



## Mini-Livestock Farming as a Strategy for Food Security in Oyo State of Nigeria

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**Abstract.** This study was carried out in Oyo state of Nigeria. The population of the study was all mini-livestock farmers in Oyo State. The sample for this study was selected using both purposive and random sampling techniques. Primary data was collected with the use of a well-structured questionnaire from 120 households in the study area. The data was analyzed using descriptive statistics, Food Security Index and Logit model. The average age and household size of the respondents were 44 years and 7 members respectively. The mean years of experience were 10.3 years. The result further reveals that age, gender, marital status, household size and household experience have significant effect on household food security status in the study area.

**Key words:** Mini-Livestock, Farming, Food Security, Oyo State.

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## INTRODUCTION

The small size of micro or mini-livestock animals means a small amount of input per unit, which in turn means more flexible production. Backyard food production such as mini-livestock can be a major contributor to a more balanced diet for both rural and urban people. The domesticated animals of mini-livestock widely bred in Africa include; Grass-cutters, Snails, Rabbits, Quail, etc.

The attributes of mini-livestock gives it the potential of contributing significantly to food security and meeting up the recommended dietary animal protein intake. Its small indigenous and flexible nature makes it a suitable livestock production that can be handled by women and children (Hardouin *et al.*, 2003). In recent times, raising of micro livestock by rural household is becoming popular due to the fact that the households have realized the need to diversify their source of income, thereby reducing the risk involved in depending on crop production as the main source of income.

It also offers the prospect of a regular income source once the volume of production exceeds what the producer wishes to consume. Farmed 'bush-meat' is still highly ranked in terms of taste and preference, and there is no doubt that a market exists if necessary intensive management techniques, including domestication, can be developed. Juste *et al.*, (1995) for example, pointed to the demand for bush meat, including many mini-livestock, in Equatorial Guinea. There is also clear evidence of an international demand for bush meat to supply ethnic restaurants around the world, not always legally (Leake, 2000), which may have positive implications for the long-term profitability of some mini-livestock species.

Mini-livestock can also be easily raised in an urban setting and represent a possible option for urban farming which is a system gathering momentum in many countries and which can provide food and revenue for poor people. Mini-livestock does not have the undesirable side-effects of rearing the larger species such as cattle, goats and sheep in urban areas (i.e. traffic accidents, noise and odours). However, it should never be forgotten that many of the mini-livestock rodents are serious pests of food

crops cultivated on the edges of forests. Trapping them is understandable, while hunting in protected forests is not allowed. Hence, the recent concept of “garden hunting” i.e. pest control in and around gardens and backyards by humane means (catching rather than use of traps which injure the animals) and possibly short-term fattening of the caught animals before consumption (Dounias, 2000).

Animal protein intake is quite low in developing than in developed countries and the level of meat and animal protein consumed by Nigerians is estimated at 6g per caput per day which is about 29g less than the minimum of 35g daily requirement recommended by the Food and Agriculture Organization (Abu *et al.*, 2008; FAO, 2004). Indeed there is need to bridge the wide gap between protein requirement and actual protein consumed by the people which are not sufficiently supplied by crop production (Ajibefun, 2000). Unfortunately, the conventional and regular sources of animal protein supply in the country like beef, pork, goat meat and poultry are getting out of reach of the common populace due to the economic down-turn. There is therefore the need to look inward and integrate into our farming system some non conventional meat sources (Ebenebe, 2000).

Over the years, efforts and concentrations has been put on developing the conventional meat sources to meet the animal protein requirement to no avail. The FAO raised an alarm of the animal protein deficiency of Nigerians (Akinusi, 2000). Lyon (2000) observed gradual shift from the production, consumption of conventional animal protein sources to a class of livestock referred to as ‘mini-livestock’, ‘micro- livestock’ or ‘unconventional livestock’. With the shortage of animal protein, nutritionists are now interested in prolific, good converters of feed to flesh and short production cycle animals (Isaac *et al.*, 2010).

Grass – cutter average weight fluctuate between 2 – 4kg in the females and 3 to 6kg in the males and its body comprise a mixture of brow reddish and grey hairs hat vary depending on its habitat (Jori and Chardonnet, 2001). Grass-cutters are harmless and their response to danger is generally to flee. The grass-cutter is easy to house,

though its handling requires skills. Among rural communities and even some urban people with adequate space, the animal has been bred and kept in boxes, empty drums, Poly Vinyl Chloride (PVC) pipes and enclosures (Adu, 2002).

In spite of the considerable international and local demand, commercial snail farms such as those in Europe, South-East Asia and the Americas are not common in West Africa. In Nigeria and Ghana, where snail meat is particularly popular, snails are gathered from the forest. However, wild snail population is declining rapidly due to indiscriminate hunting of snails before they reach maturity, bush burning, the use of agro chemicals, deforestation and change in weather (Efarmspro, 2006). Snail is one of such micro livestock that has recently attracted attention among few farmers in Nigerians as an aftermath of the alarm raised by FAO on animal protein deficiency among Nigerians (Adesope, 2000; Akinnusi, 2000). Snail meat could be cheap, tasty, nutritious food, and help reduce anemia caused by a lack of iron in the diet. Snail has higher protein and iron content and lower fat content than other meats, as well as many essential nutrients such as calcium, Magnesium and vitamin A

In Nigeria snails have been raised in small pens in many areas either as backyard activity to supplement household income and protein supply or as large scale commercial activity. The process of farming or raising snails is known as heliciculture/snail culture. Snails could also be gathered from the wild. Snails gathered in the wild to stock snail farm may have a high mortality rate as they try to adapt easily to new environmental conditions (Ebenebe, 2000).

Raising of rabbits, according to Abu *et al.*, (2008), appears to be the most sustainable means of producing high quality animal protein for the expanding populations of the lesser developing countries like Nigeria. It is small-bodied sized (2.5 – 5.4Kg), has a short gestation period (6 months), rapid growth rate, genetic diversity, large litter size, ability to utilize forage and agricultural by-products, and adaptation over a wide range of ecological environment. In addition, it is affordable and its management requirements are low-cost. It is a monogastric- herbivore animal; it is a

good food converter (Hemmer, 1992). They are considered delicacy, highly prized (Yeboah and Adamu, 1995).

Mustafa (1996) viewed food security as a major element in national security alongside domestic laws and order as well as territorial defense and other forms of security. Furthermore, according to the checklist of fundamental human rights, the right or easy access of food means more to household who are food insecure than the right to basic education, participation in political and social life, and so on. Food is a basic human need and the major of nutrients needed for human existence. Food security indicates the availability of and access of food.

Report of the Vision 2020 National Technical Working Group on Agriculture and Food Security shown that over 31% of the population in Sub-Saharan Africa (SSA) (203.5 million individuals) is classified as being undernourished and identified that recently key trends that have emerged are severely worsening the global food situation. These include: high population growth and the pressure this exerts on the world's food supply, loss of agricultural land to residential and industrial development as well as to increasing desertification arising from global warming and the shifting balance between the use of food for human consumption and the generation of biofuel which is to cater for the ever-increasing global energy demands (Nigeria Vision 2020, 2009).

Therefore, as part of measures to improve the level of food security (availability, affordability and accessibility) and reduce undernourishment among the populace, there is urgent need to encourage mini-livestock farming as a strategy for food security. In the light of this background, this research work is set out to provide evidence based answers to the following research questions; what are the socio – economic characteristics of the mini – livestock farmers? Does mini-livestock production have effect on their food security? What are the determinants of food security level among the mini-livestock farmers?

## METHODOLOGY

This study was carried out in Oyo state of Nigeria. Oyo state has four (4) major Agricultural zones namely; Ibadan/Ibarapa zone, Ogbomoso zone, Oyo Zone and Saki Zone. Oyo state had a population of about 5,591,585 people according to 2006 census (NPC, 2006). The major occupation of the people in the study area include; farming, trading, artesian, civil servant e.t.c. Crops such as maize, cassava, vegetable etc. are grown there while livestock such as sheep, goat, local poultry (chicken and duck) and micro-livestock (snail, honey-bees, grass cutter and rabbit) are raised in the state.

The population of the study was all mini-livestock farmers in Oyo State. The sample for this study was selected using both purposive and random sampling techniques. The list of registered Mini-livestock farmers was collected from Oyo State Agricultural Development (OYSADEP) located in each zone and farmers were randomly selected from the list to obtain a sample of 120 respondents. The data for this research work was mainly primary, which was collected using well-structured questionnaire.

The analytical method that was used to analyse the collected data are;

- (i) Descriptive statistics such as frequency, percentages and mean were used to analyse the personal characteristics and food security status.
- (ii) Food security index: the household was classified into food secure and food insecure households using food security index, which is used to establish the food security status of various households. It is given by

$$F_i = \frac{\text{per capita food expenditure for the } i\text{th household}}{2/3 \text{ mean per capita food expenditure of all households}}$$

Where F = food security index.

$F \geq 1$  = food secured household.

$F \leq 1$  = food insecure household.

A food secure household is therefore that, whose per capita monthly food expenditure fall 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 capital food expenditure.

- (iii) Logit regression model was used to examine the determinants of food security level among the respondents. The dependent variable Y takes the value of one for food insecure and zero otherwise.

#### Independent variables

$X_1$  = Age of respondent (years)

$X_2$  = Sex (male 1, female 0)

$X_3$  = Marital status (Married = 1, otherwise = 0)

$X_4$  = Education (Years)

$X_5$  = Household Size (Actual size)

$X_6$  = Years of Experience (Years)

$X_7$  = Occupation (Farming 1, others 0)

$X_8$  = income (Amount in Naira)

## RESULTS AND DISCUSSIONS

### Socio – Economic Characteristics of the Respondents

The result revealed that age of the respondents range between 23 to 71 years with mean age of 44.2 years. This implies that majority of the mini-livestock farmers were still in their active ages. Majority of the respondents (66.7%) in the study area were male while 33.3% of the respondents were female. This implies that lager percentage of the respondents that practices mini-livestock farming were males.

About 72% of the respondents were married, 15.8% were single, 8.3% were widowed and only 4.2% were divorced. This implies that majority of mini-livestock farmers were married. Analysis of the profile of the respondents as regarding their belief or religious groups indicates that 55.8% were Christians, 37.5% were Muslim and 6.5% were traditional worshippers. Since major religious groups reared mini-livestock,

this implies that religion does not have any significant negative effect on mini-livestock production among farmers like pigs and dogs.

Educational attainment showed that 30% of the respondents had no formal education, 45% had primary education, 13.3% had secondary education and 11.7% had tertiary education. This implies that there is high level of literacy among the respondents because 70% of the mini-livestock farmers were literate.

Evaluation of household size in study area revealed that there were houses with minimum of one (1) person per household and maximum of 25 persons per household. The mean value household size was about 7 members per household. This implies that most of the respondents have fairly large household size. The larger the household size, the higher the expenditure of the family on food.

The result further showed that the farming experience of farmers range between 2 and 21 years with the mean of 10years. This result implies that these respondents have been practicing mini-livestock farming for a relatively long time. The table further showed that majority (90.8%) of the respondents has other occupation other than mini-livestock farming and 9.2% of the respondents are involved in mini-livestock farming as a major occupation. This implies that mini-livestock farming can be practiced with other occupations leading to income diversification that could result into better standard of living among the farmers. Therefore, income generated from mini-livestock is supplementary to the stream of the expected income for the producers.

The result further showed that the mean monthly income was ₦15, 268.33 while the standard deviation of their monthly income is ₦13,260. This implies that majority of mini-livestock farmers were into other occupations to supplement the small monthly income.



**Table 1: Frequency and percentage distribution of respondents by socio-characteristics**

Variable	Frequency	Percentage	Mean
<b>Age</b>			
< 30	22	18.4	44.2
31-40	24	19.2	
41-50	41	34.0	
51-60	20	16.6	
> 60	14	11.5	
<b>Gender</b>			
Male	80	66.7	
Female	40	33.3	
<b>Marital Status</b>			
Married	86	71.6	
Single	19	15.8	
Widowed	10	8.3	
Divorced/ separated	05	4.2	
<b>Religion</b>			
Christianity	67	55.8	
Islam	45	37.5	
Traditional	8	6.7	
<b>Educational level</b>			
No formal education	36	30.0	
Primary education	54	45.0	
Secondary education	16	13.3	
Tertiary education	14	11.7	
<b>Household size</b>			
1-5	56	46.6	7
6-10	41	34.2	
11-15	18	19.2	
>15	05	4.0	
<b>Experience (yrs)</b>			
1-5	14	11.7	10.3
6-10	40	33.4	
11-15	53	44.1	
>15	13	10.8	
<b>Pry Occupation</b>			
Yes	11	9.2	
No	109	90.8	
<b>Income</b>			
No income	15	12.5	₦15,268.33
≤ 20,000	77	76.5	
20,001 - 40,000	20	16.5	
≥ 40,000	08	6.6	
<b>Total</b>	<b>120</b>	<b>100.0</b>	

Source: Field survey, 2011.

### Types of mini-livestock reared among the Respondents

Distribution of types of mini-livestock reared among the respondents indicated that 57.5% of the respondents were snail farmers, 40.8% were grass-cutter farmers and 22.5% are rabbit farmers. This implies that many mini-livestock farmers are into snail farming. The higher percentage of farmers rearing snail could be attributed to the fact that Snail meat is socially well accepted in many parts of Nigeria. This means snail production is demand driven.

Moreover, Snail farming has numerous advantages which are highlighted below: cheap to maintain in terms of housing, feeding, health care etc; highly adaptable to a variety of conditions (villages, farms backyard, shed, cities etc); they reproduce rapidly; they are efficient producers of meat; they have high medicinal value-they are used in the prevention and care of diseases like hypertension; Due to the fact that snail are small, noiseless and easy to handle, they can be reared in the urban areas without infringing on the peace of the neighbors (Odunnaiya, 1991).

**Table2: Distribution of Types of mini-livestock Reared Among the Respondents**

Mini-livestock farmers	Frequency	* Percentage
Snail farmers	69	57.5
Grass-cutter farmers	49	40.8
Rabbit farmers	27	22.5

Source: Field survey, 2011

\*Response > 100% due to multiple response

### Food Security Index

Household are profiled into two group namely food secured and food insecure group based on their per capita food expenditure. The food insecurity line is defined as two third of the mean per capita food expenditure of the total household.

Therefore, households whose per capita food expenditure falls below ₦2154.16 are food insecure while a household whose per capita food expenditure equal or is greater than ₦2154.16 are food secured. The food insecurity incidence ( $P_0$ ) for the households studied was found to be 0.475, food insecurity gap/depth ( $P_1$ ) was found to be 0.213 and the food insecurity severity ( $P_2$ ) was found to be 0.115 and they all show the pattern of food insecurity based on these household characteristics.

The food insecurity incidence means that 47.5% of the respondents were food insecure. This implies that the respondents have to increase their production and economics activities in order to increase their income. The food insecurity gap/depth implies that each food insecure person represent 21.3% of the food insecurity line, while the food insecurity severity (11.5%) represents the inequality among the food insecure households.

Mean per capita household food expenditure is = N3231.25

2/3 mean per capita household food expenditure = N2154.16

**Table 3: Food Security indices**

Group	$P_0$ (%)	$P_1$ (%)	$P_2$ (%)
Farmers	47.5	21.3	11.5

Source: Field survey, 2011.

