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Assessment of Food Security Status of Goat Farmers In Lagos State, Nigeria

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Abstract

The goat value chain plays a pivotal role in income and employment generation, livelihood enhancement; food and nutrition security among the poor, marginalized and disadvantaged groups and they are reared to supplement income and as a means of reducing food insecurity. The objective of this study is to assess the food security status of urban goat farmers in some local government areas of Lagos state, Nigeria. The use of qualitative method of data collection in the form of structured questionnaires were executed during the course of this study on a sample size of 80 goat farmers. Furthermore, during the course of the study, the specific objectives were analyzed using descriptive statistics as well as USDA food security code module. Using the Pearson's rank correlation and binary logistic regression, the hypotheses were accurately tested to achieve results. From the result acquired, it was determined that men dominated women in the goat farming sector as well as revealing that the average age of respondents were 42.4 years. Furthermore, the results revealed that, about 65.4% of the respondents made an annual income ranging from 100,000-300,000 Naira and have been residents of the sample location for about 10-15 years. Another observation made from the results obtained during the course of this study showed that majority of the respondents practiced semi intensive system of management. This involves them using family labor (55.6%), having an average of 18.8 goats, as well as revealing sales as their main purpose of farming. More revelations from the result showed that, majority of the respondents were food insecure without hunger. Showing the major reasons for food insecurity to be insufficient finance, high cost of food and poor storage and processing. It was recommended that farmers be encouraged to belong to organizations such as cooperatives to solve problems in management and also for easy access or contact by government and extension agents.

Keywords: food security, goat farming, production, farm management

Introduction

The livestock sector has been known to contribute largely to the improvement in agricultural productivity and this is seen through its impact on poverty alleviation and food security. This impact is quite enormous as it significantly contributes to the total supply of nutrients found in food intakes (Hassan, et al., 2007). Zewdie and Welday (2015) highlighted that, aside from economic impact and resource supply of food to poor farmers, some specific biological features are important characteristics that can come in handy when integrating goats into pastoral and sedentary small holder production systems. These characteristics include; feeding behavior, reproduction efficiency and small body size to name a few. Goat is a member of the Bovidae animal family are deeply rooted in most African cultural norms and ideologies. These genuine friend's to rural and poor areas has received little or no attention and investments from African governments and people alike (Christie, 2005).

Farmers in this study area rear goat to absorb shock in rural economy especially in situation of crop loss and unfavorable farming year. They mainly rear goat because of their small body size, high adaptation to climatic condition of these areas, high fertility rate, low goat farming start-up capital and ease of marketing. The goat farmers in this study practice subsistence agriculture due to low capital and land fragmentation, rearing of goat becomes an important business activity to improve their income and food security level.

Adane and Girma (2015) claimed goats and sheep are widely adapted to different climates and are found in all production systems. They have lower feed requirements compared to the cattle because of their small body size. Sheep and goats contribute to the subsistence of small holder farmers in rural areas. They are mainly kept for meat, skin, milk and manure, they also play important role in income generation,

capital storage, employment generation and improving household nutrition. They serve as easy way to store cash for future needs, through their purchase. They account on average for 40% of the cash income and 19% of the total value of subsistence food derived from all livestock production (Ezeano et.al., 2019).

According to FAO (2002), 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". Furthermore, Jensen (2002) asserts that food can be used as a tool for sustaining the political stability, wellbeing and insuring peace amongst people in a given location. FAO (2009) states that there exist four (4) pillars that food security is built on. These pillars include; food availability, food accessibility, food utilization and food stability. These pillars infer from the concept that food security is not just a production issue, it shows a diminishing pattern when the food system is stressed. However, Shala and Stacey (2012) argued that many countries do experience food insecurity with food supplies, and this occurs as a result of the inadequacy to maintain citizens' per capita consumption. Shala and Stacey (2012) concluded that the African continent has more countries with food insecurity problems as compared to other countries in other continents around the world

The different contributions of goats to smallholder families include their role in improving household food security. Thus, the focus of this study is to assess the contribution that livestock value chains, specifically goats, have made towards improving the social wellbeing among poor households. This stems from various arguments that seem to back the ideology that goats contribute to household food security and income generation for poor farmers as they are being progressively highlighted as the animal species with the potential for poverty reduction. Despite the fact that substantial consideration is given into analyzing intangible benefits of small ruminants, the economic value of such benefits across production systems along with farmers' strategies to exploit them were not sufficiently examined.

