WASD WORLD ASSOCIATION FOR SUSTAINABLE DEVELOPMENT

W | J | S | T | S | D
World Journal of Science, Technology and Sustainable Development

ISSN: 2042-5945 (Print) | 2042-5953 (Online)

WJSTSD V19 N1 2022

OPEN ACCESS

DOI: 10.47556/J.WJSTSD.19.1.2022.3

RESEARCH PAPER

Determinants of Poultry Farmers' Willingness to Raise Noiler Birds in Oluyole Local Government Area, Oyo State

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ABSTRACT

RESEARCH BACKGROUND: The search for an indigenous breed of bird that would address the problems associated with local birds in terms of slow maturity, unimpressive weight at maturity and susceptibility to diseases contributed to the inability of the poultry sub-sector to perform its statutory role of making animal protein at affordable prices for Nigerians. The emergence of the noiler bird, that can be raised intensively or extensively, has addressed most of the problems associated with local birds.

PURPOSE OF THE ARTICLE: This study analysed the determinants of poultry farmers' willingness to raise noiler birds in Oluyole Local Government Area, Oyo State, Nigeria.

CITATION: Sowunmi, F.A., Adeleye, O.S., Salman, K.K. and Okewumi, F.T. (2022): Determinants of Poultry Farmers' Willingness to Raise Noiler Birds in Oluyole Local Government Area, Oyo State. *World Journal of Science, Technology and Sustainable Development (WJSTSD)*, Vol. 19, No. 1, pp. 25–38.

RECEIVED: 16 May 2021 / **REVISED:** 2 April 2022 / **ACCEPTED:** 26 April 2022 / **PUBLISHED:** 1 June 2022

METHODS: A three-stage sampling technique was employed to sample 125 poultry farmers in Oluyole Local Government Area of Oyo State using a well-structured questionnaire. Data were analysed using descriptive statistics, chi-square and logistic regression.

FINDINGS AND VALUE ADDED: The majority of the poultry farmers (women in particular) were willing to raise noiler birds. This was affirmed by the moderately high probability (0.67) of farmers' willingness to raise noilers in the study area. This was attributed to the ease of management and appreciable weight at maturity of the breed. The study revealed that awareness and flock size (small scale) positively influenced farmers' willingness to raise noilers. Raising noilers on a small scale can be used by governments to reduce youth unemployment by giving out loans in form of inputs.

KEYWORDS: *Poultry Production; Noiler Bird; Logistic Regression; Indigenous Chicken*

INTRODUCTION

According to Ajayi (2010), Nigerian chickens are small and mature slowly. Using conventional methods of rearing, the growth rate and egg production of local birds are not encouraging. According to Emokaro and Erhabor (2014), developing the chicken sector is a viable method of increasing protein in Nigerian's diet. The Nigerian federal government banned the importation of frozen or live poultry products; this was to promote the local poultry business (ADBG, 2013) and ensure that the country satisfies the population's protein demands. Oyebanji *et al*. (2018) discovered that the noiler bird can survive on low quality feedstuffs and still produce high quality meat and eggs, thereby solving the concerns of food insecurity and financial dependency among the rural population, particularly women. Noilers are an improvement on the indigenous breed of chicken; bred through the cross-breeding of indigenous cockerels with broilers to improve yield and ensure chickens can easily be produced by farmers on an extensive system as practised by most rural farmers. Noilers were developed as part of the African Chicken Gains Genetic Program to boost smallholder chicken production and productivity as a means of escaping poverty in Sub-Saharan Africa, which includes Nigeria (Yakubu *et al*., 2020). The noiler breed is more resistant to diseases, grows faster and has more weight compared to indigenous chicken; several studies have shown that indigenous breeds are low in productivity, have low body weights, low egg production and low conversion rates (Ajayi *et al*., 2020; Chah *et al*., 2014; Ajayi, 2010; Akinleye *et al*., 2011; Adeleke *et al*., 2011). Noiler birds also produce more eggs and are better than broilers in terms of their ability to thrive on a free-range system. Noilers also have a better taste that is close to that of the indigenous chicken (BnetHub, 2021).

