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EFFECTS OF INPUT COSTS ON EGG PRODUCTION AMONG PULLET FARMS IN JOS, PLATEAU STATE, NIGERIA

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ABSTRACT

This study was carried out with the view to examining the effects of input cost on the production among pullet farms in Jos South local government area of Jos, Plateau State, Nigeria. The major objectives were to determine the effects of inputs costs on pullet production and determine the effects of socio-economic profiles of the pullet rearers on farm productivity. A sample size of 100 pullets farming households were randomly sampled using a set of detailed and well-structured questionnaire. Objectives were realized using descriptive statistics such as mean, frequency distribution and percentages and multiple regression model. In determining the effects of the input costs on pullet productivity in the study area, the double log regression model gave the best fit to the data. The result indicates that 91% of the variations in pullet productivity was accounted for by variability of the input costs included in the model. The number of birds, cost of feed, additional light and additional heat; drugs, had significant effects at 1% & 5% level respectively on pullet productivity which suggests that they are important determinants of pullet productivity. In determining the effects of socio economic profiles of the pullet rearers in the study area, the linear regression model gave the best fit to the data. The results indicate that about 62% of the variations in pullets output was accounted for by socio economic characteristics (membership of cooperative, age; household size, farming experience; extension service and sex of the pullets rearers influenced the productivity of pullets egg farms in the study area) of the respondent included in the model. Provision of feed mill, extension services cum formation of cooperative groups are among the key prescriptions to save feed cost and improve egg productivity.

KEY WORDS

Pullet farms, input costs, socio-economic characteristics, effects, egg productivity.

Poultry are chickens, ducks, geese, guinea fowls, turkeys and other related birds kept for meat and egg. In Nigeria, the poultry population is estimated to be 140 million (Ocholi et al; 2006). They are the most commonly kept livestock and over 70% of those keeping livestock are reported to keep chickens (Amar-Klemesu and Maxwell, 2000). Chickens have its scientific name to be *Gallus domestica* and it is a type of poultry. It belongs to the family *phasiendae* and it is estimated to be about 69% of the total number of birds kept in Nigeria (Sonaiya, 1990). Pullets are a type of chicken solely kept for egg production and by implication a source of protein (FAO, 2006). They are young chickens suitable for egg production.

Background of the study. Generally, agriculture is very important in man's everyday life particularly in provision of food and revenue; generation of a sizable amount of national income and raw materials for agro-allied industries in addition to provision of employment in terms of processing and marketing activities for the populace. The importance of poultry industry is that it concentrates in providing employment not only to those engaged in its production directly, but also for the hatchery operations, feed dealers, manufactures of incubators, building materials, processors of egg and poultry products and all dealers engaged in the marketing of egg and poultry from the time they leave the producer until they are in hands of consumers (Morly, 1982). In particular, the Nigeria's poultry section of the agricultural sectors' industries has its root in the initiative of regional governments from the

1960's when the Western Regional Government entered into joint pilot poultry production schemes with some foreign partners, notably the Israeli government. The entry of private investors into poultry production in the late 1960s to early 1970s marked the beginning of indigenous commercial poultry production. It then spread from the west to the eastern region and parts of the Northern region. The size of the industry grew from less than a million in the mid-1960s to over 40 million by the early 1980s. All along, the growth of the industry had been propped by government initiatives and incentives, especially in terms of training, technological support, input support services and others. For example, many of the poultry technical staff were products of government subsidizing training programmes, while inputs like vaccines and diagnostic services were subsidized by government or even free initially (Adene and Oguntade, 2006). Meanwhile the national economic climate was enjoying a boost from the newly advancing petroleum sector and this visibly helped to propel national investment, including poultry sector. As from this time, the poultry industry had started to be self-supporting, viable and attractive to financial institutions.

Benefits of Poultry Egg and Meat Production. Augmenting the production of laying chickens is an important objective in helping to meet the nutritional needs of the growing population in Nigeria. Commercial egg production is perhaps the most significant and cheap source of quality protein and income as compared with other livestock production activities (Ebraheem *et al* 2012). Layers are prolific, easy to raise and their output can be generally expanded more rapidly and easily than that of other livestock. Furthermore, they are adaptable to various climates and altitudes. Poultry raising can often be combined with other types of farming and offers the possibility to raise extra revenue for farmers.

