

Adoption of Improved Poultry Technologies by Poor Resource Farmers in Nigeria: Implications to Meat Protein Availability in the 21st Century

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Summary

A study to assess the prices of inputs and the adoption of improved poultry technologies by poor resource farmers was conducted in Akwa Ibom State in the southern zone of Nigeria. A multi-stage random sampling method was adopted in the study. The data obtained was subjected to descriptive and inferential statistics. The results show that both young and older farmers are involved in poultry production. The study reveals that 78% of the farmers are married while 22% are single. About 44% of the farmers earn an annual income of ₦5000 – 20,000, 35% of them earn from ₦21,000 – 35,000 while about 21% earn from ₦36,000 to over 50,000 (151 NGN = 1 USD). The prices of a 25 kg poultry feeds: chick mash, starters mash, growers mash, layers mash and finishers mash, prices of day old chicks, poultry equipment and medication show some slight variations in some years and remain stable in some during the period of study. However, the R-value of coefficient shows that the socioeconomic characteristics of the farmers collectively have a significant positive but low relationship with cost of inputs adopted by the farmers. Similarly, the socioeconomic characteristics of the farmers collectively have a significantly positive but low relationship with medication practices adopted by the farmers. Therefore, the peasant poultry farmers will be able to continue with production of egg and meat protein if prices of inputs and other related services are affordable.

Key words

adoption, poultry, improved practices, meat, protein

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Introduction

Poultry production in the 1960s was more of free range but there were about 250,000 improved chickens specifically raised on government research stations. During the period, poultry feeds were manufactured solely by the government and the sales of eggs and broilers for meat were undertaken by government agencies. According to Loosli *et al.* (1999), in 1972 there were about 600 private flocks of chickens with well over 2,000,000 birds. But the main limitations to further development and expansion of the poultry industry were the availability of feed ingredients and supplies at affordable prices. But the poultry industry in Nigeria has developed into business with millions of birds and with the native birds gradually being replaced with improved strains, balanced rations, intensive housing and with better poultry equipment (Olufemi and Roberts, 2007). For example, Nigeria has an estimated population of 140 million birds with about 60% of the country's production done by the small rural poor resource farmers. Besides, Nigeria's poultry meat production has grown in the past few years; for example, it grew from 0.08 million tones in 2001 to 0.11 million tones in 2004. This show percentage contribution to GDP increase from 4.29% to 4.45% in 2001 and 2004 respectively (CBN Report, 2004).

Since the 1960s, 70s, and the late 80s, poultry in Nigeria as a whole had attracted considerable attention, rapidly developing into a potential industry, capable of helping to bridge the gap between animal protein supply and demand. The poultry industry has shown a tremendous growth in the last three decades simply because of the complete and fundamental change in the industry. For example, instead of keeping chickens as a hobby and for some incidental profits, thousands of peasant flock owners come to look upon the poultry enterprise on their farms, as an economic unit, means of livelihood, a source of income by which to keep the family and acquire a certain degree of economic independence. In Burkina Faso, Kondombo *et al.* (2003) shows that production objectives for village chickens range from chickens raised as a gift to the family of a spouse, as an exchange for traditional medicine and indispensable for funeral ceremony and finally as a source of funds for family small expenses.

But in Nigeria when depression set in 1983 a lot of mandatory structural changes took place in the poultry industry as well as in other sectors of the economy. This resulted in a remarkable reduction in the volume of production leading to low supplies of poultry meat and eggs and a high unit cost of production. According to Laviria *et al.* (1998) poultry production is capital intensive and the capital includes buildings, equipment, additives, feeds, day old chicks and others. As a result, effective demand for poultry products drastically dropped and this led to further drop in production. Equally, poultry equipment, housing and related facilities were abandoned to waste away.

Now, assuming that every Nigerian was opportune to have an egg on his breakfast table, it therefore implies that about 140 million Nigerians (NPC, 2006) would have consumed about 140 million eggs by breakfast. Generally, that responsibility rests primarily on instruments offered by agricultural policy – the incentives, pricing policy, etc., for the farmers to attempt to use such instruments the best way they can to produce high quality products. But do the Nigerian poultry farmers have adequate and affordable poultry feeds, day-old chicks, poultry equipment

and drugs to enable them to produce the eggs profitably so as to provide this source of protein to the populace? Or will the farmers' socioeconomic variables have any relationship with the adoption of improved poultry feeds, use of exotic day old chicks, use of recommended poultry drugs and use of poultry equipment? These are some of the questions that would be answered in the course of our discussion. This study was therefore conducted to assess the adoption of improved poultry practice by poor resource farmers in Nigeria with regards to meat protein availability to the populace in the future.