In Nigeria, indigenous chicken breeds are being improved genetically. Several studies (Ajayi, 2010; Alabi *et al*., 2012; Sola-Ojo *et al*., 2012; Adedeji *et al*., 2015; Bamidele *et al*., 2020; Adetunji and Ola, 2020) observed how these breeds could be adaptable and productive in the Nigerian environment. Nevertheless, economic viability is also crucial for a balanced analysis. This involves knowing how widely acceptable the breeds of birds are among poultry farmers, their perspectives about them, their preferences and other factors that influence poultry farmers' decisions. The goal of developing improved poultry is to raise the productivity of the poultry sub-sector to meet the

population's protein needs. The role of farmers towards achieving this cannot be over-emphasised. However, despite the aforementioned studies that addressed the genetic improvement of indigenous chicken, there is little literature on the socio-economic factors influencing farmers' decisions to raise the noiler breed, which is an exotic breed but adaptable to local conditions. Despite being known to most farmers and having many advantages, many still keep to conventional poultry (broiler, pullet and cockerel). In this context, this paper aims to estimate poultry farmer's; willingness to raise (WTR) as an option towards increasing animal protein at an affordable price to the populace, and providing means of livelihood for unemployed youth. The study is in line with the Nigerian government's Economic Recovery and Growth Plan (ERGP) 2017-2020. This plan prioritises food security and youth employment as important national targets (MBNP, 2017). The intent is to provide policy-makers with information that can be of use when addressing the problem of food security and youth unemployment. As a result, the following research questions are posed:

1. What is the extent of the readiness of farmers in the study area to raise the noiler breed of poultry?
2. What factors influence farmers' willingness to raise noiler poultry breeds?
3. What is the likelihood that a poultry farmer selected at random will agree to raise noilers?

The following research hypotheses were tested:

Ho_1: Farmers' decision to raise noiler birds is not influenced by the ease of management.
Ho_2: Farmers' decision to raise noiler birds is not influenced by the bodyweight (kg) at maturity.

LITERATURE REVIEW

The maximisation of anticipated utility theory underpins the study. This is a method used for analysing circumstances in which individuals must make a rational decision without knowing the result. Subjective expected utility theory is another version of the expected utility theory; in this case, however, it holds in the face of uncertainty. According to this concept, a farmer will accept a new technology if its utility is greater than the old technology's (Chebil *et al*., 2009).

In the literature, various approaches for estimating willingness to pay (WTP) or WTR have been utilised (Lee and Hatcher, 2001; Caswell, 1998). GMO products (Jaeger and Harker, 2005), champagne (Lange *et al*., 2002), grass-fed beef (Umberger *et al*., 2002; Corrigan *et al*., 2009), and regional speciality items (Stefani *et al*., 2006) were studied using Experimental Auctions (EA). The EA is widely used in experimental economics (where participants compete for a product or a better product), and has been applied to a wide range of situations. The shortcoming of experimental auctions is that the bidding mechanism does not naturally mimic how consumers express their preferences. Another commonly used method is Conjoint Analysis (CA) as used in fruit attributes

(Ranasingha *et al*., 2019), kiwifruit (Jaeger and Harker, 2005) and risk reduction (Telser and Zweifel, 2002; Voelckner, 2006). According to Grunert *et al.* (2009), results from CA have been a subject of criticism. They posited that CA is faulted for having high WTP.

This study only concentrates on the willingness of poultry farmers to raise noiler birds (participation and non-participation). The WTP aspect of the CV was not considered because noiler birds are neither a new product nor an attempt being made for improvement of the breed. Also, the current price being charged per carton of day-old birds is fixed by the parent company producing the bird. Since most established farmers are yet to include it in their stock, this study is an attempt to know the factors influencing farmers' willingness to raise noilers. Several approaches have been employed in the literature to model drivers of agricultural innovation adoption decisions using dichotomous choice models such as logistic regression (Miassi and Dossa, 2018; Conteh *et al*., 2016) and probit (Thuo *et al*., 2014; Kimbi *et al*., 2020; Simtowe and Mausch, 2018); multiple response models such as multinomial logit (Danso-Abbeam *et al*., 2017) or multivariate probit (Abay *et al*., 2016) are widely used. Following Alberini and Cooper's (2000) approach, if an individual indicates willingness to adopt a new agricultural technology, for example raising noiler birds, the WTR must be bigger than the bid. This requires a different statistical analysis for dichotomous choice questions on the adoption of the new technology.

