables, and e is the error term. Table 1 shows the measuring units and expected signs of backyard agriculture and other variables hypothesised to affect household income.

Table 1: Measuring Units and Expected Signs of the Variables

Variable name	Description	Unit of measurement	Expected sign
Backyard agriculture	Household engagement in backyard agriculture	Dummy: Yes = 1, otherwise = 0	Positive
Age	Age of household head	Years	Negative/positive
Educational status	Years spent in school by household heads.	Years	Positive

Household size	Number of family members in a household.	Number	Negative/Positive
Credit	Household heads' access to microcredit.	Dummy: yes = 1, no = 0	Positive

Source: Authors conceptualisation, 2024

Results and Discussion

Socio-economic Characteristics of Respondents

The socio-economic characteristics of household heads are presented in Table 2. Table 2 revealed that the majority (93.5%) of the household heads were males while only 6.5% were female. This could be due to the nature of the research which was household based. This is common in African household settings where men are the head of the family with the responsibility of providing for the family. More than half of the household heads were less than 40 years old with an average age of 43.3 years. This indicates a youthful and economically active age where they can contribute to household welfare (Mukaila et al., 2022a). Almost all the respondents had one form of education or the other as only 5.8% of them had no formal education. This indicates that most household heads had formal education. This could influence their decision-making towards engaging in economic activities to enhance their income nutrition and food security (Falola et al., 2023a).

About 90% of the respondents were married which indicates some level of responsibility for other people's welfare. About 7.5% were separated, and 2.3% were widowed. This implies that this study focused on the right population who have households. The larger proportion of the households (55.2%) had between six and ten household members who feed from the same pot. This is followed by those with one to five household members (42.9%) and those with ten to fifteen household members (1.9%). The respondents had an average household size of about six persons, indicating a significant number of children in the households. This could influence the contribution of children to the households' income and welfare (Falola et al., 2023b). The larger proportion of urban household heads had business (45.6%) as their major occupation. This is followed by civil servants (18.5%), trading (16%), artisanship (11.9%) and farming (7.9%). Their low participation in farming as a major occupation was due to being in an urban area with little availability of farmland. Membership in associations was very high among the respondents as only 16.2% do not belong to cooperative associations. This could enhance getting financial assistance needed for better well-being (Akanbi et al., 2022; Falola et al., 2022a; Falola et al., 2022b). In the same vein,

access to credit was also high among urban households as only 35.8% could not access credit. This could improve their welfare and standard of living. About half of the household heads had between ₦50,001 (USD 62.5) and ₦150,000 (USD 187.5) monthly income. Their average monthly income was ₦112,598.3 (USD 140.75), indicating a medium-level income.

Table 2: Socio-economic Characteristics of Respondents

Variable	Category	Frequency	Percentage
Gender	Male	449	93.5
	Female	31	6.5
Age (years)	≤ 30	82	17.1
Mean = 43.3	31 – 40	173	36
	41 – 50	126	26.3
	≥ 51	99	20.6
Educational level	No education	38	7.9
	Primary	89	18.5
	Secondary	206	42.9
	Tertiary	147	30.6
Marital status	Married	433	90.2
	Widowed	11	2.3
	Separate	36	7.5
Household size	1 – 5	206	42.9
Mean = 6.1	6 – 10	265	55.2
	11 – 15	9	1.9

Major occupation	Business	219	45.6
	Farming	38	7.9
	Trading	77	16
	Civil servant	89	18.5
	Artisanship	57	11.9
Membership of association	Yes	402	83.8
	No	78	16.2
Access to credit	Yes	308	64.2
	No	172	35.8
Monthly income (₦)	≤50,000	145	30.2
Mean = ₦112,598.3	50,001 – 150,000	251	52.3
	150,001 – 250,000	49	10.2
	≥250,001	27	5.6

Source: Field survey, 2023

Income of the Households Based on Engagement in Backyard Agriculture

Table 3 presents the income of the households based on engagement in the practice of backyard agriculture. The results revealed that the average income of a household that engaged in backyard agriculture was ₦130,125 (USD 204.84) while the average income of a household that did not engage in backyard agriculture was ₦64,700 (USD 101.85). The difference between the average income of households that engaged in backyard agriculture and households that did not engage in backyard agriculture was ₦65,425 (USD 102.99). The t-test result which was significant at a 1% level of significant further showed that there is a significant difference in the average income of households that engaged in backyard agriculture and

households that did not engage in backyard agriculture. This implies that households that engaged in backyard agriculture have a higher income than households that did not engage in backyard agriculture. Thus, backyard agriculture plays a crucial role in household income and livelihoods and can be used as a policy tool to boost household economic status. This is because backyard agriculture does not only serve as a means of accessing food but also as a means of earning additional income for the households. They earned extra income from the proceeds of backyard agriculture. This result is in tandem with the findings of some previous studies such as Bushamuka et al. (2005), Baliki et al. (2019) and Olney et al. (2009) where they reported that homestead garden enhances participants' income.

Table 3: Income of the Households Based on Engagement in Backyard Agriculture

	Households that engaged in background agriculture	**Households that did not engage in background agriculture**
Average income (₦)	130,125	64700
Difference (₦)	65,425	
t value	21.372	
Sig.	0.000	

Source: Field survey, 2023

Effect of Backyard Agriculture on Household Income

Table 4 presents the multiple regression results for the effect of backyard agriculture on household income. From the results of the three function forms of the regression, the semi-log form of the regression has the best fit based on the diagnostic tests. It has the highest R-squared, the highest F value which was significant at a 1% probability level, the least mean squared error of the regression, and the highest significant variables with the a priori coefficient signs. The variable of interest, backyard agriculture had a significant influence on household income. Other significant variables that influenced household income were the age of the household head and credit.

The coefficient of backyard agriculture was positive and significant in relation to household income (p<0.01). This implies that the probability of engaging in backyard agriculture increases household income. Therefore, households that engaged in backyard

agriculture had a higher income than their counterpart who did not. This is because of the economic benefits of backyard agriculture such as the revenue generated from the sales of food crops harvested from the backyard farms. The respondents stated that they sold vegetables harvested from the backyard farms almost daily which significantly contributes to household income. They also sold other food crops such as cassava and maize to boost household income to be non-poor and improve their livelihoods. Thus, backyard agriculture plays a crucial role in enhancing income, and improving livelihood and can be used as a policy tool for poverty alleviation. This result is supported by Bushamuka et al. (2005), Baliki et al. (2019) and Olney et al. (2009) who reported that homestead garden enhances participants' income. Achoja and Obodaya (2019), Igwe et al. (2014) and Adeyemo (2016) also found that backyard agriculture significantly contributed to rural income.

The coefficient of age of the household head was negative and significant in relation to household income (p<0.01). This implies that an increase in the age of household heads decreased household income. Therefore, households whose heads are aged had a lower income than their counterparts whose heads are young and active. This is because people's economic activeness decreases as they age, and as a result, their income declines. Furthermore, all things being equal, people's health tends to decline as they age, thereby, limiting their ability to work and earn income (Aidoo-Mensah, 2018). This result is in line with the findings of Aidoo-Mensah (2018), Fadipe et al. (2014), Mukaila et al. (2021a), and Viera et al. (2017) that age inhibits household income. However, it is against the findings of Mukaila et al. (2021b), who reported that income increased alongside age.

The coefficient of credit access was positive and significant in relation to household income (p<0.01). This implies that an increase in credit access by the household heads increased household income levels. This is because external financial supports serve as a means of getting the required capital to invest and increase the production level needed to boost household income. Thus, households whose heads accessed credit had a higher income than those with small sizes. This is in line with the findings of Mukaila et al. (2021a), Mukaila et al. (2022b), Purnamadewi and Firdaus (2018) and Urgessa (2015), who reported that access to credit enhanced household income level.

Table 4: Effect of Backyard Agriculture on Household Income

	Linear		Semi-log		Double log	
	Coef.	t	Coef.	t	Coef.	t
Backyard agriculture	48212.76***	4.56	0.4804727***	5.51	0.0178435***	5.13
Age	-777.4299	-1.57	-0.0114635***	-2.80	-0.20209*	-1.66
Education	4236.28***	2.94	0.0048447	0.41	0.0092927	0.73
Household size	5837.299**	2.32	-0.0095776	-0.46	-0.1249375	-1.06

Credit	9176.245	0.86	0.3129814***	3.56	0.0071893***	3.51
Constant	41264.89	1.21	11.61028	41.21	12.2148	27.61
F	7.92		11.11		9.05	
Prob > F	0.0000		0.0000		0.0000	
R-squared	0.0771		0.1049		0.0871	
Adj R-squared	0.0674		0.0954		0.0775	
MSE of regression	1.1e+05		0.91832		0.92738	

** and *** represent significance at 5% and 1%, respectively

Source: Field survey, 2023

Conclusion

This study investigates the effect of backyard agriculture on household income during the COVID-19 era in Southeast Nigeria. Households that engaged in backyard agriculture have a higher income than those that did not embark on backyard agriculture, which is statistically significant. Therefore, the study concludes that backyard agriculture has a significant influence on household income during health and economic shocks. Thus, backyard agriculture is an important tool that can be used to combat poverty in Nigeria.

Backyard agriculture has a crucial role to play in enhancing households' income and lowering poverty in the country. The government should organise a programme that would promote the engagement of households, especially urban households, in backyard agriculture. This would educate urban households on the critical role backyard agriculture can play in their welfare status. Also, the government should encourage participation in backyard agriculture through the provision of micro-credit dedicated to backyard agriculture to increase household income. Household heads on their part should join their resources through cooperative associations to enhance their access to credit needed to embark on backyard agriculture.

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