### **Food Security Status of Respondents based on the Mini-livestock Combinations**

Table 4 indicated that 51.0% of the respondents that rears one out of the three mini-livestock were food secured while 49.0% were food insecure. 57.1% of the respondents that rear two out of the three mini-livestock were food secured while 42.9% were food insecure. Half (50.0%) of the respondents that rears all the three mini-livestock were food secured, while 50.0% were food insecure. This implies that the majority of the respondents that rear one and two mini-livestock out of the three mini-

livestock had better return on their production, generate more streams of income and these cause them to be food secured.

**Table 4: Distribution of Food Security among Respondents Based their on the Mini-livestock Combinations**

Food security status	One mini-livestock		Two mini-livestock		Three mini-livestock	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Food secure	35	51.0	20	57.1	8	50.0
Food insecure	34	49.0	15	42.9	8	50.0
Total	69	100	35	100	16	100

Source: field survey, 2011

### **Determinants of Food Security.**

The analytical approaches that are commonly used in study involving dichotomous dependent variable include Logit Model and Probit Model. They are important for analyzing food security and insecurity. The result of Logit Model was found more suitable to analyze food security amongst farming households after diagnostic of statistical and econometrical parameters. The Chi-square (65.197) and Log likelihood function (50.429) were significant.

The result of the analysis reveals that age is a significant determinant of being food insecured at 5%. The older household heads are more likely to be food insecure than the younger household heads. This implies that a unit increase in age would result in an increase in the probability of being food insecure. It is well known fact that as age increases over time labour efficiency tends to decline, this would in turn decrease monthly wages.

Gender is positive and statistically significant at 10% level. This implies that male headed households are more likely to be food insecure than female headed households.

The analysis also revealed that marital status is statistically significant at 5%. This implies that a unit increase in the married respondents result in about 19% increase in the probability of being food insecure.

Household size was found to be statistically significant at 1% level. The relationship between household size and the food security status reveals that larger household sizes significantly increase the likelihood of being food insecure by about 63%. This implies that respondents with larger household size are more prone to be food insecure and this is because more expenditure on food would be needed by household to be food secured.

Years of experience have a negative influence of being food insecure and it is significant at 10%. The household heads with more years of experience are less likely to be food insecure than those with less years of experience. Experience is said to be the best teacher, over time household could device means of procuring food for members of the family, and it could be through food processing and preservation.

**Table 5: Logit Estimate of Food Security Status**

Explanatory variable	Coefficient	t-value
Constant	-0.470	-0.214
Age	0.430	2.252**
Gender	0.106	1.667*
Marital status	0.194	2.180**
Education	-0.294	-0.463
Household size	0.629	7.366***
Experience	-0.747	-1.843*
Occupation	0.221	0.167
Income	0.416	0.008

Source: Data Analysis. 2011

\*\*\*, \*\*, \* significant at 1%, 5% and 10% respectively.

## Summary and Conclusion

The major findings from this research work were summarized thus; most of the mini-livestock farmers were still in their active ages, were males, many of the farmers were married. Religion does not have any significant negative effect on mini-livestock production among farmers like pigs and dogs. There is relatively low level of literacy and fairly large household size among the respondents. Many of the respondents have been practicing mini-livestock farming for a long time. Mini-livestock farming can be practiced with other occupations and the average monthly income derived from mini-livestock in the study area was ₦15, 268.33

Larger percentage (58%) of mini-livestock farmers are into snail farming, 47.5% of the respondents were food insecure, majority of the respondents that rear one and two mini-livestock out of the three mini-livestock studied had better return on their production.

Age, gender, marital status, household status and farming experience were the major determinants of food security status among the micro-livestock farmers in the study area.

## Recommendation

Based on the findings, the following recommendation was made; Young people that have interest in mini-livestock production should be encouraged through provision of incentive and other necessary production facilities. Micro-livestock expertise should organize training and educate those who are into production and intended individuals on the best mini-livestock management practices. People living in the study area should be sensitizing on the importance of family health education, child-spacing programme and benefits of keeping moderate household size to food security and standard of living.

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