METHODOLOGY

Description of the Study Area

Oluyole Local Government Area (LGA) is one of the 33 LGAs in Oyo State, Nigeria and is known for the high concentration of poultry farmers in the state. Oluloye Local Government Area is located in the South-Eastern part of the state and lies at latitude 7°23'47"N and longitude 3°56'0"E. Oluyole Local Government Area covers a land area of 629km^2 and had a population of 202,725 at the 2006 census (NPC, 2010). The annual rainfall ranges from 100mm to 1,500mm, with an average daily temperature of 24.1°C and 28°C, which are suitable for poultry. The administrative headquarters is at Idi-Ayunre Old Lagos/Ibadan Road.

Sample Selection and Data Collection

A three-stage sampling technique was employed. Due to the high number of poultry farmers in the Oluyole Local Government Area, the LGA was purposively selected out of the LGAs in Oyo State. The second stage involved another purposive selection of two villages/towns from the LGA based on the concentration of poultry farms. The third stage was random sampling using proportionate size to select poultry farms using the list obtained from the local branch of the Poultry Association of Nigeria (PAN). A total of 145 poultry farms were selected. Data were gathered using a well-structured questionnaire. Questions were asked on the socio-economic characteristics of respondents (age, sex, marital status, educational status, household size, and farm size in terms of several birds, among others), willingness to raise noiler birds, the quality of noiler birds over other

breeds, and questions to reveal respondents' perceptions on the quality of noiler birds using a Likert scale. A total of 145 questionnaires were administered; 132 were returned on time although only 125 were used for the analysis due to inconsistencies.

METHODS OF DATA ANALYSIS

Descriptive statistics were used to profile the respondents in the research area based on their socio-economic characteristics. This includes charts, frequency distribution, mean, standard deviations and skewness. To enhance the robustness of the result from logistic regression, the chi-square test was used to discover whether or not farmers' decisions to raise noiler birds were influenced by two major characteristics of the bird (the ease of management/body weight (kg) at maturity). Generally, chi-square indicates the discrepancy between two frequencies; the frequency of what is expected and what is observed. The chi-square equation is given as:

$$\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i} \tag{1}$$

where:

χ^2 represents chi-square
$\sum$ represents summation
O represents the observed frequency
E represents the expected frequency

The drivers of farmers' willingness to raise noiler breeds in the study area were determined using logistic regression. The model's anticipated values (post-analysis) were also utilised to calculate the likelihood that a chicken farmer in the research area would be willing to raise noilers. The following is the logistic regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon \tag{2}$$

where:

Y = Dependent variable (willingness to raise noiler breed: Yes = 1, Otherwise = 0)
β_0 = Intercept; β_1, β_2, …, β_7 = slopes of the parameter of the model
X_1 = Sex of respondent (male = 1, female = 0), X_2 = Age (in years)
X_3 = Education (in years), X_4 = Marital status of respondents (Married = 1, Otherwise = 0)
X_5 = Household size of respondents, X_6 = Farm size (in terms of bird capacity),
X_7 = Farming experience (in years) and X_8 = Noiler awareness (Aware = 1, Otherwise = 0)

RESULTS AND DISCUSSION

Socio-economic Characteristics of Respondents

The study revealed that 62.4% of poultry farmers were willing to raise noiler breeds (see Table 1). Figure 1 shows that 50% of the farmers within the age bracket 40-59 years were willing to raise noilers. Most of the respondents (51.28%) willing to raise the breed were female poultry farmers. Moreover, 78.21% of married respondents were willing to raise noilers, while 53.85% of the respondents willing to raise noilers had between 5-9 household members. The averages of household sizes were 5.03 and 4.65 for willing and unwilling respondents to raise noilers, respectively. Also, 68.18% of the respondents who were aware of noiler birds were willing to raise the bird. The majority of the farmers (76.92%) willing to raise noilers had a flock size of at most 1,000 birds (see Table 1).

