

Assessment of Poverty among Urban Farmers in Ibadan Metropolis, Nigeria

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ABSTRACT This study examined poverty status of urban farm households. The study was carried out in Ibadan metropolis. The data used for the study were obtained from well-structured questionnaires. 200 farming households were sampled from two local government areas within Ibadan metropolis. Data generated were analysed using descriptive statistics, poverty indices and logistics regression analysis. Results from the study showed that those engaged in crop farming have the highest poverty level (50%), while mixed farming households have poverty level of 37% and livestock, 17%. The estimated logistic regression equation showed that crop farming activity engaged in and household size increase the odd ratio of being poor while age of urban farmers, educational status, years of experience in farming and livestock farming decrease the odd ratio of being poor. Hence, mixed farming and livestock farming are antidote to reducing poverty among urban farmers.

I. INTRODUCTION

The role of urban agriculture in the food supply of cities and towns, as a complement to rural agriculture is becoming an important issue in a globalizing world economy. Factors affecting this rise in urban agriculture include increasing levels of urban poverty, agricultural policies, economic transition, disasters, and policy initiatives on urban agriculture. For the poor, economic benefits are considerable- they save by consuming food produced at home, and they earn extra income by selling produce. For the poorest of the poor, urban agriculture provides access to food and helps stamp out malnutrition (Drakakis-Smith, 1992). For the stable poor, it provides a source of income and high-quality food at a low cost. And for middle-income families, it offers the possibility of savings and a return on investment in urban property (UNDP, 1996). The participation of middle-income households in urban food production has been a notable finding of research undertaken in Nigeria (Gefu, 1992), Mozambique (Sheldon, 1991), and South Africa (May and Rogerson, 1995).

Gefu (1992) argues that the escalation in part-time farming in urban Nigeria represents a survival strategy for many urban wage earners to supplement declining real wages in the wake of structural adjustment measures. Economic crisis and structural adjustment in Nigeria fostered the development of multiple modes of

social livelihood, and many public servants becoming part-time urban cultivators (Mustapha, 1991). In many African cities, past two to three decades have been times of economic hardship. During the 1960s and 1970s, urban populations were favored over rural people with relatively high wages, cheap food policies, better access to health and social services, and stronger safety nets. But from the early 1980s, urban economies across Africa have been in a state of stagnation, if not steep decline. One of the factors contributing to this decline was the economic reforms undertaken by many African countries in the 1980s (Demery and Squire, 1996; Becker, et al., 1994).

Table 1 shows the trends in poverty level in Nigeria between 1980 and 1996. The incidence of poverty increased sharply both between 1980 and 1985 and between 1992 and 1996. The 27.2% for 1980 translated to 17.7 million persons whereas there were 34.7 million poor persons in 1985. As at 1996, two out of every three Nigerians were below the poverty line (Yusuf, 2002).

Poverty reduction is the ultimate goal of development policy. To reduce poverty, policy makers first need to know the incidence, depth, and severity of poverty. The paper estimates poverty measures using the gap and squared gap poverty measures as well as the headcount ratio; Easterly (2000) and Ravallion (1997) limit their analysis to the headcount measure. The use of depth and severity measures of poverty is important as these two additional measures

Table 1: Trends in poverty level: 1980-1996 (in %)

Year	Poverty level %	Estimated total population (Million)	Population in poverty (Million)
1980	28.1	65.0	17.1
1985	46.3	75.0	34.7
1992	42.7	91.5	39.2
1996	65.6	102.3	67.1

Source: FOS, 1999

provide information on the depth and severity of poverty and, hence complement the poverty – spread picture painted by the headcount ratio. Given the importance of urban agriculture as enunciated above, the main objective of this study is to determine the impact of urban farming on the poverty status of households. This becomes imperative in Nigeria due to paucity of literature on urban farming. The working hypothesis is that urban farming will significantly affect the poverty status of the respondents.

II. CONCEPTUAL FRAMEWORK

Urban agriculture refers to the practice of farming in a city environment. Urban farming is conceptualized to have mitigating effects on household poverty. Urban households that practice farming tend to spend less on food, which has been found to take about 70 percent of poor household's expenditure (Omonona, 2001; Adejobi, 2004). In another vein, it is possible that households may produce more than the food required for home consumption and the excess is offered in the market as a tradable commodity to generate income, which is in turn spent on other household needs, thus reducing poverty. In this connection, household income saved by consuming own produced food and the money made from sales of excess food produced by the households that practice urban farming (is assumed) would be spent on other household needs thus improving the welfare of such households. Therefore, this concept is very important in the study of urban farming and its impact on poverty. Hence, urban agriculture is expected to be positively associated with reduced poverty through both direct consumption and increased cash income.

The rest of the paper is divided into three: section three discusses the methodology while section four is on results and discussion. The last section concludes the paper.

III. METHODOLOGY

Area of Study

This study is carried out in Ibadan city, the largest indigenous city in sub-saharan Africa. Ibadan, the capital of Oyo State is located between longitude 7° 20' and 7° 40' East of the Greenwich meridian and between latitude 3° 55' and 4° 10' North of the equator. The city lies in the equatorial rain forest belt and has a land area of 445 – 455km². Ibadan land has 11 local governments made up of five within the metropolis and six at the periphery of the metropolis. Ibadan North and Ibadan North West which are in the main city were chosen for the study.

Sampling Procedure

The study used multi-stage sampling technique for selecting the representative farming households. The first stage was the selection of two local government areas – Ibadan North and Ibadan North West. This is because they are in the main city with all the features of an urban location. The second stage involved the random sampling of the areas within the LGAs seven in Ibadan North and three in Ibadan North West on the basis of the size(s) of each LGA. The third stage involved the use of systematic sampling to obtain the required respondents. In this context, every sixth farming households was interviewed until the total number of farmers was made up. A total of 230 households were sampled of which 200 were analyzable. Both structured and semi structured questionnaires were used in the study. The questionnaire administration was cross sectional in nature. Table 2 shows the distribution of the 200 farm households whose questionnaires were used for the analysis. The distribution of the sampled respondents is based on the number of farmers available for each category of farming as obtained from reconnaissance survey prior to the study proper.

Table 2: Distribution of farming households

Farming System	Ibadan North	Ibadan North west
Livestock*	67	35
Crop	20	11
Mixed farming	38	29
Total	125	75

b Computed from field survey

* Livestock farming is typically poultry farming in the metropolis

Analytical Framework

Measures of Poverty

Poverty Line: The traditional approach of a poverty index is based on headcount of poor individuals below the specified cut-off point, i.e. the proportion of the population whose standard of living is less than the poverty line to the number of individuals or households (World Bank, 1990).

Foster-Greer-Thorbecke (FGT) Class: The FGT class of poverty measures has some desirable properties (such as additive decomposability), and they include some widely used poverty measures (such as the head-count and the poverty gap measures). The FGT poverty measures are defined as

$$P_{\alpha} = \int_0^z \left[\frac{z-x}{z} \right]^{\alpha} f(x) dx \quad \alpha \geq 0, \quad (1)$$

where x is the household consumption expenditure, $f(x)$ is its density (roughly the proportion of the population consuming x), z denotes the poverty line, and α indicate greater sensitivity of the poverty measure to inequality among the poor. In what follows, we will be concerned with the estimation of poverty measures P for $\alpha = 0, 1$ and 2 , which respectively define the head-count index, the poverty gap index and the squared poverty gap index. Hereafter, these measures are denoted H , PG , and SPG (Foster, et al., 1984)

Logistic Regression: Model and Notation:

The correlates of poverty status are usually analyzed using either a poverty profile or a poverty status regression. Poverty profiles identify the characteristics of the poor using a tabulation approach and usually do not allow more than one correlate of the poor to vary simultaneously. In contrast, poverty status regressions aim to analyze the correlates of poverty in a multivariate framework (Baulch and McCulloch, 1998).

For this paper, correlates of poverty are isolated using a logit model in which a dichotomous variable representing whether or not a household is poor is regressed on a set of supposedly exogenous explanatory variables. This approach is in line with Allen and Thompson (1990); Coulombe and McKay (1996); Appleton (1996); and Manson, (1998).

In logistic regression, a single outcome variable Y_i ($i = 1, \dots, n$) follows a Bernoulli

probability function that takes on the value 1 with probability π_i and 0 with probability $1 - \pi_i$. Then π_i varies over the observations as an inverse logistic function of a vector x_i , which includes a constant and $k - 1$ explanatory variables: $Y_i \sim \text{Bernoulli}(Y_i/\pi_i)$

$$\pi_i = \frac{1}{1 + e^{-x_i\beta}} \quad (1)$$

The Bernoulli has probability function $P(Y_i|\pi_i) = \pi_i^{Y_i} (1 - \pi_i)^{1-Y_i}$. The unknown parameter $(\beta = (\beta_0, \beta_1))$ is $k \times 1$ vector, where β_0 is a scalar constant term and β_1 is a vector with elements corresponding to the explanatory variables. An alternative way to define the same model is by imagining an unobserved continuous variable Y_i^* (e.g., poverty status) distributed according to a logistic density with mean μ_i . Then μ_i varies over the observations as a linear function of x_i . The model would be very close to a linear regression if Y_i^* were observed.

$$Y_i^* \sim \text{Logistic}(Y_i|\pi_i)$$

$$\mu_i = x_i\beta$$

where $\text{Logistic}(Y_i|\pi_i)$ is the one-parameter logistic probability density

$$P(Y_i^*) = \frac{e^{-(Y_i^* - \mu_i)}}{(1 + e^{-(Y_i^* - \mu_i)})^2} \quad (2)$$

Instead of observing Y_i^* we see only its dichotomous realization, Y_i , where $Y_i = 1$ if $Y_i^* > 0$ and $Y_i = 0$ if $Y_i^* \leq 0$. For example, if Y_i^* measures poverty status, Y_i might be poor (1) or non-poor (0).

The model remains the same because

$$P(Y_i) = P(Y_i^* > 0) = P(Y_i^* \geq 0) = \int_0^\infty \text{Logistic}(Y_i^*|\mu_i) dY_i^* = \frac{1}{1 + e^{-\mu_i}} \quad (3)$$

The parameters are estimated by maximum likelihood, with the likelihood function formed by assuming independence over the observations: $L(\beta|y) = \prod_{i=1}^n \pi_i^{Y_i} (1 - \pi_i)^{1-Y_i}$. By taking logs and using Eq (1), the log-likelihood simplifies to

$$\ln L(\beta|y) = \sum_{i=1}^n Y_i \ln(\pi_i) + \sum_{i=1}^n (1 - Y_i) \ln(1 - \pi_i) = \sum_{i=1}^n [Y_i \ln \pi_i + (1 - Y_i) \ln(1 - \pi_i)] \quad (4)$$

Following from the above the specified model is

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_k X_{ik} + \epsilon_i \quad (5)$$

It is stated explicitly as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7) \quad (6)$$

Where

$$Y = \text{poverty status (poor} = 1, \text{ non-poor} = 0)$$

X_i = Vectors of (non-stochastic) explanatory variables which are defined in table 3

Table 3: Description of Explanatory variables included in the model

<i>Explanatory variable</i>	<i>Description of the variable</i>	<i>Hypothesised relationship with the poverty status</i>
Age (X_1)	Age of the household head in years	Positive
Gender (X_2)	Gender of the household head (D = 1 if male, 0 otherwise)	Ambiguous
HhdDR (X_3)	Household dependency ratio: number of people not contributing to household income	Positive
Educ. (X_4)	Educational status of the household head	Negative
Year (X_5)	Years in farming	Negative
Type 1 (X_6)	Type of farming activity (1) (D = 1 if crop, 0 otherwise)	Ambiguous
Type 2 (X_7)	Type of farming activity (1),(D = 1 if livestock, 0 otherwise)	Ambiguous

Note: 1 Naira (₦) = US \$126.50

IV. RESULTS AND DISCUSSION

Socio-economics Characteristics of the Respondents

The study revealed that there are more male headed households than female headed households. 28.9 percent of the respondents are female. Table 4 reveals that majority of the households are between the ages of 36 and 45. The average age stood at 41.2 years.

The level of education varies from primary to secondary and tertiary. The number of years spent in school varies from six to 14 years. Table 5 shows the distribution of respondents by education level. Majority of the respondents have tertiary education probably reflecting the urban nature of the study area. The attainment

Table 4: Age distribution of respondents

<i>Age</i>	<i>Cropp- ing %</i>	<i>Mixed farming</i>	<i>Livestock</i>	<i>Total</i>
< 25	-	6.7	2.2	3.3
26 – 35	28.6	30.0	26.1	27.7
36 – 45	28.5	26.6	52.1	40.0
46 – 55	21.5	23.4	17.4	20.0
56 – 65	21.4	6.6	2.2	6.7
> 65	-	6.7	-	2.3
Total	100.0	100.0	100.0	100.0

Computed from field survey 2000

Table 5: Educational status of respondents^e

<i>Edu- cational</i>	<i>Cropp- ing %</i>	<i>Mixed farming</i>	<i>Livestock</i>	<i>Total</i>
Primary	7.2	6.7	2.2	4.4
Secondary	21.4	23.3	26.1	24.4
Tertiary	71.4	70.0	71.7	71.2
Total	100.0	100.0	100.0	100.0

Computed from field survey 2000

of some educational qualification is expected to positively influence farming activities. Besides, it is certain that most urban dwellers are engaged elsewhere outside farming, thus making farming a complimentary activity.

The household size of the respondents ranges from one to nine for those involved in cropping and mixed farming, and one to 12 for those in livestock production as shown in table 6. On the average, those involved in crop and mixed farming have four members of household while those engaged in livestock production have an average of five members.

Table 6: Distribution of household size of respondents^f

<i>Household size</i>	<i>Cropp- ing %</i>	<i>Mixed farming</i>	<i>Livestock</i>	<i>Total</i>
1 – 3	35.7	23.3	41.3	34.4
4 – 6	57.2	53.4	54.4	54.4
7 – 9	7.1	23.3	2.1	10.0
10 – 12	-	-	2.2	1.1
Total	100.0	100.0	100.0	100.0

^fComputed from field survey 2000

Income from farming activities of crop farmers constitutes 29 percent of their total income, 33.6 percent for mixed farmers while income from farming activities constitutes a large portion 46.3 percent of total income of livestock farmers.

Table 7: Distribution of monthly income from farming activities^g

<i>Income ₦</i>	<i>Cropp- ing %</i>	<i>Mixed farming</i>	<i>Livestock</i>	<i>Total</i>
≤ 5000	7.1	6.7	2.2	4.4
5001-10000	35.8	3.3	6.5	10.0
10001-15000	14.2	16.7	2.2	8.9
15001-20000	14.3	16.6	8.7	12.2
20001-25000	7.1	10.0	17.4	13.3
25001-30000	-	6.7	4.3	4.4
< 30000	21.4	36.7	58.7	46.7
Total	100.0	100.0	100.0	100.0

Computed from field survey 2000

Table 7 shows the distribution of monthly income from farming and non-farming activities.

Reasons for Urban Farming

Sixty-three percent of the respondents farm for food self-sufficiency and as a means of food security. Only about three percent farm because they do not have any other means of livelihood while 34 percent farm for commercial purposes. Thus it can be inferred that respondents are into urban farming so as to augment their main means of livelihood. We also found out that 51 percent of the urban farmers are engaged in livestock production. This can be attributed to quick returns and profitability of the enterprise as opposed to the slow returns in cropping and mixed farming. Besides, the land requirement for livestock activities is smaller compared with that for crop and mixed farming.

Determination of the Poverty Status of Urban Farmers

Poverty lines were estimated using the cost of basic needs method. Details on the implementation of the method can be found in Wodon (1997). The household level of total expenditure on food and non-food items was used in the classification of the households into poor and non-poor. This is done in two ways-

- A moderate poverty line equivalent of 2/3 of the mean per capita expenditure is drawn.
- A core poverty line equivalent of 1/3 of the mean per capita expenditure is also drawn.

The households are then classified into one of the mutually exclusive groups separated by the line either as Core poor, moderately poor or non-poor. Based on the mean per capita expenditure of ₦1949.12 for all households, ₦1299.41 is the poverty line for moderately poor households, while ₦649.71 is the poverty line for extremely poor households.

Table 8 presents the poverty incidence (in percentage) of the urban farmers in Ibadan metropolis. 50 percent of the respondents that are involved in crop farming are poor compared with 17.4 percent of the livestock farmers who are poor. This implies a lower poverty level for those engaged in livestock farming when compared to those in mixed and crop farming. On the whole, about 29 percent of the sampled urban farmers are poor.

Table 8: Poverty incidence (in %) of urban farmers in Ibadan metropolis in year 2000^h

Core poor	12.9	12.9	0	-
5001-10000	35.8	3.3	6.5	10.0
10001-15000	14.2	16.7	2.2	8.9
15001-20000	14.3	16.6	8.7	12.2
20001-25000	7.1	10.0	17.4	13.3
25001-30000	-	6.7	4.3	4.4
< 30000	21.4	36.7	58.7	46.7
Total	100.0	100.0	100.0	100.0

^hComputed from field survey 2000

Table 9 shows the computed headcount index, poverty gap index and squared poverty gap index given as 0.2903, 0.2195 and 0.1510 respectively. These indices showed that there is relatively low level of poverty among urban farmers in Ibadan metropolis. The low level of inequality as revealed by the calculated Gini ratio (0.344) further confirms this. Thus, income inequality typified by the expectation on basic needs among urban farmers is low. This suggests that urban farmer's spending do not diverge from one another.

Table 9: Poverty measures, elasticities, and related statistic for urban farmers in Ibadan metropolisⁱ

Mean consumption		Poverty line (z) ₦1299.41	
(μ) = ₦1949.12			
Poverty measure/ statistic	Estimated value	Elasticity with respect to	
		Mean Consumption	Gini index
Headcount index (H)	0.2903	-3.015	0.67
Poverty gap index (PG)	0.2195	-0.50	1.75
Foster-Greer- Thorbecke (SPG)	0.1510	-0.94	3.46
Gini index	0.344		

ⁱAuthors' calculations

Table 9 also contains the elasticities of each of the poverty measures in respect of mean income (the growth elasticity) and changes in inequality (the Gini elasticity). The poverty measures are more sensitive to changes in inequality than to changes in average incomes. Clearly, any pro-poverty policy that is geared towards income redistribution may have great impact. This is in line with the findings of Ali and Thorbecke (2000), which revealed that reducing income inequality has a larger positive impact on poverty than does growth. However, these authors assume that the impact of growth is

Table 10: Results of Logit regression analysis¹

Variable	Coefficient	S. E.	$z = b/s.e$	$P[Z^2]$	Mean of X	(Antilog-1) $\times 100$
Constant	4.961	1.958	2.534	.003602		
Age	-0.798E- 01	0.364E - 01	-2.196	0.02812**	41.46	-16.71
Gender	0.576E - 02	0.690	0.007	.099042	0.71	1.34
HhdDR	0.754	0.199	3.798	0.00054***	0.75	507.86
Educ	- 0.413	0.164	-2.514	0.00976***	12.67	-62.42
Year	- 0.942e - 01	0.44E - 01	-2.143	0.03997**	8.64	-19.43
Type 1	1.541	0.859	1.793	0.0712*	0.16	4123.68
Type 2	- 0.569	0.709	-0.801	0.4295	0.51	-73.73

¹Field data analysis S.E. = Standard Error $R^2 = 35.07$ Likelihood Ratio = 17.61

***Significant at 1% **Significant at 5% *Significant at 10%

independent of the nature of the income distribution. Generally, most people in a given country are likely to be poor at very low levels of incomes; hence a redistribution of income that reduces inequality would put more individuals around the poverty line, thus decreasing poverty.

Determinants of Poverty among Urban Farmers

As indicated in the methodology, the correlates of poverty among urban farmers were examined. The results are indicated in table 10. In all, the Likelihood Ratio value of 16.74 indicates that some of the coefficients of the independent variables are statistically different from zero. The chi-square value also shows that the model performs well. However, the age, household size, educational status, years of experience and type of farming activities (type 1) of the respondents have significant influence on the log likelihood of being poor. Other variables have no influence on the log likelihood of being poor as indicated by the Z tests. While household size increases the log likelihood of being poor, age, education and years of experience reduce the log-likelihood of being poor.

Following from above, the larger the dependency ratio of the respondents, the more likely that the household will be poor. This is also true for people engaged in crop farming as indicated by the coefficient of type 1 farming activities. Hence, crop farming increases the likelihood of being poor. This is in agreement with earlier findings (Omonona, 2001 and FOS, 1999). The log likelihood of becoming poor due to one unit change in the value of the regressors is indicated in the last column of table 11. From the table, it is evident that a unit increase in farmer's age will lead to about 16.71 percent reduction in their log likelihood of being poor. The same change in the educational status and

years of farming experience will lead to a reduction in the likelihood of being poor by 62.42 percent and 19.43 percent respectively. On the other hand, an attempt by farmers to switch to crop farming will lead to about 4124 percent increase in the likelihood of being poor. In sum, the log-likelihood of being poor is very sensitive (elastic) to changes in the values of the significant variables. The results are in line with generally accepted theory. Having a large household is generally correlated with poverty status (Lipton, 1983). Also the results are similar to what is obtained in Baulch and McCulloch (1998).

VI. CONCLUSION

The practicing of crop production, illiteracy of household head, large dependency ratio and lack of farming experience could aggravate poverty in Ibadan metropolis. This finding implies that poverty in the study area could be reduced if these four factors are taken into consideration. A lower poverty level for those engaged in livestock farming when compared to those in mixed and crop farming was recorded. The poverty measures are sensitive to changes in inequality. While dependency ratio increases the log likelihood of being poor, age, education and years of experience reduce the log-likelihood of being poor.

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