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Food Security Determinants among Urban Food Crop Farming Households in Cross River State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author OWI designed the study, wrote the first draft of the manuscript, and analyzed the data. Author NEB managed the literature searches and proof read the second manuscript. Authors EAA and OJO assisted in data collection and collation. All authors read and approved the final manuscript.

Original Research Article

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ABSTRACT

The study investigated food security determinants among urban food crop farming households in Cross River State, Nigeria. A two-stage sampling technique was utilized to obtain a sample size of 217 urban food crop farming households. The study was conducted in three urban areas in Cross River State, namely: Calabar, Ikom and Ugep. Cross sectional data were collected through well structured questionnaires and oral interview. Data were analyzed using headcount index, food insecurity gap index, food surplus gap index as well as logistic regression. The result showed that only 52.5% of urban food crop farming households were food secure while 47.5% were food insecure. The food insecurity gap and food surplus index showed that food secure households exceeded the food security line by 44% while 53% of food insecure households fall below the poverty line. The logistic regression result revealed that, years of formal education, farming experience, age of farmers, farming as main occupation, household size, income from farm and output of food crops produce were major determinants of food security

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status of urban farming households in the study area. The study recommends among others that in other to increase the output of food crop produced by urban farming households, government should encourage the use of improved planting materials, adoption of improved land management techniques and fertilizer should be made affordable and available to farmers.

Keywords: Urban farming; food security; food crops; logistic regression; determinants; Cross River State.

1. INTRODUCTION

All over the world, except in sub-Sahara Africa where the opposite holds, urbanization is associated with economic growth. Paradoxically, Sub-Saharan Africa has the highest rates of urbanization globally and more than half of its entire population will be living in cities during the next two decades [1]. This situation implies that in West Africa, especially Nigeria, the problem of urban poverty, unemployment and urban food insecurity will become exacerbated rather than ameliorated by the phenomenon. As these problems persist, the niches for activities that alleviate them also take hold and possibly expand. One of such activities to which urban households have turned for food, employment and income is urban agriculture [1]. Urban agriculture defined in simple terms; is the growing, processing and distribution of food and other products through intensive plant cultivation and animal husbandry, in and around cities [2]. It includes: green belts around cities, farming at the city's edge, vegetable plots in community gardens and food production in thousands of vacant inner-city lots. According to [3] urban agriculture is an important supply source in developing countries food systems. It represents a critical food security valve for poor urban households; providing cheap, simple and flexible tool for productively, using open urban spaces; generating employment and income and adding value to agricultural products.

Food security is defined as, a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life [4]. In Nigeria, the percentage of food insecure households was reported to be 18% in 1986 and 40% in 2005 [5]. Recently, [6] asserted that the number of hungry people in the country is over 53 million, which is about 30% of the country's total population of roughly 150 million and 52% live under the poverty line. The Global Food Security Index (GFSI), of the Economist Intelligence Unit has ranked Nigeria as the 80th among 105 countries with food affordability, availability and quality. According to the Index, Nigeria recorded weak scores in the areas of Public expenditure on agricultural research and development, 0.0; presence of food safety net programmes, 0.0; gross domestic product per capita, 3.0; proportion of population under global poverty line, 9.6; food consumption as a share of household expenditure, 9.6 and protein quality, 12.8 [7]. These are matters of grave, concern largely because Nigeria was self sufficient in food production and was indeed a net exporter of food to other regions of the continent in the 1950s and 1960s. Agriculture remains the largest sector contributing 40% of GDP and employing about 70% of the labour force, bulk of which are subsistence farmers [8]. According to findings of [9] in 2009, more than ₦400 billion was injected into the sector, while in 2010, agriculture accounted for only 3.7 percent of budgetary allocation (recurrent ₦34.4 billion and capital ₦49.9 billion). Despite the huge financial investment in the sector and 53 years of independence, many Nigerians cannot afford three square meals

a day. The slow growth of agriculture and food production has resulted in growing food imports and food insecurity in the country. Hence, apart from complimenting rural food supplies which invariably reduce hunger and poverty, boosting urban agriculture, would reduce the huge import bills, enhances household's incomes and reduces some wasteful and unfriendly environmental costs associated with transportation and packaging of agricultural products.

Unfortunately, several factors are thought to limit the food security status of urban food crop farming households. Identification and understanding of these factors would equip urban policy makers with the true picture of local urban practices that are economically viable and would assist in tackling the food security problems in the sub sector. Against this backdrop, the study provides answers to the following research questions: Are the sampled urban food crop farming households food secured? What factors affect the food security status of urban farming households in the study area? Based on the above research questions, the study specifically investigated factors that determine the food security status of urban farming households in Cross River State, Nigeria.

1.2 Hypothesis of Study

Ho: Urban food crop farming households in the study area are not food secure.
Ha: Urban food crop farming households in the study area are food secure.

1.3 Literature Review

1.3.1 Conceptual framework

Food Security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life [4]. This definition implies that food insecurity reflects uncertain access to enough and appropriate foods [10]. However, irrespective of how food security is defined, it is generally agreed that four distinct variables are central to the attainment of food security, namely: food availability, access, utilization and stability of access. Food availability: Food security research before [11] focused on food availability in a macro sense. The goal was to ensure that sufficient quantities of appropriate kinds of food were available from domestic sources, imports, or donor sources [12,13]. The focus of both domestic and international policy was on removing constraints to food availability by concentrating on agricultural policy, trade policy, marketing and transportation systems, the role of natural disasters and the price effects of economic policies. Eventually, the realization grew that availability was necessary but not sufficient to promote food security. The concept of food security was expanded to include access. Food access: The debate on food security shifted from macro supply issues to focus on the ability of households to obtain food in the market place or from other sources [13]. Having access to food includes having physical access to a place where food is available and economic access, as well as a socially legitimate claim to food [23]. It is important to note that in many developing countries, the availability and access dimensions of food security are strongly linked. While availability reflects the supply side of food security, access reflects effective demand. The two concepts are linked by food prices [14]. Food utilization/consumption: This third aspect of food security speaks to the proper usage of food and includes processing, storage, consumption and digestion. How the food is prepared (which affects nutritional value) and the health of the individuals consuming the food (which affects the ability to absorb and use nutrients) affects

food security [14]. Providing nutrition education and family management skills is another aspect of the process of ensuring food security. Stability of access: The fourth aspect of food security addresses the stability of household access to nutritious food. Fear of instability in access to nutritious foods in itself can have significant effect on the production and consumption decisions of households which eventually affect the food security experience and outcomes (nutritional and health) and is thus an important consideration.

Urban agriculture defined in simple terms is the growing, processing and distribution of food and other products through intensive plant cultivation and animal husbandry in and around cities [2]. It includes green belts around cities, farming at the city's edge, vegetable plots in community gardens and food production in thousands of vacant inner-city lots. Urban agriculture comprises fish farms, farm animals at public housing sites, municipal compost facilities, schoolyard greenhouses, restaurant-supported salad gardens, backyard orchards, rooftop gardens and beehives, window box gardens and much more [2]. Urban farms, which can vary widely in size and scale, are the primary form of urban agriculture. Urban farms according to [15], are grouped into three categories: recreational farms (which sell less than $10,000 worth of products annually and consist of less than 100 acres); adaptive farms (which sell more than $10,000 annually and range in size from 100 to 200 acres) and traditional farms (which sell more than $10,000 annually and are less than 200 acres). Community gardens are another example of urban agriculture. The main objective of a community garden is to provide land for family gardening use. This usually means that, the land is divided into smaller plots for individual household users, where each gardener is responsible for maintaining his or her plot. Community gardeners are generally not permitted to sell the products of their labour for profit—most community gardens are for personal use only. Community gardens can have a variety of owners: institutions, community groups, land trusts, or private citizens. According to the Community Food Security Coalition, community gardens have helped families grow their own food according to their personal needs, thereby providing a cost savings [16].

1.3.2 Empirical literature

Numerous researches have been carried out on the determinants of food security in Africa [17]. Investigated food insecurity determinants among rural households in Nigeria using farm-level data collected from 220 rural farm households from Benue State. The study revealed that farm income, nonfarm income, share of own produced food in total quantity consumed, farm size, household size, transfer income, age, years of formal education, household expenditure on education, access to agricultural extension services and household food expenditure were major determinants of households food security [18]. Uses the logistic regression model to examine the determinants of food security among rural households in Kwara State, Nigeria. Their findings showed that farm size, gross farm income, total nonfarm income and household size were significant determinants of household's food security in the study area [19]. Investigated changes in household food security and poverty status in PROSAB (Promoting Sustainable Agriculture in Borno State) area of Southern Borno State, Nigeria. The PROSAB project used a participatory approach to promote improved varieties of cereals and legumes along with improved crop management practices. The estimated food insecurity lines were ₦2160.94 and ₦1748.99 from households in PROSAB and non-PROSAB participating communities. These food insecurity lines were expected to meet the minimum recommended daily energy level (2250 kilocalories) of an adult/month in the participating communities and 61% in the non-participating communities. Based on these food insecurity lines, 49% of households were classified as food insecure in the participating communities and 61% of households in the

non-participating communities. The aggregate expenditure gap or expenditure shortfalls of the food-insecure households were 51.3% and 24.5% of the food insecurity line for PROSAB and non-PROSAB communities. The probit regression result indicated that; household size, cost of hired labour, participation in PROSAB activities and non-agricultural income had significant positive effects on the food security status of the household. [20] Used the logit model to assess location specific socio-economic factors influencing food insecurity of households in urban areas of Ogbomoso metropolis in Oyo State, Nigeria. From the estimated food insecurity line, 60% of the sampled households were food insecure. Also, family size, annual income, amount of credit received, age of household head, farm size and livestock owned showed theoretically consistent and statistically significant effect on food security status of the respondents. [21] Analyzed food insecurity status of rural households during post planting seasons in Nigeria. The authors found out that almost half (49.4%) of rural households in the country were food insecure. Identified key rural food insecurity determinants were: gender of household head, tertiary education of household head, access to both formal and informal credits and remittances, household size, dependency ratio and living in the North-Central, North-East and South-West geopolitical zones of the country. [22] Estimated the food security status and identified the determinants of food security among households receiving government grants in a township of Kwakwatsi, South Africa. The results of the regression analysis showed total household income, household size, employment and marital status of the household head and employment status of the spouse as important determinants of food security in the area [23]. In a study of household food security in Vihiga district of Kenya, also reported a significant influence of household income, number of adults, ethnicity, savings behavior and nutrition awareness on household food security.

[24] Investigated the state of urban food insecurity in Cape Town. A total of 1,060 households were surveyed in three poor areas of the city. The study showed that, food insecurity in the poor areas of Cape Town is both severe and chronic. According to the Household Food Insecurity Access Scale (HFIAS), 80% of households were either moderately or severely food insecure, only 15% of households could be classified as food secure. Some 88% of households stated that, they had gone without food in the previous six months due to unaffordability, while 44% had gone without food once a week or more. In the survey very few of the poor urban households engaged in any form of urban agriculture (field crops, garden crops, tree crops or livestock). Household urban agriculture was not a significant source of food in Cape Town, despite the existence of an Urban Agriculture Policy created by the city. [25] Assess the state of food security among urban households in the Federal Capital Territory of Nigeria. The results revealed that 70% of the urban households in the study area were food secure, while only 30% were not food secure. [26] Analyzed the lives of urban households of the City of Mutare, Zimbabwe, who undertook home gardening as a survival strategy, showing their reasons for involvement, type of crops grown and their access to and use of different inputs and the different strategies used in order to cope with unavailability of these inputs. The study revealed that vegetable production on home gardens improved the food security status of 67% of households investigated in the study. The study also shows that urban policies changed during this period to accommodate home gardening. Results showed that urban home vegetable gardening plays an important role in establishing sustainable and profitable livelihoods for majority in the urban area of Mutare City. These gardens help in the provision of household food nutrition.

2. MATERIALS AND METHODS

2.1 The Study Area

Cross River State occupies an area of about 22,342.176 square kilometers [27]. It is located on Latitude 5° 25°N and longitude 25° 0°E. The soils of Cross River State are ultisol and alfisol but predominantly ultisol, suitable for pineapple production. Cross River State is bounded on the North by Benue State, South by Bight of Bonny and in the East by Ebonyi and Abia States, while in the West by Republic of Cameroun [28]. About 2,888,966 people inhabit the area, of which the Efiks, Ejaghams and Bekwarras are the major ethnic groups [29]. Cross River State has the largest rainforest in Nigeria covering about 7,290 square kilometers. It is described as one of Africa's largest remaining virgin forest harboring as many as five million species of animals, insects and plants. The State is located within the evergreen rainforest zone. There are two distinct climate seasons in the area, rainy season, from March to October and dry season from November to February. The annual rainfall varies from 2,942mm to 3,424mm. The average temperature is about 28°C. Cross River State is characterized by the presence of numerous ecological and zoo-geographically important high gradient streams, rapids and waterfalls. Fishing and subsistence agriculture are the main occupations of the people. Crops grown in the locality include; rice, maize, yam, cassava, pineapple, plantain, banana, oil palm, rubber and cocoa among others [29].

2.2 Sampling Procedure and Sampling Size

The population of this study comprises of all urban food crop farming households in Cross River State. Urban food crop farmers are those farmers who cultivated crops like vegetables, root and tubers and staple crops with one growing season. A two stage sampling technique was used in selecting the sample. The first stage involved the random sampling of three urban areas out of eight major urban areas in Cross River State. The eight urban areas were arranged in an alphabetical order and a number assigned to each of them. These numbers were written in separate piece of papers and were put into a basket, then thoroughly mixed. The researcher blindfolded himself, dips his hand into the basket and picked out a number at random. This process continued until three urban areas were selected, namely: Calabar, Ugep and Ikom. In stage two, a snowball sampling technique was employed to select urban food crop farmers in each urban area. With this approach, the researcher initially contacted few respondents and then asked them whether they knew anybody practicing urban farming activities in their residence to recruit future subjects from among the acquaintances. This was done mainly because it was near impossible to get the exact number of urban food crop farmers in each town. The sample size calculator was used to determine the total number of urban farmers that were interviewed. Of a total number of 220 urban food crops farmers sampled, only 217 supplied complete data that were used in the analysis. While sixty seven (67) were interviewed in Calabar, ninety six (96) and fifty seven (57) were interviewed in Ikom and Ugep respectively.

2.3 Analytical Techniques and Variables Measurement

To identify the factors influencing the food security status of urban farming households, we carried out 2 stages of analyses; first, we constructed a food security Index (Z_i) and determine the food security status of each household as used by [30]. Second, we used the logit model to estimate the food security status of households as a function of a set of

independent determinants. The food security index (Z_i) used to classify households food security status is given by:

$$Z_i = \frac{\text{Per capita food expenditure for the ith household}}{\text{2/3 mean per capita food expenditure of all households}}$$

Where Z_i = food security index (when $Z_i \geq 1$ = food secure ith household, $Z_i \leq 1$ = food insecure ith household)

A food secure household is, therefore, that household whose per capita monthly food expenditure falls above or is equal to two-third of the mean per capita food expenditure. On the other hand, a food insecure household is that whose per capita food expenditure falls below two-third of the mean monthly per capita food expenditure. Additionally, food insecurity gap index, food surplus gap index and the headcount ratio of food security were calculated for the sample households based on the food security index (Z). The food insecurity gap (P), measures the extent to which food insecure households on average fall below the food security line and the food surplus gap (S), the extent by which food secure households exceeded the food security line. The headcount ratio (H) measures the percentage of the population of household that are food insecure/secure.

- Food insecurity gap index (P) = $\frac{1}{M}\sum_{i=1}^{m} Gi$ where $G_i = (\frac{R-Yi}{R})$ ..... (1)
- Food surplus gap index (S) = $\frac{1}{L}\sum_{i=1}^{L} Gi$ where $G_i = (\frac{Yi-R}{R})$..... (2)
- Headcount index (H_{fi}) = $\frac{M}{N}$ ..... (3)
- Headcount index (H_{fs}) = $\frac{L}{N}$ ..... (4)

Where M = number of food insecure households; N = total number of households in the sample; L = number of food secure households; G_i = deficiency or surplus faced by i^{th} households; H_{fs} = headcount index for food secured households; H_{fi} = headcount index for food insecure households; Y_i = monthly per capita expenditure on food item of i^{th} households; R = food security line (₦3, 024.5).

Based on the household food security index (Z_i), the logit model was estimated to identify the determinants of food security among farm households. The implicit form of the model is expressed as:

$$Z_i = \beta X_i + U \quad \text{..... (5)}$$

Z_i = Household food security status (food secure households =1, food insecure households = 0)
X_i = Vector of explanatory variables
U = Error term
β = Vector of the parameter estimates

Xs are explanatory variables and are defined as follows: FAM = Farming as main occupation (0=yes, 1= no); MSF = Marital status of farmer (1 for married, 0 for otherwise); FEU =

Fertilizer usage (1= yes, 0 = no); SOF = Sex of farmer (1= male, 0 = female); HHS = Household size (number of person); YOE = Years of formal education; EXP = Farming experience (years); AOF = Age of farmer (years); IFF = Income from farm (₦); FAS = Farm size (hectares); OFI = Off farm income (₦); OFC = Output of food crops (grain equivalent per Kg)

On apriori ground, while β_1, β_3, β_6, β_7, β_9, β_{10}, β_{11}, β_{12} are expected to be positive; β_5 is expected to be negative and β_2, β_4 β_8 are expected to be either negative or positive.

3. RESULTS AND DISCUSSION

Table 1. shows the socio-economic profile of urban food crop farmers. About 58.52% of the farmers were within the age of 30–49 years. Within this age range, the respondents are expected to be very active on the farm and more responsive to agricultural extension programmes. This could also lead to a boost in agricultural activities as [31] recognized that young people are more likely to be energetic and have the capacity to use innovation. The sex distribution of the urban farmers showed 51.6% of females and 48.4% of males. Most of the farmers (90.8%) were married. Only 2.3% of the farmers did not have any formal education. This is in contrast to rural areas where over 20% were illiterate [1]. About 75.2% of the farmers had gone through primary and secondary education, while 22.6% had their higher diploma and degree. The educational status of urban food crop farmers will enable them to acquire knowledge and skill and this in turn increase their productivity and reduce food insecurity. The household consisted of 11 members on average, with a standard deviation of 6 members. Household size is important because it increases the number of consumers putting pressure on household resources particularly food and household with high dependency ratio are particularly prone to food insecurity. Agriculture serves as a part time occupation because majorities (61.3%) of the respondents were not full time farmers. This means that urban farming serve as additional source of income to the farmers. This agrees with [32], that urban agriculture is a viable intervention strategy for urban poor to earn extra income. The result also showed an estimated average annual income per household of N372, 040($2, 325.00).

Table 2 shows the summary of food security indices of the respondents. Households were categorized into food secure and food insecure groups based on their per capita food expenditure. This method has been applied in several studies, whose main focus is to determine the food security status of households [30,33]. The food insecurity line is defined as two-third of the mean per capita food expenditure of the total households studied. The estimated food security line was ₦3,024.50. Therefore, household whose per capita expenditure fall below ₦3,024.5 are designated as food insecure while households whose mean per capita food expenditure equals or is greater than ₦3, 024.5 are food secure. The results in table 1, shows that, 52.5% of urban food crop farming households were food secure while 47.5% were not food secure. The food insecurity gap and food surplus index which measure the extent of deviation from the food security line, shows that the food secure households exceeded the food security line by 44%, while 53% of food insecure households fell below the poverty line. Also, the mean per capita expenditure for all households was ₦7365.53 and ₦1408.40, for food secure and food insecure households' respectively. This empirical finding agrees with the results of [19] and [20].

Table 1. Socio-economic profiling of the respondents

Variables	Frequency	Percentages
Age(years):		
20 – 29	14	6.45
30 – 39	56	25.80
40 – 49	71	32.72
50 – 59	45	20.74
60 – 69	24	11.06
Over 70	7	3.23
	217	100
Sex:		
Male	105	48.4
Female	112	51.6
	217	100
Marital status:		
Single	14	6.5
Married	197	90.8
Widow	5	2.3
Divorcee	1	0.4
	217	100
Educational level:		
No formal education	5	2.3
Primary education	37	17.1
Secondary education	126	58.1
Tertiary education	49	22.6
	217	100
Household size:		
1 – 5	24	11.1
6 – 10	103	47.5
11 – 15	59	27.2
16 – 20	18	8.3
Above 21 persons	13	5.9
	217	100
Employment status:		
Farming	84	38.7
Non-farming	133	61.3
	217	100
Estimated annual income($1 = N160):		
N1,000 – N99,999	52	23.9
N100,000 – N199, 999	21	9.6
N200,000 – N299, 999	25	11.5
N300, 000 – N399, 999	20	9.2
N400, 000 – N499, 999	35	16.1
N500, 000 – N599,999	25	11.5
>N600,000	39	18.2
	217	100

Source: Computed from field data, (2012)

Table 2. Summary of food security indices for urban food crop farming households in the study area

Food Security indices	Food Secure	Food Insecure	All
Percentage of household	52.5	47.5	100
Number of households	114	103	217
Head count ratio (H)	0.525	0.475	-
Food insecurity gap/surplus gap index	1.44	0.53	-
Mean per capita expenditure	₦7365.53	₦1408.40	₦8773.93
Food insecurity line is ₦3, 024.5			

Source: Computed from field data, (2012)

Table 3 shows the descriptive statistics of some of the explanatory variables (continuous variables). The average household size in the study area was 11 persons per household, average farm size was 0.63 hectares, average income from farm was N52, 667 per annum and average off farm income per annum was N80, 205.

Table 3. Descriptive statistics of continuous variables

Variables	Mean	Median	Minimum	Maximum	Std.dev.
HHS	10.75	9.0	1.0	45	6.05
YOE	11.79	12.0	3.0	16	6.35
EXP	15.99	14.0	1.0	52	10.37
AOF	46.32	46.0	20.0	85	11.71
IFF	52677	28000	4000	620000	72459
OFI	80205	56000	1000	620000	81522
OFC	1263.2	667.66	5.76	16167	1918.9
FAS	0.63	0.25	0.0035	6	0.723

Source: Computed from data analysis (2012)

Table 4 presents the maximum likelihood estimates of the logit model described in equation 5. The result shows that, in terms of predictive efficiency, the model predicted the food security status of urban food crop farming households with 81.63% accuracy. The estimated logit regression model gave the McFadden R-square of 0.394, which implies that, all the explanatory variables included in the model were able to explain about 39.4% of the determinant of the food security status of urban food crop farming households. The log-likelihood ratio (LR) statistic (-87.25) is significant, meaning that the explanatory variables included in the model jointly explain the probability of the determinants of food security status of urban food crop farming households. The information criteria also attest to the reliability of the logit model in this study. This implies that, factors that influence the food security status of urban food crop farming households are better expressed in the specified logit model. The average marginal effect was 0.51, this implies that on average, the probability that urban food crop farming households will be food secured is 51%. This result further strengthens the headcount ratio, which shows that 52.5% of the respondents were food secure in the study area.

The empirical result revealed that the slope and log odd coefficients of years of formal education (YOE) was statistically significant at 10% and had a positive effect on the food security status of urban food crop farming households. The odd interpretation implies that every unit increase in farmers' years of formal education, the odd in favour of households to be food secure increase by 1.1420 times or about 14.2%. The result implies that the more

educated urban food crops farmers are the more likely that their households will be food secure. This is because education is a social capital which has positive impact on household ability to make good and well-informed production and nutritional decisions. This result agrees with [34], [23], [17] and [21].

Table 4. Logit model estimates of determinants of food security status of urban food crop farming households in Cross River State

Variables	Coefficients	Standard errors	Z-value	Odd estimates	Marginal effect
Constant	-0.9794	1.5098	0.65	-	-
FAM	4.22e-06	2.71e-06	1.55*	1.0000	1.05e-06
MSF	0.0217	0.8429	0.03	1.0219	0.0054
FEU	0.1937	0.5124	0.38	1.2137	0.0482
SOF	-0.5775	0.4156	1.39	1.7815	-0.1433
HHS	-0.4774	0.0846	5.64***	1.6119	-0.1192***
YOE	0.1328	0.0715	1.85*	1.1420	0.0332*
EXP	0.0469	0.0264	1.80*	1.0480	0.01174*
AOF	0.5108	0.0264	1.93**	1.6666	0.0127**
IFF	5.06e-06	2.96e-06	1.71*	1.0000	1.26e-06*
FAS	-0.3584	0.2990	1.20	1.4310	-0.0895
OFI	4.22e-06	2.71e-06	1.55	1.0000	1.05e-06
OFC	0.00053	0.00019	2.73***	1.0005	0.00013***
Log-likelihood = -87. 2583		Average marginal effect = 0.51			
LR chi^2 (12) = 113.49***		Number of cases correctly predicted = 177(81.6%)			
McFadden R^2 = 0.3941					

Source: Computed from field data, (2012)

Also, the slope and the log odd coefficients of farming experience (EXP) was statistically significant at 10% and had a positive effect on the food security status of urban food crop farming households. This agrees with the apriori expectation. The odd interpretations imply that for every unit increase in farming experience, the odd in favour of household food security increases by 1.0480 times or about 4.80%. This means that, as farming experience of urban food farmers' increases, the chance of households being food secure increases too. This can be attributed to the increase tendency of innovation adopted, over the years.

The slope and the log odd coefficients of age of farmers (AOF) was statistically significant at 5% and had a positive effect on the food security status of urban food crops farming households in the study area. This agrees with the apriori expectation. The odd interpretation means that for every unit increase in farmer's age, the odd in favour of household's food security increases by 1.666 times or 66.6%. Increase in the farmer's age implies increase in exposure and probably farming experience. This will in turn boost household's food crop production and therefore increase the chance of urban food crop farming household's food security. This result is in consonant with the findings of [20] and [17].

However, the log-odd coefficient of farming as main occupation (FAM) was statistically significant at 10% and had a positive effect on food security status of urban food crops farming households in the study area, thereby agreeing with the apriori expectation. This means that urban food crop farmers whose main occupation are not farming, increases the chance of households food security as compared to those farmers, whose main occupation

is farming only. The odd ratio of urban farmers, whose main occupation was not farming were 1.00000422 times or 0.0004% higher than those urban farmers whose main occupation was farming. This implies that, farming not being the main occupation of urban food crop farmers' increases the chances or probability of households being food secure. This finding further strengthens the fact that urban farming serves as a niche were poor urban households turn to, for employment and additional income.

The slope coefficient of household size (HHS) was statistically significant at 1% level and had a negative relationship with the food security status of urban food crop farming households. This means that, as household size increases, the chance or probability of household food security reduces. In another language, large size households are more likely to be food insecure than small size households. The result implies that a unit increase in household size reduces the odd of household food security by 1.6119 times or 61.19%. Alternatively, a unit decrease in household size increases the odd of household food security by 61.19%. This is because, household size increases the number of consumers putting pressure on household resources, particularly food and household with high dependency ratio are particularly prone to food insecurity. This result agrees with the findings of [19] and [20].

The log-odd coefficient of income from farm (IFF) was statistically significant at 10% and had a positive effect on food security status of urban food crops farming households in the study area. This agrees with apriori expectation. The odd interpretation means that for every unit increase in farm income the odd ratio in favour of households food security increase by 1.00000506 times or 0.0005%. This indicates that the higher the household farm income, the higher is the probability that the household would be food secure. This attests to the fact that urban farming is another source of income for urban farming households and contributes significantly to household food security. This result agrees to the empirical findings of [18].

The coefficient of output of food crops (OFC), was statistically significant at 1% and had a positive effect on food security status of urban food crops farming households in the study area. The odd interpretation means that, for every unit increase in output of food crops produced by urban farming households, the odd ratio in favour of household food security increase by 1.0005 times or 0.05%. This indicates that, the higher the amount of food obtained from own production, the higher the likelihood of household food security. This result also agrees with the findings of [17].

4. CONCLUSION

This study was conducted to identify the factors that determine the food security status of urban food crop farming households in Cross River State, Nigeria. Data for the study was gotten from 217 urban food crop farming households from three urban areas in Cross River State. The study used headcount index, food insecurity gap index, food surplus gap index and logit regression to analyze the data. The result of headcount index showed that only 52.5% of urban food crop farming households were food secure while 47.5% were food insecure. The food insecurity gap and food surplus index showed that, food secure households exceeded the food security line by 44%, while 53% of food insecure households fall below the poverty line. Using the logistic regression model; years of formal education, farming experience, age of farmers, farming as main occupation, household size, income from farm and output of food crops produced, are statistically significant decision variables influencing the probability of households being food secure. However, the magnitude of years of formal education, farmer's age, household size and output of food crops produced

were the most important policy variables that determine the food security status of urban food crop farming households.

To improve urban household's food security status, the study recommends effective household size management, and enlightenment programmes on family planning should be encouraged in the study area. Educational programmes should be implemented for urban farming households, as this would help to improve their food security status. Extension agents, when disseminating information on improved farm practices, should pay close attention to urban farmers that have enhanced exposure and farm experiences as this category of farmers are likely to increase the chances of household food security. In other to increase the output of food crop produced by urban farming households, government should encourage the use of improved planting materials, fertilizer should be made affordable and available for farmers and adoption of improve land management practices should be encouraged.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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