Table 1: Socio-economic Characteristics Distribution Among Poultry Farmers in Oluyole LGA, Oyo State

	Willing to Raise			Not Willing to Raise		
Variable	**Frequency**	**Percentage**	**Mean**	**Frequency**	**Percentage**	**Mean**
Sex						
Male	38	48.72		13	27.66	
Female	40	51.28		34	72.34	
Marital Status						
Married	61	78.21		13	27.66	
Not married	17	21.79		34	72.34	
Household Size			5.03			4.65
1-4	31	39.74		26	55.32	
5-9	42	53.85		19	40.43	
10-14	5	6.41		2	4.26	
Flock Size			776.92			1004.7
1-1000	60	76.92		33	70.21	
1001-2000	12	15.38		8	17.02	
2001-3000	5	6.41		3	6.38	
3001-4000	1	1.285		0	0	
4001-5000	0	0		2	4.26	
Awareness about noiler						
Yes	75	68.18		3	20.0	
No	35	31.82		2	80.0	

Source: Constructed by authors

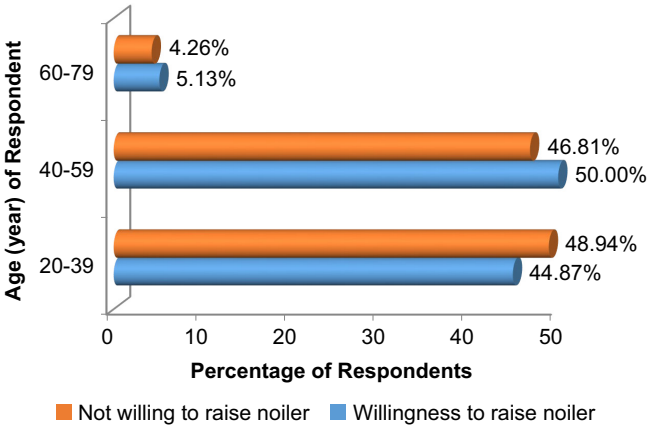

Figure 1: Age Distribution of Respondents

Source: Constructed by authors

The study showed that farmers' willingness to raise noiler birds was influenced by the ease of management and body weight at maturity, respectively. Appendices 1 and 2 contain the contingency tables and the chi-square calculated.

Determinants of Poultry Farmers' Willingness to Raise the Noiler Breed of Birds

The logistic regression results in Table 2 shows the factors that influenced poultry farmers' willingness to raise the noiler breed of birds in Oluyole LGA of Oyo state. The log-likelihood value of -73.01 means that the explanatory variables used predicted the outcome of the model effectively. The pseudo R^2 value is 0.1127, suggesting the model fits the variables and that the variables can explain the model fit by more than 10%.

The model was fitted with eight variables and four of them were significant at varying levels of significance. The sex of respondent and flock size of farm negatively influenced poultry farmers' willingness to raise noilers, while the farmers' awareness and production experience positively influenced farmers' willingness to raise noiler birds. Specifically, the sex of the farmer negatively influenced the decision to raise the noiler breed of birds by male farmers. Conversely, this means that willingness to raise noilers increased among female poultry farmers. This result disagrees with the findings of Obisesan (2014), that there is a positive correlation between sex and adoption of technology. She posited that males were more likely to adopt compared to their female counterparts. The negative relationship between flock size and willingness to raise noilers implies that willingness to raise noilers was more pronounced among the poultry farmers with small flock sizes. This is in line with the findings of Idrisa *et al*. (2012), that farm size negatively influenced the adoption of

new technology. This finding supports the assertion that small farmers adopt new technologies at a faster rate than large farmers if the added benefits are significant (Shiyani *et al.*, 2002). However, this submission is contrary to the findings of Asante *et al*. (2011) and Clancy *et al*. (2011). The coefficient of awareness shows that as awareness increases, the willingness of the farmer to raise noiler breeds increases by 22.5%. This finding supports Tamir *et al.* (2015) and Tsadik *et al.* (2015), who found that awareness is the first step of adoption before respondents develop an interest in technology and decide to embrace it.