The main objective of this research is to assess the food security status of goat farmers in Epe and Ikorodu local government area of Lagos State. Furthermore, highlighting sub-objectives under the umbrella of the main objective, sub-objectives of this research include; describe the socio-economic characteristics of goat farmers in the sample location, examine the food security status of goat farmers in the sample location, identify the reasons for food inadequacy among the respondents in that sample location. The hypotheses of the study states that, there is no significant relationship between socio-economic characteristics and the food security status of goat farmers in the sample location, and there is no significant relationship between the competence in management practices and the food security status of the goat farmers in that same sample location.

Research Methodology

The study was carried out in Epe and Ikorodu local government area in Lagos State (longitude 3° 58' 43E, latitude 06° 35 3N). The State lies on 6m above sea level with a tropical climate. The summers are much rainier than the winters in Lagos. The Köppen-Geiger climate classification is Aw. The average temperature in Lagos is 27.0 °C | 80.6 °F. The annual rainfall is 1693 mm | 66.7 inch. The population of this study constitute all goat farmers in Epe and Ikorodu Local Government Areas of Lagos State, however due to the unavailability of data on the number of goat farmers in the state, multi-stage random sampling technique was utilized in sample selection. Purposive sampling was employed in the first stage which involved the selection of four communities each from two pre-selected local government (Odo-iragunshin, Noforija, Odomola, Iyare from Epe. while Gberigbe, Imota, Odogunyan. Oke ijebu from Ikorodu) and they were chosen due to the fact that goat farming is prominent in these communities (Yesufu et.al., 2017).

The second stage involved using simple random sampling to select ten goat farmers from each of the communities to make up a sampling population of 80. Structured questionnaire was used through field survey and farmer's interview. Respondents were asked the reasons for food insecurity among urban goat farmers and was weighted on a 4-point Likert type summated rating scale of agreement with options strongly agree=4, agree=3, disagree=2, strongly disagree=1. The values of the scale (4, 3, 2 and 1) were summed up to obtain 10. The mean value of the sum gave 2.50. which serve as the cut off mean; this value became the benchmark for accepting any item as a factor for food insecurity among the goat farmers.

Respondents were asked their current food security status using the USDA standard 18 questions (Abbasi et.al., 2016). According to their response, they were categorized into food secure, food insecure without hunger, food insecure with moderate hunger, food insecure with severe hunger.

Hypothesis 1 was analyzed using binary logistic regression:

$$P_i (Y = 1/X_i) \frac{p_i}{1-p_i} = e^{(\beta 0+\beta_1 X_1+\beta_n X_n +u)}$$

Where:
y = Food security status of Goat farmers
X_1 - X_n = independent variables (socioeconomic characteristics)

Hypothesis 2 was captured with Pearson Product Moment Correlation Coefficient (PPMC)

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x^2 - (\Sigma x)^2 \,][\, n\Sigma y^2 - (\Sigma y)^2 \,]}}$$

Where: r = correlation coefficient, Σxy = summation of xy scores, n = number of pairs of data, Σy^2 = summation of y square, Σx^2 = summation of x square, Σy = summation of y scores, Σx = summation of x scores

Results and Discussion

Socio-Economic Characteristics of Respondents

The age distribution of the respondent shows that 40.7% of the respondents are between the ages of 41-50 years, 23.5% are between 30-40 years, 17.3% fall under 30 years and 18.5% are 51 years and above (Table 1). The mean age was 42.4 years, as 64.2% of the respondents fell between the ages of 30-50 years. This age category represents the active labor force, and this reveals that a large percentage of goat farmers belong to the active working population and are still in their years of economic productivity. This is in line with Boz (2014) who reported that 47.9% of goat farmers were between the ages of 35-50 years with a mean age of 45.67 years. The fact that 95% of the respondents were aged above 31 years showed a major generation gap. The generation below 30 years of age preferred to seek off-farm employment, a finding which is consistent with the general tendency of migration of youth to urban areas to find white collar jobs.

Our study demonstrated that 39.5% of the respondents had a primary school degree, 34.6% had a secondary school degree, 11.1% had a tertiary school degree (university or polytechnic) and 14.8% of the respondents had no formal education (Table 2). Thus, about 74.1% of the respondents has had one form of formal education or another (at least a primary level of education) indicating that goat farmers in the study area are fairly educated. This result confirms Rahman et al. (2013) as reported in their study that 85.71% of goat farmers have undergone at least primary level of education.

Table 1. Age distribution of the respondents

Age	Frequency	Percentage
<30	14	17.3
30-40	19	23.5
41-50	33	40.7
51-60	9	11.1
60 and above	5	7.4

Source: Field survey, 2020.

Table 2. Educational level distribution of the respondents

Educational Level	Frequency	Percentage
No formal	12	14.8
Primary	32	39.5
Secondary	28	34.6
Tertiary	8	11.1

Source: Field survey, 2020.

Table 3. Sex distribution of the respondents

Sex	Frequency	Percentage
Male	63	77.8
Female	17	22.2

Source: Field survey, 2020.

Table 3 shows that 77.8% of the respondents were males while 22.2% of the respondents were females. This can be credited to the fact that most households in the sample location are headed by men and women are left to take care of the household by doing chores and caring for children. This correlates with Woldu et. al. (2016) who reported that 91% of goat owners in Ethiopia are males.

There are more of the respondents (56.8%) had family size of less than 5 persons, 39.5% had a family size of 5-10 persons and 3.7% had a family size of 11 persons and above (Table 4). The average or mean family size was 6.0 persons per household implying that the respondents in the sample location had large family size.

Sources of labor available and used by respondents showed that a bulk of the respondents about 95.1% employed both self (39.5%) and family (55.6%) labor while a very low percentage of 4.9% used hired labor. This implied that family labor was the main type of labor used by goat farmers in the study area and this may be attributed to the inability to employ hired labor. This finding agreed with Haile (2012) who stated in his study that family labor was the major source of labor used in the management of goats.

A high percentage of the respondents (51.9%) sourced credit or funds from personal savings, 30.9% sourced credit from family and friends and 17.3% of the respondents sourced funds from other financial institutions This may be attributed to the fact that the interest rates on other sources are high and that they do not have enough collateral to borrow funds or source credit because most of the respondents in the study area operate on small scale goat farming. Gul et al. (2016) reported that an average of 25% of respondents used agricultural credits and the remaining 75% did not use agricultural credits.

Respondents' annual income (Naira) from goat farming showed that 65.4% earn 100,000-300,000 and 34.6% earned less than 100,000. This revealed that majority of the respondents earned more than others, and this was attributed to the fact that some had more farming experience and high competence in the management practices of goats, and this implied

Table 4. Household size distribution of the respondents

Household size	Frequency	Percentage
<5	46	56.8
5-10	31	39.5
11 and above	3	3.7

Source: Field survey, 2020.

Table 5. Source of farm labour distribution of the respondents

Source of labor	Frequency	Percentage
Self	32	39.5
Family	44	55.6
Hired	3	3.7
Family and Hired	1	1.2

Source: Field survey, 2020.

Table 6: Source of credit distribution of the respondents

Source of Credit	Frequency	Percentage
Personal	42	51.9
Family and friends	24	30.9
Commercial bank	3	3.7
Cooperative bank	5	6.2
Micro finance	2	2.5
Money lender	3	3.7
Government	1	1.2

Source: Field survey, 2020.

that goat farming was indeed a viable supplementary source of income.

The purpose of farming as shown in table 8 revealed that 72.8% of the respondents produced for market/ sales, 16% produced for just consumption and 11.1% produced for both consumption and market/sales. This indicated that respondents in the study area practiced goat farming mainly for sales to provide income to be able to meet up with financial obligations.

The results of the study showed that majority of the respondents 65.4% had farming experience of less than 10 years, 25.9% had from 10-20 years farming experience and only 8.6% had above 20 years of farming experience (Table 9). The average farming experience was estimated to be 7.33years. the goat farmers in the study area are well experienced and are not novice in goat farming.

A large percentage of the respondents (76.5%) practiced semi-intensive system of management, 17.3% practiced extensive system of management and 6.2% practiced purely intensive system of management. This revealed that the semi-intensive system of management was a general system of management practiced by respondents in the study area.