Methodology

Akwa Ibom State is located (Latitude 4°30' and 5° 53'N and Longitude 3° 25' and 5° 25'E) in the southern zone of Nigeria and it is one out of the 36 states in the country. There are 31 Local Government Areas (LGAs) in Akwa Ibom State with 337,800 registered small poultry farmers with about a total stock population of 16,216,860 birds raised under intensive family system. The number of registered poultry farmers increased from year to year (1997 – 2001). Similarly, the number of poultry stock increased appreciably from year to year except for one LGA and three LGAs in 1998 and 1999 where the poultry stock declined slightly and respectively. There were no major poultry producers in the area during the period of study.

Ten out of 31 Local Government Areas (LGAs) were randomly selected for the study. One hundred of the registered farmers were randomly selected from a mean of 496 registered farmers to take part in the study. Prices of feeds, feed additives and poultry drugs, day old chicks, heating equipment, poultry drinkers and feeders were obtained from dealers and the prices confirmed with selected farmers. Data for the study were collected by means of a structured questionnaire supplemented with a focused group discussion.

Questions were also asked on the following areas: The farmers' socioeconomic profile (age, sex, marital status, educational level, occupation, size of flock/stock population and income).

The size of your poultry farm

Effect of high prices of day old chicks, poultry feeds, medication and equipment;

Kinds of poultry feeds used, and

Constraints in poultry farming.

Awareness on the improved practices;

Capital for expansion;

Cost of labour; and

your suggestions that may improve the performance of your poultry business

The data obtained were subjected to descriptive statistics and multiple linear regression analysis. The number of registered poultry farmers and poultry stock in the selected LGAs from 1997 to 2001 are shown in Table 1.

The table also shows that there is an increase in the number of poultry farmers as well as in stock population in the respective years. The percent changes in registered farmers and poultry stock are also shown in the Table. For example, between 1997 and 2001 the percent change in number of registered farmers in Ikot Ekpene LGA was 45.5 with a percent change in poultry

Table 1. Summary of registered poultry farmers and poultry population in Akwa Ibom State 1997 – 2001

S/N	LGA	2001 No. of Registered Farmers	2001 Stock Population	1997 No. of Registered Farmers	1997 Stock Population	% Change in Registered Farmers		% Change in Stock Population	
						Absolute	%	Absolute	%
1.	Ikot Ekpene	550	18,500	300	12,000	+250	+45.5	+6500	+35.1
2.	Ibesikpo Asutan	200	16,800	100	11,800	+100	+50.0	+5000	+29.8
3.	Itu	660	16,000	500	13,000	+160	+24.2	+3000	+18.8
4.	Uyo	500	16,850	200	11,000	+300	+60.0	+5850	+34.7
5.	Nsit Atai	350	15,000	100	12,000	+250	+71.4	+3000	+20.0
6.	Ibiono	600	18,300	300	13,000	+300	+50.0	+5300	+29.0
7.	Uruan	650	15,500	300	11,500	+350	+53.8	+4000	+25.8
8.	Etinan	400	15,400	100	4,700	+300	+75.0	+10,700	+69.5
9.	Abak	500	19,850	150	15,000	+350	+70.0	+4850	+24.4
10.	Ikot Abasi	550	18,840	180	14,000	+370	+67.3	+4840	+25.7

Source: Computed from data from Akwa Ibom State Ministry of Agriculture, 2007.

population of 35.1. The trend in other LGAs shows that there is a relationship between the number of registered farmers and poultry stock during the period. The increases indicate a positive situation with regard to poultry production in the study area.

Statement of hypothesis

The null hypothesis states that there is no significant relationship between the farmer's socio-economic characteristics and level of adoption of improved poultry technologies. A list of registered poultry farmers in the State was obtained from the Ministry of Agriculture and Natural Resources (MANR).

Results and discussion

Socio-economic characteristics of poultry farmers

The farmers' ages range from less than 25 years to 60 years of age. However, 58% were between 25 – 40 years. The rest, 41% fell between 41 – 60 years of age. This reveals that the modal age group was between 25 – 40 years, which indicates that young people were involved in the poultry production in the study area. This is a positive development because if the younger and educated poultry farmers remain in the business of poultry production this will enhance the growth of the industry in the future.