Moreover, the positive influence of farmers' experience in poultry production on the willingness to raise noilers implies that willingness of poultry farmers to raise noiler birds in the area increases with an increase in the years of farmers' poultry production experience. Farmers with more poultry production experience are often eager to try something new in terms of adopting a new breed of birds. According to Tanko (2004), years of experience in agricultural production help farmers set realistic goals; therefore, there is a favourable association between years of farming experience and technology adoption. However, the result is not in agreement with Ume *et al*. (2010). The different farming environments may be attributed to the divergent result.

Table 2: Logistic Regression Result

Variables	Coefficient	Std. Error	Z	dy/dx
Age of respondent	-0.0410711	0.028077	-1.46	-0.0094614
Sex of respondent	-1.028247**	0.4380095	-2.35	-0.2269983
Years of education	0.0301296	0.0731192	0.41	0.0069409
Marital status	0.4217211	0.5098927	0.83	0.0996495
Flock size	-0.0004346*	0.0002281	-1.91	-0.0001001
Household size	0.0902354	0.1142821	0.79	0.0207872
Production experience	0.1007048**	0.483145	2.08	0.023199
Awareness	0.9762913*	0.5633928	1.73	0.224905

Number of observations = 124, Pseudo R^2 = 0.1127, Prob > chi2 = 0.0175

Notes: **indicates significance at 5%, *indicates significant at 10%

Source: Constructed by authors

The post-logistic regression result was used to predict the likelihood that each respondent would raise noilers (Table 3). The result indicates that the average likelihood that a poultry farmer chosen at random from the study area would raise noiler birds was 0.67 while the standard deviation was 0.16. The distribution of the probability is shown in Table 3.

Table 3: Probability Distribution of Farmers' Willingness to Raise Noilers

Probability Range	Frequency	Percentage
0.27-0.41	6	7.8
0.42-0.56	13	16.9
0.57-0.71	19	24.7
0.72-0.86	29	37.7
0.87-0.96	10	13.0

Mean = 0.67, Standard deviation = 0.16

Source: Constructed by authors

CONCLUSIONS AND RECOMMENDATIONS

The study showed that most of the poultry farmers in the study area were willing to raise noiler birds; most of the willing farmers were female. The decision of the farmers to raise noiler birds was influenced by the ease of management and the bodyweight at maturity of noiler birds. The study affirmed that awareness of noilers contributed to the farmers' willingness to raise noiler birds. Flock size, production experience (years) and awareness of the bird were factors that influenced poultry farmers' willingness to raise noiler birds. There was a high probability of respondents' willingness to raise noilers in the study area. Relevant government and Non-Governmental Organisations (NGOs) should assist in creating more awareness on noiler birds through radio, television and social media. As a way of creating employment for the youth by the government, raising of noilers on a small scale can be encouraged by making quality day-old noilers available and other inputs in form of loan to interested youths.

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APPENDICES

Appendix 1: Measures of Ease of Management * Respondents' Opinion Cross tabulation

			Respondents' Opinion					Total
			Strongly Agreed	Agreed	Neutral	Disagreed	Strongly Disagreed	
Measures of Ease of Management	A11	Count	51	41	19	10	4	125
		Expected Count	39.2	47.2	23.3	12.0	3.3	125.0
	A22	Count	16	56	30	20	3	125
		Expected Count	39.2	47.2	23.3	12.0	3.3	125.0
	A33	Count	51	45	21	6	3	126
		Expected Count	39.5	47.6	23.5	12.1	3.4	126.0
Total		Count	118	142	70	36	10	376
		Expected Count	118.0	142.0	70.0	36.0	10.0	376.0
Chi-square calculated = 35.16, df = 8, p-value = 0.000								

Where: A11 represents raising noiler chickens will reduce management stress, A22 represents noiler is cheaper to raise, A33 represents noilers are more resistant to heat, unlike broilers and layers.
Source: Constructed by authors

Appendix 2: Measures of Weight (kg) at Maturity * Respondents' Opinion Cross Tabulation

			Respondents' