

## ALLEVIATING RURAL POVERTY: WHAT ROLE FOR SMALL-HOLDER LIVESTOCK PRODUCTION IN DELTA STATE, NIGERIA

INONI O. E., CHUKWUJI C. O., OGISI O. D., OYAIDE W. J.

### *Abstract*

*In order to examine the role of small-holder livestock production in reducing rural poverty among small-scale farmers in Delta State, Nigeria, structured questionnaires were administered randomly to 264 small-scale farmers in 24 communities in 6 local government areas of the State, using multistage sampling technique. Data collected include socio-economic characteristics of households, flock size, livestock income, annual income of households, index of food insecurity and improved nutrition, ownership of residential accommodation, educational level, as well as gender of household head. Descriptive and inferential statistics were used to analyse the data.*

*The results showed that annual income, household size and gender of household head are statistically significant determinants of the value of flock size in small-holder livestock production. Average annual household income from livestock keeping was N=12,447.47 and this constituted 42.6% of the mean annual income of N=31,262.95. The study also found income from small-holder livestock operation to have a positive and statistically significant ( $p < 0.001$ ) effect on improved nutrition, household food security and consequently, rural poverty reduction.*

**Key words:** small-holder livestock production, rural poverty alleviation, livestock income, food security

### INTRODUCTION

The problem of poverty and strategies to alleviate its burden has been issues of great concern in the developing world since the 1980's. The poor are people who are unable to obtain adequate income to maintain healthy living conditions. The World Development Report 1990 estimated that about one billion people in the developing world live in absolute poverty, surviving on US\$1.00 per day. According to Olayemi (1995), the poor have no access to the basic necessities of life such as food, clothing and a decent shelter; unable to social and economic obligations; they lack skills and gainful employment; have few, if any economic assets and also lack self-esteem. In most cases, the poor lack the capacity to liberate themselves from the shackles of poverty; and this situation causes the condition of extreme poverty to persist and to be transmitted from generation to generation. (Obadan, 1997). While it is easy to recognise those who are absolutely poor, relative poverty refers to a situation in which some household are less rich than others in terms of income and other resources.

Although the incidence of poverty is widespread in Nigeria, it is much higher in the rural areas where a greater proportion of the population live. The World Bank (1996b) put the total population of the poor in Nigeria at 34.7 million, with the incidence, depth and severity higher in the rural areas than urban centres. The rural poor comprise of two groups according to Aku, Ibrahim and Bulus (1997).

Those who do not own enough land to grow food for family consumption. They are poor because of unequal distribution of cultivable land a situation that may be exacerbated by population pressure. Farmers who

do not have sufficient land often have their problems compounded by inadequate access to complementary inputs such as fertilisers and credit.

Landless agricultural and non-agricultural labourers who rely on employment opportunities in the countryside. According to Lipton (1983), the poverty of the landless consists not just of low agricultural wages but also in the shortage of employment opportunities during the year.

The role of agriculture in alleviating poverty has been well reported in the literature. According to d' Silva and Bysouth (1992), agricultural projects constitute one of the major avenues available to governments to alleviate poverty due to the abundant natural resources that the poor can exploit to their advantage. In Nigeria for example, about 75% of the total land area is cultivable and support a thriving agricultural economy, coupled with abundant and well distributed rainfall throughout the year (Evbuomwan, 1997). The land, water, fishery and forest resources are capable of improving the well-being of the poor if optimally and sustainably exploited. Increasing the demand, and therefore the price for those factors of production that the poor own, such as labour, as well as transferring physical assets such as land to them through appropriate land reform policies will improve their income and guarantee better living conditions for the rural poor (The World Development Report, 1990).

Although the role of agriculture in mitigating the effects of poverty in developing countries is very well known, the role of small-holder livestock production has not been the focus of such studies. The objective of this study therefore, is to examine the effect of small-holder livestock production as a tool for rural poverty reduction in Delta State, Nigeria. Specifically, the study will investigate the contribution of small-holder

livestock production to household food security, and improved nutrition; determine the income shares of livestock in household annual income; and identify the factors that influence flock size in small-holder livestock production.