The result shows that more married people, of about 78% were engaged in poultry farming. This indicates that the poultry business has helped to sustain the families. It therefore implies that the married couples could try to adopt improved practices in order to improve the families' incomes and meat protein for family consumption. If prices of poultry inputs, feeds and day old chicks could be stable it therefore means that the farm families will sustain their poultry business. Therefore, poultry production in the future could be inherited by younger family members from their elders or parents just as it is feasible in crop farming. This will mean a revolution in poultry production and a regular and effective supply of meat and egg for protein consumption.

The study reveals that a majority or 60% of the poultry farmers had secondary school education. In essence, it shows that the occupation is taken up by people who can read and write and more so read manuscript and labels on poultry feeds, poultry drugs and medication. If more educated farmers would continue to take up poultry production as a business in the future, then the production of meat and eggs will sustain the provision

of meat protein to the teeming population in the third world in general and Nigeria in particular.

The study also reveals that 32% of the farmers raise flock size of 250 – 300 birds, 56% raise 350 – 400 birds while 12% of the farmers also raise 450 – 500 birds in their farms. The expansion of the flock size is attributed to improved poultry techniques. This implies that if demand continues to rise, farmers will continue to increase their stock, however, only to a profitable level.

The amount of income utilized in a farming business depends on the level of capital investment on a particular interest especially in poultry enterprises. About 44% of the respondents obtained an annual income of ₦5000 – ₦20,000 in the poultry enterprise. Thirty five (35%) percent of the respondents obtained ₦21,000 – ₦35,000 from their poultry ventures while 12% of them obtained ₦36,000 – ₦50,000 in their poultry business per flock of production. However, 9% of the farmers obtained income of more than ₦50,000 from their business. The income so realized was per annum for one crop of production. It therefore means that if farmers could try and raise two to three crops of birds per year for broilers they will increase or even double their profit and income per year. With the level of income realized from the venture, it is feasible that farmers will want to sustain their business by adopting improved techniques in poultry production that may enhance productivity at least in the opening decade of the 21st century. Studies on poultry production in the central Highlands of Ethiopia by Dessie and Ogle (2001) maintain that poultry meat and eggs were generally accepted and appreciated for food and income.

Price of poultry feeds (Naira) and changes from 1997 – 2001

The price of a 25 kg chick mash remained almost stable between 1997 and 1998 but increased slightly from ₦500 in 1998 to ₦550 and ₦620 in 1999 and 2000 respectively. However, the price increased dramatically to ₦880, a 30% increase in 2001. Starters mash, layers mash and finishers mash followed almost the same trend as in chick mash. However, the price of growers mash from 1997 through 2001 remained somewhat stable (Fig. 1). The price of feeds and the percent changes for each of the types of feed for the respective years are shown in Figs. 1 & 2.

Though farmers maintained the level of consumption of feeds throughout the period of study, due to low level of income of

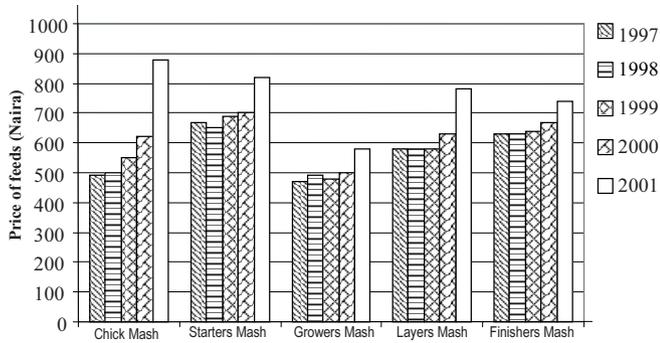


Figure 1. Price of poultry feeds (Naira) from 1997 – 2001, 151 NGN = 1 USD

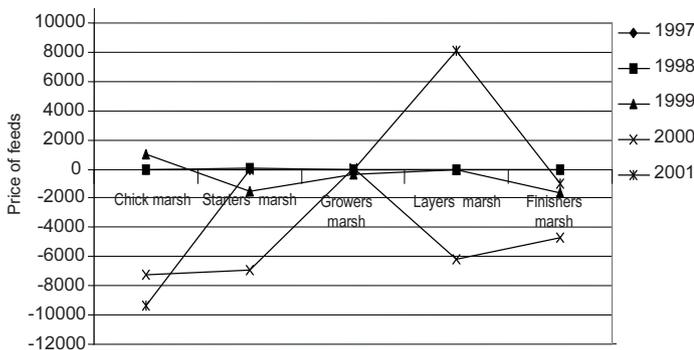


Figure 2. Percentage changes in price of feeds from 1997 - 2001, 151 NGN = 1 USD



Figure 3. Price of day old chicks (Naira) from 1997 – 2001, 151 NGN = 1 USD

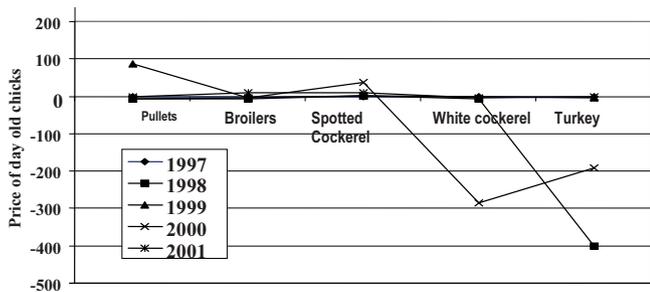


Figure 4. Percentage changes in the price of day old chicks from 1997 - 2001, 151 NGN = 1 USD

the farmers, the high cost of poultry feeds may limit the farmers from expanding production to a point that they can realize a good margin of profit. Livestock feeds according to Lamorde *et al.* (1981), constitute about 80% of the total recurrent cost in poultry enterprise. To encourage farmers to continue to produce, cost of raw materials for poultry feeds should be subsidized by government to make the price of poultry feeds stable and therefore encourage more farmers to venture into the business of poultry farming and to encourage the farmers to sustain their production. With the above, poultry production in the 21st Century could be expected to have a better future.

Price of day old chicks (Naira) and price changes from 1997 – 2001

Fig. 3 shows the price of day old chicks for pullets, broilers, spotted cockerels, white cockerels and turkey from 1997 – 2001. Except for spotted and white cockerels which the price remained stable, prices for pullets and broilers rose gradually for other years but steeply in the year 2001. However, the price for day old turkey rose steadily from 1997 through 2000 and sharply for the year 2001. The percent changes for the various years followed the same trends as in price changes shown in Fig. 4.

Most of the farmers concentrated in production of both layers and broilers. However, the supply of day old chicks according to the respondent farmers did not meet demand especially for turkey. The demand for spotted and white cockerels was not high and the price remained stable. The low demand may be related to the fact that the birds are only raised to about three weeks. At the age of three weeks, the birds are not yet mature for table and are therefore sold out to other farmers who raise the birds to table size. For a steady supply of day old chicks, more functional hatcheries with adequate equipment are required to stabilize production and supply. This will therefore help to ensure a steady availability of poultry meat and eggs for the population in the future.

Price of Poultry Equipment

The price of feeders showed very minimal increases between 1997 through 2000 with an increase of 14.3% in the year 2001. However, the price of drinkers rose steadily throughout the years (1997 – 2001). The price of egg crate showed a steady but slight increase for all years except in 2001. For stove used for heating, except for the first three years which the price remained stable, the last two years saw remarkable increases of 20% and 25% respectively. However, the price of 60 watts bulb remained stable throughout the period of this research (Fig. 5).

The percent price changes for the various equipment that follows a similar trend like the prices are shown in Fig. 6.

Over 90% of poultry farmers in Nigeria are peasants. They use very simple poultry equipment like hand troughs, feeders, drinkers and stove for heating and the farmers operate on litter system. The cost of these basic equipment are not stable especially for a 4-litre stove coupled with high cost of kerosene (fuel) for heating. The cost of electric bulbs remained stable throughout the period. The consumption of electric bulbs by this class of farmers is low though its supply is not limited to poultry farmers alone. Most of the farmers do not even have the need for bulbs since they do not have electricity in their farming communities. Even

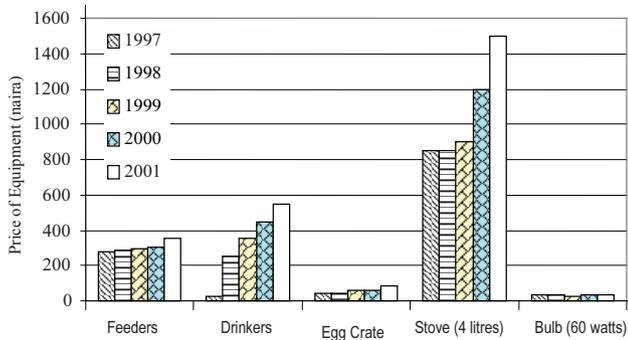


Figure 5. Price of poultry equipment (Naira) from 1997 – 2001, 151 NGN = 1 USD

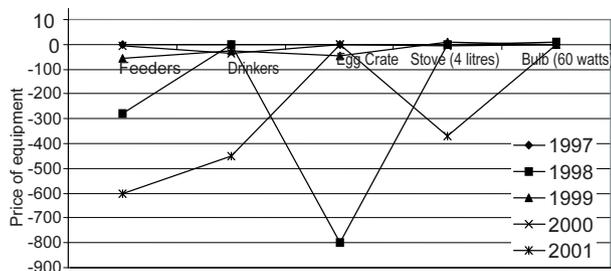


Figure 6. Percentage changes in price of poultry equipment from 1997 - 2001, 151 NGN = 1 USD

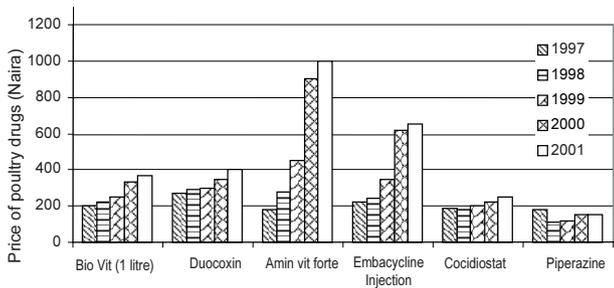


Figure 7. Price of poultry drugs (naira) from 1997 - 2001, 151 NGN = 1 USD

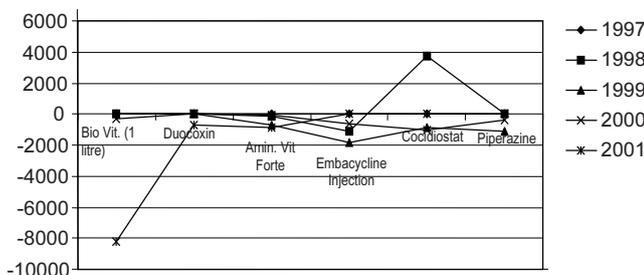


Figure 8. Percentage changes in price of poultry drugs from 1997 - 2001, 151 NGN = 1 USD

where there may be electricity, the supply is not steady. Therefore farmers could not rely on this source to heat the poultry house for the chicks. However, Smith (2001) maintains that heating is usually provided from paraffin heaters, gas heaters, or steam pipes. He concludes that which ever system is used it is important to provide a back-up system in case of power failure. The availability of steady supply of electricity in the rural communities is long over due. Government should therefore pursue rural electrification with urgency and the escalating price of kerosene checked if enough meat protein to the populace through poultry farmers must be contained.

Poultry drugs, prices and changes

Improved poultry production involves prevention, control and treatment of diseases and infections. It therefore requires proper sanitation and use of drugs. The poultry drugs were highly demanded on prescription and used by farmers in order to prevent infection and epidemic. However, if the prices for Amin vit Forte and Embacycline keep rising in the manner as observed in Figs. 7 and 8 then it may become difficult for the peasant poultry farmers to continue to purchase and use the products. Udoh and Nyienakuna (1997) in their study spread between 1973 – 1996 found a similar trend in prices of poultry drugs. The prices of the products may be lower for farmers if extension personnel could form the farmers into a body whereby they could purchase the products in bulk and distribute among themselves. But cooperative societies are still in their infancy in Nigeria (Udoh, 1997).

In order to test the hypothesis that was stated earlier, two variables were identified as follows:

- i) Farmers’ socio-economic characteristics as the independent variable.
- ii) Level of adoption of improved poultry technologies as the dependent variable. Socio-economic characteristics of the respondents were classified into the following variables such as age, sex, marital status, level of education, years of farming experience, stock size, size of the poultry pens and annual income while level of adoption of improved poultry technology was classified into two variables such as cost of inputs and medication. Multiple linear regression was used for data analysis.

The calculated R – value of 0.234 (i.e. 23.4%) was greater than the tabular R-value of 0.205 at 0.05 alpha level with 98 degrees of freedom. The R-value (co-efficient) of 0.234 predicts 23.4% of the impact of those socio-economic characteristics of the farmers on their level of the cost of inputs in poultry farming (Table 2). This rate of percentage is actually low and therefore implies that the socio-economic characteristics of the farmers collectively has significantly positive but low relationship with the cost of inputs adopted by the farmers.

The calculated F-value of 0.660 was less than the tabular value of 2.10 at 0.05 alpha level with eight and 91 degrees of freedom. This signifies that there is no significant difference that exists among each of the socio-economic characteristics of the farmers as regards their individual relationship with the cost of inputs adopted by the farmers. This signifies that the socio-economic characteristics of the farmers are significantly indifferent in their relationship with cost of input (Table 3).

Table 2. Model Summary of correlation between farmers socio-economic characteristics and adoption of cost of inputs

Model	R	R ²	Adjusted ²	Std Error of the Estimate
1	0.234 ^a	0.055	-0.028	229.6891

P > 0.05; df = 98⁷ critical R – value = 0.205

Table 3. Analysis of variance (ANOVA) of the socio-economic characteristics of farmers and relationship with the cost of inputs

Model	Sum of square	df	Mean square	F
1 Regression	278494.3	8	34811.78	0.660
Residual	4800893	91	52757.06	
Total	5079387	99		

P > 0.05; df = 8 and 91; Critical F – value = 2.10

The R-value (coefficient) of 0.284 predicts 28.4% of the impact of the socio-economic characteristics of the farmers on their level of adoption of medication in poultry farming. The rate of percentage is actually low and therefore implies that the socio-economic characteristics of the farmers significantly positive but low relationship with the medication adopted by the farmers.

From Table 5 calculated F – value of 0.0995 was less than the tabulated F – value of 2.10 at 0.005 alpha level with eight and 91 degrees of freedom. This signifies that there is no significant difference existing among each of the socio-economic characteristics of the farmers as regards their individual relationship with the medication adopted by the farmers. This signifies that socio-economic characteristics of the farmers are significantly indifferent in their relationship with medication.

A summary of the results in the four tables signifies that socio-economic background of the farmers is not significantly different in their individual relationship with the improved poultry technologies but collectively has significantly positive but low relationship with the improved poultry technologies adopted by the farmers. Hence the null hypothesis is rejected while the alternative hypothesis is accepted.

Summary and Policy Implications

The responsibility of producing eggs and meat protein for the Nigerian teeming population rests on the farmers. Over 90% of the Nigerian poultry farmers are peasants. But are the prices of poultry inputs affordable to enable the farmers to produce eggs and poultry meat to the populace? A study to assess the prices of inputs and the adoption of improved poultry technologies by the poor resource farmers was undertaken in Akwa Ibom State of Nigeria. A multi-stage sampling technique was adopted in the study. The data obtained was subjected to both descriptive and inferential statistics. The results show that the modal age group of the poultry farmers was between 25 – 40 years indicating that young people are involved in poultry production in the study area. A majority or 75% of the farmers used pen size of 8 m x 30 m and 8 m x 70 m to stock their birds. Besides, 56%

Table 4. Model Summary of correlation between farmers socio-economic characteristics and adoption of medication

Model	R	R ²	Adjusted ²	Std Error of the Estimate
1	0.284 ^a	0.080	0.00	0.5026

P > 0.05; df = 98; critical R – value = 0.205 (i.e. 28.4%) was greater than the tab R – value of 0.205 at alpha level with 98 degrees of freedom

Table 5. Analysis of variance of the socio-economic characteristics and their relationship with farmers' adoption of poultry medication

Model	Sum of square	Df	Mean square	F
1. Regression	2.011	8	0.251	0.995
Residual	22.989	91	0.253	
Total	25.00	99		

P > 0.05; df 8 & 91; critical F – value = 2.10

of the farmers raised a population of 350 – 400 birds in their farms. However, some farmers of about 44% earned an annual income of ₦5000 – ₦20,000.

However, the R-value of coefficient shows that the socio-economic characteristics of the farmers collectively had a significant but low relationship with the cost of inputs adopted by the farmers. Similarly, the socioeconomic characteristics of the farmers collectively had a significantly positive but low relationship with medication adopted by the farmers. Generally, this signifies that socio-economic characteristics of the farmers are significantly indifferent in their relationship with medication. This portrays then that the peasant poultry farmers will be able to continue with production if prices of inputs and other related services could be kept at an affordable cost for the poor resource farmers. Udoh (2003) established that non-adoption of improved packaging materials and use of disinfectants by both small and large meat sellers was attributed to high cost of the materials respectively.

According to Chawatama *et al.* (2005) the global responsibility of animal agriculture in improving the quality of human welfare has been emphasized during the 20th century and is expected to be even more important in terms of food supplies in the future. Therefore, improved poultry technologies must be made feasible for farmers to adopt for sustainable meat protein supplies in future.

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