The number of goats reared or owned by the respondents showed that 49.4% of the respondents had 10-20 goats, 24.7% had 21-30 goats, 14.8% had

Table 7. Income from goat distribution of the respondents

Annual income from goat	Frequency	Percentage
<100,000	28	34.6
100,000-300,000	52	65.4
Annual income from other sources		
<100,000	12	14.8
100,000-300,000	25	32.1
300,001-600,000	33	40.7
600,001 and above	10	12.3

Source: Field survey, 2020.

Table 8. Farming purpose distribution of the respondents

Purpose of farming	Frequency	Percentage
Consumption	13	16.0
Market/sales	58	72.8
Consumption and market	9	11.1

Source: Field survey, 2020.

Table 9. Farm experience distribution of the respondents

Farming experience	Frequency	Percentage
<10 years	52	65.4
10-20 years	21	25.9
21-30 years	7	8.6

Source: Field survey, 2020.

Table 10: Farming system distribution of the respondents

Farming system	Frequency	Percentage
Intensive	5	6.2
Semi-Intensive	61	76.5
Extensive	14	17.3

Source: Field survey, 2020.

Table 11. Number of goats reared distribution of the respondents

No of goats	Frequency	Percentage
<10	6	7.4
10 to 20	40	49.4
21 to 30	20	24.7
31 – 40	11	14.8
41 to 50	3	3.7

Source: Field survey, 2020.

31-40 goats, 7.4% had less than 10 goats and 3.7% had above 40 goats. The average number of goats owned/reared by respondents in the study area was 18.8. This result revealed that majority of respondents in the study area practiced small scale goat farming. The low herd size may be due to financial constraints, large of labor required for operation of large herd size, lack of access to farmlands and the part-time nature of the business.

Food Security Status of Urban Goat Farmers

Results in Table 12 shows the food security status of respondents in the sample location. It was detected that only 7.4% of the respondents were food secure, 59.3% were food insecure without hunger, 20.9% were food secure with hunger (moderate) and 11.1% were food secure with severe hunger. The mean score of the food security status was 20 which mean the 20th person is food insecure without hunger and this score value falls within the food insecure without hunger range i.e. 2.4-4.4 on USDA for security scale. This means that an average goat farmer in the study area was food insecure without hunger. The implication of this result is that goat farmers in the study area do not have access to basic quality food, however, they could manage the little they have access to and make optimum use of it.

Available food to farmers in this study area are basic staple food which are grains e.g. rice, beans and protein source like meat and egg which can be unaffordable for farmers in the study area. This could be as a result of the subsistence nature of farmers in this location, as they do not have enough capital to expand beyond their subsistence level. The quest to ensure food security leads to engaging in goat farming to augment their income.

Factors for Food Insecurity among Goat Farmers

Table 13 shows the ranking of factors or reasons that contributed to food insecurity among urban goat farmers in the study area in the order of relevance (magnitude). It was obvious from the table that high cost of food (M= 3.61), insufficient finance (M= 3.19) and poor storage and processing (M= 2.88) were the strongest reasons why urban farmers in the study area could not attained food security. The cost of food is high and insufficient finance implies that respondents are faced with low capital or income and cannot afford food at high prices which results in food insecurity as more food is demanded when the price is low. Also, poor processing and storage of food implies that when food are not properly processed and stored, it leads to food wastage reduces the availability and shortens the supply of food especially during offseason thereby resulting in food insecurity. Béné (2020) highlighted two key challenges rural farmers experienced in attaining food security which structural issues which include challenges of operation under unfavorable condition example is insufficient finance, also shocks and stressors which is the inability of the local system to respond and recover rapidly from effects of shocks and stresses especially in the current world health situation where the COVID-19 virus has limited farmers and local producers from optimum production. Koppelmäki (2020) highlighted the importance of processing facilities in areas of high agricultural production in order to ensure circularity in food production systems and improving access to food for local producers. Factors like poor quality of

Table 12. Food security status of respondents

Status	Frequency	Percentage	Range
Food secure	6	7.4	0.0-2.2
Food insecure without hunger	48	59.8	2.4-4.4
Food insecure with hunger	17	20.9	4.7-6.7
Food insecure with hunger severe	9	11.1	6.6-9.3

Source: Field study, 2020

food (M=1.87), transportation difficulty (M=1.67), large family (M=1.34) and distant market (M=1.29) were also responsible for food insecurity among farmers but were not considered serious by the respondents as shown in the table because their mean was below the bench mark of 2.5.

Estimate of Binary Logistics Regression

Logistic regression model, a model used to test the hypothesis carried out in this study states that, "There is no significant relationship between socio-economic characteristics and the food security status of goat farmers in the study area". Result of logistic regression analysis for hypothesis testing is presented in Table 14. The result showed that age had a significant effect on the food security status of the respondents (P = 0.01). Data on Table 1 shows that majority of the respondents were within the age bracket of the active labor force, this implies that the respondents have the ability and capacity to work to be able to meet up with financial obligation and attain a certain level of food security. The table also showed that educational level (P = 0.04) had significant effect on the level of food security of the respondents. Results from Table 1 showed that a very high percentage of the respondents have undergone at least primary education. Educational qualification increases the chances of employment (employment ability), therefore respondents with higher educational qualification were assumed to get jobs with high wages thereby increasing their level of income and attaining a higher level of food security. Household size and major occupation with P values of 0.05 and 0.01, respectively, had significant effects on their food security status. Since respondents in the study area had an average household size of 7 members, large household size is assumed to equal large labor force which implies that the household receives more income which enhances the food security status of household and its members. The major occupation of most respondents was non-agricultural related which implied that the respondents used goat farming as a supplementary source of income which helped them to meet up their financial obligation and attain a certain level of food security. The number of goats reared showed significance which means the higher the number of goats reared the higher the income generated from it and the less food insecure they are. The R^2 value of 0.894 indicates that the demographic characteristics of respondents explained 89.4% of the total variation in their food security status.

Respondents

Our study demonstrated that the respondents' competence in management practices and their food security status is positively correlated (Table 15). This implies that an increase in the competence level of respondents will result to an increase in their food security status. This may be attributed to the fact that a high level of competence in management practices of the respondents in the study area such as increased vaccination of animals, provision of feed supplements, milking etc. will lead to an increased productivity in goat farming which will increase the income of the farmers. It is assumed that as the income of the farmer increases, his food intake increases which will in turn increase his level of food security. The value of 0.047 implies that the relationship between the farmers' level of competence in management practices and their food security status is a significant one in that an increase in one lead to an increase in the other and a decrease in one result in a decrease in the other.

Table 13. Reasons for food Insecurity among goat farmers

Reasons for food inadequacy	Mea[n1)]	Std. dev
Insufficient finance	3.19	0.69
Distant market	1.29	1.21
Poor quality of food	1.87	0.63
Poor storage and processing	2.88	0.38
Transportation difficulty	1.67	0.83
High cost of food	3.61	1.11
Large family	1.34	1.16
Pest and diseases	2.38	0.12
Adverse weather conditions	2.11	0.39

Source: Field survey, 2020.
Note: 1) Mean ≥ 2.5 indicates a serious factor

Table 14. Result of binary logistic regression showing the relationship between the farmers' demographic characteristics and their food security status

Variable	Odd ratio	Std. Error	Z	P>|z|	Decision
Age	2.140	0.65	3.23	0.01	**
Education level	3.03	0.03	2.18	0.04	*
Sex	1.59	0.85	0.86	0.38	ns
Marital status	0.75	0.18	1.14	0.25	ns
Household size	1.21	0.19	2.31	0.05	*
Major occupation	2.78	0.13	3.43	0.01	**
Number of goats	1.87	0.52	3.11	0.02	*

Note: Regression at α = 1% and 5% level of significance; ns = not significant

Table 15. Result of simple correlation shows the relationship between the farmers' level of competence and their food security status

		Competence	Food security status
Competence	Pearson Correlation	1	0.163
	Sig. (2-tailed)		0.047*
Food security status	Pearson Correlation	0.163	1
	Sig. (2-tailed)	0.047*	

* Correlation is significant at α= 0.05 (2-tailed)

Conclusion

Goat farming, a fairly unpopular trend in the farming sector has the potentials to significantly contribute to the growth, development and fulfillment of food security for individuals and household in developing countries. However, based on the results of this study, it is evident that goat farmers in the sample location are food insecure without hunger. Thus, it is imperative that governmental programs organized in the goat farming sector should be poised at introducing modern methods to aid in management practices. The programs should aid goat farmers join recognized and accredited organizations in the sector as well as creating rooms for problem solving in management aspects of goat farming. This can be done through closing the gap between government/ extension agents and the goat farmers.

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