**MATERIALS AND METHODS**

In order to examine the effects of small-holder livestock production in alleviating rural poverty in Delta State, Nigeria, structured questionnaires were administered to 264 households in 24 communities drawn from the three agricultural zones, namely Delta Central, Delta North, and Delta South that comprised the State. Multi-stage sampling technique was adopted in the study. Firstly, 2 Local Government Areas (LGAs) were selected from each of the three agricultural zones making a total of 6 LGAs used for the study. Secondly, 4 communities were selected randomly from each of the 6 LGA earlier chosen, giving a total of 24 communities. From each of these communities, 11 respondents were eventually selected.

Data collected include socio-economic characteristics of households, flock size of livestock kept, the value of flock size, livestock income, annual income of household, index of food security and improved nutrition, ownership of residential accommodation, educational as well as the gender of household head.

**Model Specification and Estimation**

The following econometric model was postulated to investigate the effects of predetermined variables on value of flock size, a proxy for the poverty alleviating potential of small-holder livestock production:

$$VFL_z = f(Y_N, HH_z, GEN_{HD}, OWN_{RD}, EDU_L, u) \dots \dots (1)$$

Where VFLz is the monetary value of flock size of a particular household,

$Y_N$  is the annual income of household,

HHz is household size,

$GEN_{HD}$  is gender of household head (Male =1, Female = 0),

$OWN_{RD}$  is the ownership of residential accommodation (Owner-occupier =1, Tenant = 0),

$EDU_L$  is the level of education attained (no formal education =1, primary school = 2, secondary school = 3, tertiary education=4), and

U is error term.

Because economic theory does not indicate the precise mathematical form of the relationship among the variables, different functional forms of the above model including the linear, semi-logarithm, logarithm and exponential functions were fitted. However, the logarithmic function was chosen as the lead equation on the basis of economic and statistical theory, as well as econometric criteria. The logarithmic form of the model is specified as follows:

$$\ln VFL_z = \ln \xi_0 + \xi_1 \ln Y_N + \xi_2 \ln OWN_{RD} + \xi_3 \ln EDU_L + \xi_4 \ln HH_z + \xi_5 \ln GEN_{HD} + u \dots \dots \dots (2)$$

and the variables are as defined in equation (1).

Small-holder livestock keeping plays a crucial role in food security of the rural poor. They make a significant contribution to food production through the provision of high value protein-rich

animal products; and being a major source of income and store of wealth for small-holders

provide access to food. In order to examine the effect of livestock keeping in household food

security, the following econometric method were specified and estimated:

$$\ln HFD_{SEC} = \ln \psi_0 + \psi_1 \ln ACS_{FD} + u \dots \dots \dots (3)$$

$$\ln IMP_{NT} = \varphi_0 + \varphi_1 \ln ACS_{FD} + \ln u \dots \dots \dots (4)$$

Where  $HFD_{SEC}$  is an index of household food security,  $ACS_{FD}$  is an index of access to food measured by the ratio of livestock income to annual household income, and

$IMP_{NT}$  is an index of improved nutrition due to livestock keeping.

The Ordinary Least Squares (OLS) technique was used to estimate the relevant parameters. However, data analysis was based on information from 218 respondents as 46 questionnaires were discarded due to incomplete information and non-response.

**RESULTS AND DISCUSSION**

The socio-economic characteristics of small-holders livestock producers in northern Delta State are presented in Table 1. It shows that about 37% of the household studied are headed by females while 63% are male. However, the distribution of respondents with respect to educational status reveals that 55% of them attained different levels of formal education.

A relatively small household size was found in the study with a mean size of 7 persons per household; though about 34% of the households have a family size ranging between 9 – 13 persons. The findings do not support the preponderance of large family sizes among the poor in the rural areas reported by Eboh, (1995).

The income level of respondents as well as its disparity is another economic variable of interest in the study. As shown in Table 1, small-holder livestock producers in Delta State are mainly small-scale farmers who earn low incomes, with an average annual income of about N=31, 262.95; it is N=25, 536.48 for females and N=34, 648.68 for males. In fact, 75% of the farmers studied earned an annual income ranging between N=12, 000.00 – N=37, 000.00. Apart from generating income to the farmer, livestock keeping is a means of accumulating capital for investment in the rural economy. Being highly mobile capital goods, livestock can be liquidated easily if economic incentives are unattractive or during

period of crisis for the farm-family (Jarvis, 1993). The average annual income from livestock was N=12, 447.47 per rural household. However, the proportion of livestock income in annual household income was quite high. As shown in Table 1, income from livestock keeping constituted 42.6% of the total annual income of all households. Small farmers keep a higher proportion of livestock, and they generate an equally greater percentage of income thereby. Similar findings were reported by Sastry *et al* (1993) in Southern India.

**Regression Results**

The estimated results for equation (2) are shown in Table 2. The regression fits the data well with an Adjusted R-squared of 0.70. This implies that the independent variables jointly explained 70% of the variation in the dependent variable (value of flock size). The Durbin-Watson statistic of 1.99 indicates the absence of autocorrelation in the data. Generally, the result conforms with a priori expectations on the size and signs of the regression of the coefficients. Furthermore, it shows that income, household size and gender of household head exert a positive and statistically significant influence on value of flock size in small-holder livestock production, in Delta State. Rural dwellers require a sizeable and stable stream of income for initial as well as subsequent investment in livestock keeping. Thus, a rise in household income will enable farmers expand the size of their holdings and consequently their value. However, the elasticity of flock size with respect to income is low. A 10% increase in income will raise the value of flock size by only 1.6%. Unlike annual income, the response of flock size to household size and gender are quite large. Raising household size and male-headed families by 10% will respectively increase value of flock size by 3.6% and 4.6%. Small-holder livestock keeping depends heavily on labour input of

the household for feeding and overall management. Therefore, larger household with more labour are better able to maintain larger flocks. Although, both male and female farmers keep livestock, the study shows that flock size is gender sensitive. This may be due to differences in composition of flocks by male - and female - headed households. Male farmers kept a large number of goats, sheep, and sometimes pigs, but females had mainly chickens ducks and a few goats in their flocks. Because of the relatively large initial investment in small ruminants, female-headed household had only a few of them in their flock composition, due to their relatively smaller average annual income.

Educational level had a negative effect on flock size. This is an indication that rural dwellers with a higher level of educational attainment do not participate actively in small livestock keeping. Highly educated people will rather engage themselves in intensive backyard poultry keeping than small-holder semi-intensive production that litter the surrounding with dung and droppings.

Ownership of residential accommodation though had a positive influence on size of livestock holding, have no statistically significant effect. The economic implication of the result is that, implementing a policy that can enhance the income generating ability of the rural poor will alleviate the burden of poverty by stabilising food supply, improving the nutritional status of rural dwellers and contribute to the growth of the rural economy (Birdsall, Ross and Sabot,1995). Coupled with an average household of 7 persons, improved rural income will stimulate investment in small-holder livestock production in Delta State.

The results of food security models are presented in equations (3a) and (4a) below. They imply that access to food, a proxy of ratio of livestock income to annual income is a

$$\ln HFD_{SEC} = -0.0182 + 0.814 \ln CS_{FD} \dots \dots \dots (3a)$$

*t-ratio (26.74)\**  
*R<sup>2</sup> = 0.77; D-W = 2.09; F = 715.036; n = 218*

statistically significant determinant of household food security (p < 0.001). This is so because income from sale of livestock products provide purchasing power, and thus guarantee access to food. The fit of model (3a) is high as access to food explains 77% of the variation in food security. However, the explanatory ability of model (4a) is rather low since only 55% of the variation in improved nutrition is accounted for by variation in access to food.

$$\ln IMP_{NT} = -0.249 + 0.277 ACS_{FD} \dots \dots \dots (4a)$$

*t-ratio (16.403)\**  
*R<sup>2</sup> = 0.55; D-W = 1.97; F = 269.049; n = 218*

The implication of this finding is that a host of other factors influence household food security and these must be identified and addressed if rural poverty is to be alleviated. Nevertheless, access to food occasioned by increased income from small-holder livestock production, exerted a positive and statistically significant effect on improved nutrition (p < 0.001).

**CONCLUSION**

The paper has examined the role of small-holder livestock production as a tool for poverty reduction among farmers in Delta State, Nigeria. The following conclusion can be drawn from the study:

- (i) Small-holder livestock sector holds great potential as a strategy for improved nutrition and household food security for the rural poor.
- (ii) Small-holder livestock keeping is a major source of cash income to farmers as average annual income from livestock keeping (N=12, 447. 47) per farm family, accounted for about 43% of average annual income (N=31,262.95).
- (iii) Since value of flock size in small-holder livestock

depends significantly on annual income, household size and gender of household head, policies to stimulate the income generating ability of small-holder farmers should be pursued. There may be the need to explore off-farm sources of income generation in order to accommodate the rural landless.

- (iv) Direct intervention through livestock subsidy programmes by government agencies and donor organisations will stimulate and sustain farmers interest in small- scale livestock keeping in order to reduce rural poverty.

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Corresponding author:

**Inoni O. E.**

Delta State University, Asaba Campus, Asaba,  
Department of Agricultural Economics and Extension,  
Delta State, Nigeria  
inoniemma2003@yahoo.com

**Tab. 1. :** Distribution of Socio-Economic Characteristics of Respondents ( n = 218)

<b>Parameter</b>	<b>Frequency</b>	<b>Mean (Mode)</b>
<b>Gender</b>		
Female	81(37.2)*	(Male)
Male	137(62.8)	
<b>Educational status</b>		
No formal education (1)	98(44.5)	1.83
Primary school (2)	68(31.2)	
Secondary school (3)	43(19.7)	
Tertiary education (4)	9(4.1)	
<b>Household size</b>		
3-5	70(32.1)	7 persons
6-8	75(34.4)	
9-11	65(29.8)	
12-14	8(3.7)	
<b>Ownership of residence</b>		
Tenants	105(48.2)	(Owner-occupier)
Owners-occupiers	113(51.8)	
<b>Annual income (N,= )</b>		
12000 – 24000	73(33.5)	31,262.95
25000 – 37000	91(41.7)	
38000 – 50000	44(20.2)	
51000 – 63000	10(4.6)	
<b>Livestock income(N,= )</b>		
5000 – 10000	105(48.2)	12,447.47
11000 – 16000	74(33.5)	
17000 – 22000	31(14.2)	
23000 – 28000	7(3.2)	
29000 – 34000	1(0.5)	
<b>Livestock income (% of Annual income)</b>		
13-26	30(13.8)	42.6
27-40	77(35.3)	
41-54	63(28.9)	
55-68	32(14.7)	
69-82	16(7.3)	

\* Figures in parentheses ( ) are percentages.  
 Source: Computed from Survey Data, 2005.

**Tab. 2. :** Regression Results of Determinants of Flock Size in Small-Holder Livestock Production

<b>Variable</b>	<b>Estimated coefficient</b>	<b>t-statistic</b>	<b>p-value</b>
Annual income	0.1632	3.81	0.00*
Accommodation	0.0532	1.78	0.07
Educational level	-0.0132	-0.597	0.55
Household size	0.3595	7.85	0.00*
Gender of household head	0.4258	12.15	0.00*