Egg production involves the use of good layers stock for the purpose of table egg production. The eggs are sold in off-fresh to the public, while the spent layers are culled off from the farm. Poultry are good converters of feeds to eggs and meat within a short period of time (Ebraheem *et al* 2012). The nutritive value of poultry eggs rank second to cow milk. Apart from providing employment and a livelihood to thousands of people, it also provides a remarkably high quality nutritious food. The egg is a complete protein with excellent quality; one egg gives 6g of protein (Ebraheem *et al* 2012). Egg white protein has a biological value of 100, the highest biological value of any single food protein (FAO, 2005). Poultry egg and meat are important sources of high quality proteins, minerals and vitamins to balance the human diet. Commercial layer strains are now available with traits of high egg production and high feed conversion efficiency. Depending on the farm-size, eggs production can be the main source of family income or can provide income and gainful employment to farmers throughout the year. Poultry manure has high manure value and can be used for increasing yield of all crops. Not all eggs produced are however, directly consumed by humans; some are used for production of vaccines and antibodies (EPA, 2011).

Similarly, government policies which were in favour of food crop production as against livestock production exacerbated the situation. Banks were directed to increase lending by 50% for food crops production and distribution, 15% to the livestock industry and 35% to other agricultural crops Onyeagocha *et al* (2010).

Importance of Poultry Production in Nigeria. The importance of poultry to national economy cannot be over emphasized as it has become popular for the small-holders that have contributed to the economic growth of the country. In Nigeria, poultry contributes about 15 percent of the total annual protein intake with approximately 1.3kg of poultry products consumed per head per annum Ologbon and Ambali (2012). The poultry industry has assumed greater importance in improving employment generation opportunities and animal food production in Nigeria. An earlier report by Mbanasor (2002) showed that about 10 percent of the Nigerian population is engaged in poultry production, but mostly subsistence and small or medium sized farms. Eggs production is carried out in all parts of the country, without religious, social or cultural inhibitions associated with their consumption. Specifically, investment in pullets' enterprises is attractive because the production cost per unit is low relative to other types of livestock production (Anwasia, 2015). Poultry meat is tender and commonly used in ceremonies compared to other birds and pullet's enterprises have short production circle. Owing to these obvious advantages of pullets enterprises, large number of

farmers, men and women go into their production, many of whom do so for income generation purposes (Nwajiuba and Nwoke, 2000), besides meeting the protein needs of their households. The evidence of this is the preponderance of producers–hawkers of pullet's products in the urban and rural markets particularly during festive periods, when their demands are highest and their selling prices as well. Pullet production like any other economic venture is dependent on resources used. As noted by Etim and Udoh, (2007) maximum poultry production depends partly on the environment, technical know-how and the quality of resources employed in the production process. But to optimize production and ensure sustainability, there is need for judicious management of the resources employed in the enterprise.

Problem Statement. In 2002, the Federal Government banned the importation of poultry products into the country. This posed a greater pressure and challenge to our local farmers to produce commercially so as to meet the ever-increasing demand for poultry and poultry products. However, few major glitches which truncated the growth path of the industry, included transiting from small-scale hybrid broilers and layers and backyard poultry enterprises/semi-commercial to medium scale commercial enterprises, high input cost of feeds for pullets, which constituted over 51% of total cost of production (Effiong and Onuekwusi, 2006)? These scenarios partly resulted from policy inconsistencies of the Government, giving rise to the Structural Adjustment Programme (SAP) between 1987 and 1994, during which the industry almost collapsed due to the ban on raw materials for the poultry enterprises that vary from basic backyard poultry keeping to mechanized and automated production plants. Study by Ojo (2003) revealed that, the industry falls short of its aim of self-sufficiency in animal protein production in the country. Annual protein consumption is put at 5gm/capita per day which is a far cry from FAO recommended level of 35gm/capita per day (Anwasia, 2015). Also, in the past years, many small-scale operators in the poultry industry have been forced out of business due to problems ranging from shortage and high cost of feed, high cost and inadequate veterinary services and drugs, poor quality of equipment and other inputs. Lack of proper management in terms of feeding, housing, health care and traditional methods used by poultry farmers among other factors are responsible for the low productivity.

A lot of researches have been conducted on pullet production, technical efficiency and productivity in the study area but not much research have been done in the area of analysis of the effects of input costs on productivity among pullet rearers in the study area, and hence this research is aimed at bridging the gap. The associated problems including rising cost of the major inputs such as feeds, drugs, and equipment form a constant set back in poultry industry (Sekoni, 2002). Also, the storage of poultry products is another problem, which is largely due to epileptic power supply and as such farmers incur extra cost of hiring generators in order to avoid the spoilage of these products. The following research questions therefore are:

- What are the socio economic profiles of the pullet rearers in the study area?
- What are the management practices of the pullets rearer in the study area?
- What effects do inputs have on output in pullet egg production in the study area?
- What effects do socio economic profiles of the pullet rearers on productivity?

Objectives of the Study. The broad objective of the study is to determine the effects of input costs on the productivity among pullet farms in Jos south L.G.A of Plateau state.

The specific objectives are to describe the socio economic profiles of the pullets rearers in the study area; identify the management practices among pullets rearers the in the study area; determine the effects of inputs costs on pullet egg production; determine the effects of socio economic profiles of the pullets rearers on farm productivity.

Research Hypothesis. The research hypothesis is stated below:

H₀: Inputs costs do not significantly influence egg production among small scale pullets in the study area;

H₁: Inputs costs significantly influence egg production among small scale pullets in the study area.

Justification of the Study. The study seeks to examine the effects of input costs on the productivity among pullet farms in Jos south local government area of Plateau State Nigeria. Specifically, the study will aid managers of pullet enterprise; to be able to have a wide range of solution to deal with the effects of input costs. The main concern of any production activity has been described as that of achieving maximum possible productivity in the transformation of inputs into outputs.

Although available literatures show that many studies have been done on poultry production, but the attention was more on the technical efficiency of poultry broiler farming (e.g Ugbome, 2006; Amos, 2006, Bamiro, 2008; Adebisi, 2000; Ojo, 2003; Adebayo and Adeola, 2005). Some others looked at the Profit Efficiency in layers Production (Effiong and Onyenweaku. 2006; Oladeebo and Ambe-Lamidi 2007; Okafor, Odii, Emeyonu & Obih 2006). Little research has been done that looked at the effects of input cost on the productivity of pullet in Jos South Plateau State. Therefore, this study seeks to identify the input costs on egg production among pullet farms and their effects on productivity of pullets' enterprise in Jos South L.G.A of Plateaus State, Nigeria. Hence, the findings of the study will be a reliable quantitative result and source of reference to policy makers to adequately make relevant policies that would promote egg production in plateau state. It will equally contribute to the general body of knowledge in the study area.

METHODS OF RESEARCH

The Study Area. Jos south local government area is located between latitudes 9° 30' to 10° N and longitude 8° 48' E to 8.800°E of the Greenwich meridian. It is situated at the north western part of the state with its headquarters at Bukuru, which is about 15 km from the state capital, Jos. It share boundary with Jos North local government area in the North, in the East with Barkinladi local government area, in the south with Riyom local government area and in the west with Bassa local government area. The local government area has four districts: Du, Gyel, Kuru and Vwang districts and twelve wards. The local government area has total land area of about 1,037 km² with a population of 306,716 (NPC, 2006). It has a cool climatic condition due to its altitude. The coldest period is between November and February with an average mean daily temperature of 18°C, while it gets warm between March and April before the onset of rain. The rainy season, which is between the months of May and October, has its peak in August. The mean annual rainfall varies between 1347.5 and 1460 mm per annum. The major inhabitants of the area are the Beroms and other tribes like; the Hausa, Igbo, Yoruba among others. The mild climatic condition and the accommodative nature of its people as well as tourists attraction have continued to attract investors. According to Gwom (1992), the people of Jos south were predominantly farmers and hunters, and the common food crops grown in the area include Irish potato, sweet-potato, maize, millet, Acha, tomato and many other varieties of vegetables. Due to the ever green vegetation and tse-tse-free nature of the area, cattle rearing and grazing has been quite profitable and poultry farming is a viable business in the area. The conducive environment for poultry production has attracted investors such as the Evangelican Church of West Africa (ECWA) Rural Development Company Limited which deals in poultry production and other veterinary services. Michael (2012).

Figure 1 – Jos South Local Government Area

Sampling Procedure. Multistage random sampling technique was used to select respondents for the study. In the first stage, five wards were selected from the 12 wards in the Local Government for the study. These wards are Bukuru, Zawang A, Zawang B, Kwang and Du. In the second stage, five villages each was randomly selected from the five wards making a total number of 25 villages for the study. In the third or last stage 4 pullet farmers were randomly sampled, giving a total of 100 pullet farmers selected from the sampled villages for the study.

Data Collection. The study was conducted using primary data for the analysis. Primary data were collected using structured questionnaires administered to the respondents. The questions were structure based on the objective of the study.

Data Analysis. Objectives (i) and (ii) were achieved using descriptive statistics such as mean, frequency distribution and percentages. Objective (iii) & (iv) were achieved using Multiple regression model.

Multiple Regression Analytical Technique. Regression Analysis is a statistical tool for evaluating the relationship between one or more independent variables $X_1, X_2 \dots X_n$ to a single continuous variable Y . Thomas (1984) states that multiple regression analysis is a statistical tool for understanding the relationship between two or more variables. Four functional forms were tried: Linear, Semi-log, Double-log and Exponential. The implicit form of the regression model that was used is:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, + \mu$$

Where:

- Y = Output of pullet;
- X_1 = Number of bird;

- X_2 = Cost of feeds;
- X_3 = Drugs and vaccines (vail, L, gram, mm);
- X_4 = Labour (man days);
- X_5 = Water (L);
- X_6 = Additional Light;
- X_7 = Additional Heat;
- μ = Error term.

The explicit functional forms that were tried are as follows:

(a) Linear functional form:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \dots b_7 X_7 + \mu \quad (1)$$

(b) Semi-log form:

$$Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + \dots b_7 \log X_7 + \mu \quad (2)$$

(c) Double-log form:

$$\log Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + \dots b_7 \log X_7 + \mu \quad (3)$$

(d) Exponential functional form:

$$\log Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + \dots b_7 \log X_7 + \log \mu \quad (4)$$

Where: b_0 is a constant term and $b_1 \dots b_n$ are estimated coefficients of the variables; $X_1 \dots X_n$ are the independent variables respectively, as defined in equations above.

The variables $X_1 \dots X_n$ were expected to have positive causal relationships with Y and were added to the model to determine the extent to which each of them explained variation in total output of pullets.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Pullet Farmers. Some socio-economic characteristics of the respondents were ascertained include age, gender, and marital status, level of education, household size and farming experience.

Age of the respondents. The frequency distribution of respondents according to age is shown in table 1. It shows that 31% of pullet farmers fell within the productive age range of 46-50 years. The average age of the pullet farmers was estimated at 46 years. Therefore, among the pullet farmers, there is a strong tendency that productivity will continue to rise in the meantime, given their ages. The implication of average age estimated at 46 years is that pullet farmers are in their prime and active age of production. This result agrees with the findings of Ojo (2003) in his work Productivity and Technical Efficiency of Poultry Egg production in Nigeria where he stated that the farmers were relatively young with mean age of about 45 years with 11 years standard deviation.

Table 1 – Frequency Distribution of Respondents according to their Age;

	Categories	Frequency	Percentage
Age (years)	26-30	4	4
	31-35	12	12
	36-40	24	24
	41-45	29	29
	46-50	31	31
Total		100	100

Source: Field survey data, 2017.

Sex of the Respondents. Table 2 shows that both men and women were actively involved in egg production, but the percentage of men were more. Men accounted for 68% while, female account for less 32%. The high number of males might be attributed to hard task (such as, building of the poultry house, changing of poultry litters) involved in egg production process.

Table 2 – Frequency Distribution of Respondents according to their Gender

	Categories	Frequency	Percentage
Gender	Male	68	68
	Female	32	32
Total		100	100

Source: field survey data, 2017.

Marital Status of the Respondents. Result from table 3 shows that about 88% of the respondents were married and 12% single. The high number of married people in the business was to reduce labour cost as most married persons have children that constitute the labour force in egg production.

Table 3 – Frequency Distribution of Respondents according to their Marital Status

	Categories	Frequency	Percentage
Marital status	Married	88	88
	Single	12	12
Total		100	100

Source: Field survey data, 2017.

Educational level of Respondents. The result shows that 100% of pullet farmers had formal education at tertiary level. The average years of schooling of the respondents as estimated by this study stood at 16years. This implies that all the rearers are educated. However, this does suggest that in egg production, education was an added advantage, rather than a barrier for efficient management. With this level of education, there is tendency of the farmers being able to put into use the level of technology adopted and skill acquired. This study agrees with the findings of (Ologbon, *et al* 2012) that found out that greater percentage of small scale poultry farmers in Ogun State had formal Education.

Table 4 – Frequency Distribution of Respondents according to their Educational level

	Categories	Frequency	Percentage
Educational level	No formal (0)	0	0
	Primary (6)	0	0
	Secondary (12)	0	0
	Tertiary (above 12)	100	100
Total		100	100

Source: Field survey data, 2017.

Household size of the Respondents. Table 5 shows the distribution of respondents according to their household size. Majority of the respondents (50%) fell within the household size of 4-6 persons, (42%) fell within the household size of 1 – 3 persons, (5%) fell with the household size of 7-9 persons and (3%) fell within the household size of 10 and above persons. The average family size of the respondents was about 6 persons per household. This result agrees with the findings of Ugborne (2006) who found out that majority of the respondents (small scale broiler farmers in Delta State) had an average family size of 6 people and also agrees with the finding of Ezech, *et al*, (2012) that Poultry Broiler farmers in Umuahia Capital Territory of Abia State, Nigeria had the average household size of 6.

Table 5 – Frequency Distribution of Respondents According to their Household Size

	Categories	Frequency	Percentage
Household size	1-3persons	42	42
	4-6persons	50	50
	7-9persons	5	5
	10 and above	3	3
Total		100	100

Source: field survey data, 2017.

Farming Experience of the Respondents. The distribution of respondents by farming experience as shown in table 6 indicates that there was influx of new entrants into egg production in recent times. This could be due to the ban on importation of frozen poultry product by the Federal Government. The result shows that majority 38% had farming experience of 4-6years, followed by about 32% who had farming experience of 7-9years, 22% had farming experience of 1-3years and 8% had farming experience of 10years and above. Table 6 shows that the average farming experience of the respondents was about 6years which means that they were still new in the business and had little or no experience in egg production. However, the more experience the pullet farmers have, the more productive they will be.

Table 6 – Frequency Distribution of Respondents according to their Farming Experience

	Categories	Frequency	Percentage
Farming Experience	1-3years	22	22
	4-6years	38	38
	7-9years	32	32
	10 and above	8	8
Total		100	100

Source: Field survey data, 2017.

Membership of cooperation. Membership of cooperative organization provides means of interaction among farmers which can enhance diffusion of innovation easily among members. However, majority (66%) of the respondents were members of cooperative group. Cooperative society serves as a medium for information exchange that can improve farm output of respondents. From table 7, majority (34%) of the respondents were not members of cooperative organization, implying the existence of a wide gap in information sharing and assimilation as pullet producers. Membership of cooperative organization is important because it affords the farmers the opportunities of sharing information on modern agricultural production practices.

Table 7 – Distribution of respondents according to membership of cooperation

Membership of Cooperative	Frequency	Percentage
Yes	66	66
No	34	34
Total	100	100

Source: Field survey data, 2017.

Management Practices and Acquisition of Resources of the Respondents.
The management practices and acquisition of resources by the respondents are presented in Table 8.

Table 8 – Management Practices and Acquisition of Resources of the Respondents

Categories	Frequency	Percentage
Management system adopted		
Deep litter	100	100
Battery cage	0	0
Free range	0	0
Semi intensive	0	0
Total	100	100
Number of birds		
100-300	4	4
350-550	18	18
600-800	22	22
850-1500	9	9
2000-4000	28	28
4500-6500	13	13
7000-9000	5	5
9500 and above	1	1
Total	100	100
Land acquisition		
Inheritance	10	10
Purchased	60	60
Gift	0	0
Rent	0	0
Lease	0	0
Place of residence	30	30
Total	100	100
Source of feed		
Commercial	100	100
Compounded by self	0	0
Total	100	100
Sources of capital		
Personal savings	96	96
Cooperative societies	0	0
Commercial banks	0	0
Bank of agriculture	0	0
Money lenders	0	0
Friends and family	4	4
Total	100	100
Source of labour		
Family	95	3
Hired	3	95
Both family and hired	2	2
Total	100	100

Source: field survey data, 2017.

The table shows that majority of the respondents (100%) adopted deep litter system, because it is cheaper than battery cage system of management. 28% of the respondents rose between 2000 and 4000 pullets, followed by about 22% who rose between 600 and 800 pullets. 18% raised 350 and 550 pullets; 13% raised between 4500 and 6500 pullets; 9% raised 850-1500 pullets. 5% rose between 7000 and 9000 pullets and 4% rose between 100 and 300 while the least (1%) raised about 10000 pullets.

Majority of the farmers 60% acquired land by purchase, this will promote large scale production that require large area of land in the study area; about 30% acquired land by place of residence and 10% acquired land by inheritance. This might limit large scale production that require large area of land because place of residence and inherited lands might be too small and fragmented into smaller portions in different areas. On feed source, table 8 shows that majority (100%) bought feed from the feed miller.

On sources of capital, table 8 shows that most of the respondents (96%) used personal savings; while 4% obtained Capital as gifts from relatives, friends and family. On source of

labour, table 8 shows that majority (95%) used only family labour, 3% used only hired labour while 2% used both family and hired labour.

The Effects of Input on the Productivity of Pullet Production. In explaining the factors influencing productivity of pullet among the respondents, the multiple regression models was used to test four (4) functional forms among which the best fit turned out to be double log. Double log model used gave results of the parameter estimates of these variables as presented in Table 9. The model gave the R-square as 0.908, which implies that all the explanatory variables included in the model were able to explain about 91% of the variations of inputs on productivity of pullets in the study area. The variables that were found to positive or negative and significantly influence the productivity included; numbers of birds, cost of feed, drugs, additional light and additional heat while labour and water are not significant.

The finding reveals that number of birds (X_1) has a coefficient of 0.273 and significant at 1%. This implies that there is a direct relationship between number of birds and egg productivity. In other words, an increase in the number of birds would lead to an increase in the egg productivity of pullet. This is in agreement with Umar (2012) who found that the coefficient of herd size had a positive and significant association with output at 1% level. This implies that poultry egg production increased with increase in number of birds kept.

The coefficients of cost of feed (X_2) 0.127 have a positive sign and is significant at 1% showing direct relationship with output. This implies that a 1% increase in quantity of feed will increase the quality of pullet-egg production. The positive and significant sign of the coefficient is in line with the findings of Oji and Chukwuma (2007) and Binuomote *et al.* (2007). The result is also supported by Olayide and Heady (1982), who said that feed intake has constant marginal efficiency until a maximum egg output per hen is attained. With constant feed-egg transformation rate, the limit of a hen's capacity to produce eggs economically lies in her ability to assimilate feed (Umar, 2012).

The coefficient of drugs (X_3) 0.031 was positive and significant at 5% level which implies that proper management involving the provision of adequate, qualitative and timely veterinary services to the birds improve the egg productivity of the pullet.

The finding reveals that additional heat (X_6) has a coefficient of -0.094 and significant at 1%. This implies that there is an inverse relationship between the additional heat and output. In other words, an increase in light during the night, have a negative effects on the pullets and it leads to decrease in the egg production.

The coefficient of additional number of hours of light (X_7) was 0.402 and is statistically significant at 1% and exhibits a positive relationship with output of pullets. Egg production is stimulated by daylight; therefore, as the days grow longer production increases. This implies that in open houses, found commonly in the tropics, additional heat may be used to increase the laying period. When darkness falls artificial lighting can be introduced for two to three hours, which may increase egg production by 20 to 30 percent. In closed houses, where layers are not exposed to natural light, the length of the artificial day should be increased either in one step or in a number of steps until the artificial day reaches 16-17 hours, which will ensure constant and maximized egg production. Effective day length should never decrease during the laying period (Ebraheem *et al* 2012).

The Effects of Socio- Economic Characteristics of Pullets Rearers on the Productivity of Pullet. The socio- economic characteristics of the sampled farms which influence the productivity of pullet production were years of farming experience, membership of cooperative, extension service, household size, age, and sex. However, education level, skill/training, ownership, farm location and access to credit were found to have insignificant effects. This implies that these factors do not significantly influence the egg productivity of pullet farms. Similar results were gotten by (Umoh, 2006).

Membership of cooperative society (Z1): Membership of cooperative society was found to have positive effect on the productivity of the farms with a coefficient of 80541.082 and is significant at 1% probability level. This implies that membership of cooperative society have a direct effect on pullet productivity because members pick information that impact positively on the farm. However, majority (66%) of the respondents were members of cooperative group. Cooperative society serves as a medium for information exchange that can improve

farm output of respondents. Membership of cooperative society can enhance the accessibility of farmers to credit facility and serve as a medium for exchange of ideas that can improve their farm activities. Membership of cooperative societies is believed to enhance the sharing of information on improved technologies through interactions as well as easing inputs acquisition and utilization constraints faced by decision makers (Effiong, 2005; Kebede, 2001). It was not significant.

Table 9 – Regression Result of Inputs on Egg Productivity

Coefficients

Independent variables	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	6.581	.300	21.969	.000
lnNo. of birds	.273	.047	5.845	.000
lnCost of feed	.127	.035	3.647	.000
lnDrugs	.031	.012	2.481	.014
lnLabour	-.003	.037	-.070	.944
lnWater	-.007	.022	-.338	.736
lnAdditional heat	-.094	.031	-3.024	.003
lnAdditional light	.402	.043	9.265	.000
R Square	.908			
F Statistics	234.360			

a. Dependent Variable: lnOutput

Age (Z2): The coefficient of age has a positive sign and is statistically significant at 1% level of probability as shown in table 9. This implies that as the age of pullets rearers increases, their level of productivity increases (or technical efficiency increases). However, the findings tends to agree with the findings of Chavanapoonphol et al (2005) and Ogundari (2006) in which they found out that technical efficiency and profit efficiency, increase with age respectively.

Household size (Z4): Household size coefficient had a positive sign of 13677.755, that is, it has a positive effect on the productivity of pullets and it is significant at 1%. Therefore, respondents with larger household sizes increase productivity in pullet farms. Hence, as household size increases, productivity also increases. This could be as a result of the fact that large household size translates into cheaper and available labour which can reduce cost of production. This result was in conformity with opinion by Nwaru (2003) who reported that large household sizes enhance family labour availability, since it reduces labour constraints in poultry-egg production.

Farming experience (Z5): The year of experience is positively signed (16158.669) and highly significant at 1% level of probability which implies that farmers with more years of experience enjoy better pullet egg production. Continuous practice of an occupation for a long period presumably makes a person more experienced and more productive in practice. This agrees with (Adeoti, 2004), who reported that years of experience reduce farmers inefficiency.

Access to Extension service (Z7): The coefficient associated with extension in the linear regression function was positive (63437.462) and statistically significant at 10% level, implying that the variable increase farm's productivity. This is probably because extension agents frequently introduce packages and information which enhance the productivity of the farms and promote their efficiency. Similar result was gotten by (Amaza, 2002).

Sex (Z8): The coefficient of sex was -79028.685 and it was highly significant at 1% probability level which implies that it has a negatively effect on output. Men accounted for 68% while female were about 32%. The high number of males might be attributed to hard task (such as, building of the poultry house, changing of poultry litters) out in egg production process.

Table 10 – Regression Result of the Effects of Socio- Economic profiles of Pullets Rearers on the Productivity of Pullet

Independent variables	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	-55756.077	95267.018	-.585	.559
Membership of Coops	80541.082	20004.057	4.026	.000
Age	6711.670	1579.823	4.248	.000
Education	-8917.273	5915.675	-1.507	.134
Household size	13677.755	3341.707	4.093	.000
Farm Experience	16158.669	4610.258	3.505	.001
Access to Credits	27716.651	24821.134	1.117	.266
Extension Service	63437.462	32450.921	1.955	.053
Sex	-79028.685	16651.099	-4.746	.000
Ownership	12300.247	16641.523	.739	.461
Training	-6384.994	17409.033	-.367	.714
Farm Location	-20722.461	20350.901	-1.018	.310
R Square	.623			
F Statistics	19.210			

a. Dependent Variable: Output.

Testing the Hypothesis. This was carried out using the estimated parameters (coefficients) of the relationship in order to draw conclusions about the population parameters. These tests were aimed at finding out whether the explanatory variables do actually have any significant influence on the dependent variable. It is a test of overall significance of the multiple regression models.

Testing the Overall Significance of Double Log Function:

Null hypothesis: $H_0: b_1 = b_2 = b_7 = 0$; i.e, Inputs costs do not significantly influence egg production among small scale pullet farms in the study area.

Against the Alternative hypothesis: $H_0: b_1 = b_2 = b_7 \neq 0$; not all b are zero, i.e, Inputs costs significantly influence egg production among small scale pullet farms in the study area.

Table 11 – ANOVA Table for Testing Hypothesis

Source of variation	Sum of squares	Df	Mean squares	F*cal	F tab	Probability level
Regression	22.283	7	3.183	234.360	3.45	.000
Residual	2.268	167	.014			
Total	24.552	174				

Decisions: (i) from the table above $F^*Cal = 234 > F \text{ tab} = 3.45$; the null hypothesis is rejected. (ii) Since the model $P = 0.001 < 0.01$; the model is significant at 1% level of probability. This means that not all the b's are zero. (iii) Six explanatory variables, herd size, feed intake, farm size, and additional light used among others in testing the model were all found to be significant at 1% and related to output of pullets. The conclusion is that, herd size, feed intake, farm size, and additional light have effects on pullets output as evident from the analysis.

CONCLUSION AND RECOMMENDATIONS

This study was carried out with the view to examining the effects of input cost on the production among pullet farms in Jos South local government area of Jos, Plateau State, Nigeria. The specific objectives were to:- describe the socio economic characteristics of the respondents in the study area; identify the management practices among the respondents in the study area; determine the effects of inputs costs on pullet production; determine the effects of socio-economic profiles of the pullets rearers on farm productivity.

A sample size of 100 pullets farming households were randomly sampled using a set of detailed and well-structured questionnaire. Objectives (i) & (ii) were realized using descriptive statistics such as mean, frequency distribution and percentages, while objectives (iii) & (iv) were achieved using multiple regression model.

The study found out that, of the socio-economic characteristics of pullets rearers in the study area, a greater percentage of 31% fell between age ranges of 46-50 years with a computed average age of 46 years. Male dominated pullets' production in the study area, with 68% as male. With regards to marital status, majority of the respondents 88% were married. Besides, all the pullets' farmers in the study area had tertiary education with average of 16 years of formal education. With respect to household size, a greater percentage of about 50% of the pullets farmer household fell within the size of 4-6 with a computed average of 6 persons per household. Again, 38% of the respondents were found to have farming experience of 4-6 years and a computed average of 6 years.

Investigation into the management practices, stocking capacity and resource acquisition show that the household heads were involved in only in the use of deep litter system. And 28% raised between 2000-4000 pullets. Sixty percent (60%) of the respondents acquired land by purchase, while 10% were through inheritance. In terms of feed acquisition, all the respondents bought feed from the feed miller, and 96% had personal savings as source of capital while greater percentage of about 95% used hired labour.

In determining the effects of the input costs on pullet productivity in the study area, the double log regression model gave the best fit to the data. The result indicates that 91% of the variations in pullet productivity was accounted for by variability of the input costs included in the model. The number of birds, cost of feed, additional light and additional heat; drugs, had significant effects at 1% & 5% level respectively on pullet productivity which suggests that they are important determinants of pullet productivity.

In determining the effects of socio economic profiles of the pullets' rearers in the study area, the linear regression model gave the best fit to the data. The result indicates that about 62% of the variations in pullets output was accounted for by socio economic characteristics (membership of cooperative, age; household size, farming experience; extension service and sex of the pullets rearers influenced the productivity of pullets egg farms in the study area) of the respondent included in the model.

Based on the findings from the study, it can be concluded that the largest proportion of pullets-egg rearers in the area operated on a medium scale. High cost of inputs such as herd size, feed intake, and additional light used among others in testing the model were all found to be significant at 1% and related to output of pullets. Thus, these costs make it very difficult for existing firms to expand their scale of operation, hence a large number of them stagnate in the medium scale class, while prospective rearers are reluctant to go into the business. The socio-economic results revealed that membership of cooperative, age; household size, farming experience; extension service and sex of the pullets rearers influenced the productivity of pullets egg farms in the study area.

In line with the findings of the study, the following recommendations are made:-

(i). It is recommended that pullet rearers should encourage themselves to increased scale of production by coming together and pooling their resources together as in cooperatives to attract loanable credit facility.

(ii). Measures such as establishment of modern feed mill should be embarked upon by rearers associations cum corporate bodies, while research focused on incorporating available local feedstuffs/ materials in compounding poultry feeds will make feed available and affordable to the poultry-egg producers. This will reduce the cost of feed, thereby increasing productivity and net farm income.

(iii) It is also recommended that Federal and State Governments and indeed stakeholders in the sector should ensure steady power supply, given that increased lighting period/hours enhance productivity of the of farms.

(iv). It was found that membership of cooperative was also positively related to productivity of pullet farms the implication is that the making and implementing policies that would encourage farm owners to form cooperative/organization or join the existing ones will be a step in the right direction. This could also reduce the cost of inputs through bulk purchase as against individual procurement of inputs thereby reducing the cost of production.

(v) Since visits of extension workers are a significant factor, it is also recommended that stakeholders in the sector should encourage extension agents through the provision of

incentives such as in-services training, scholarship and better salaries. This will enhance productivity of the extension service provides and in the long run, a better productivity for rearers.

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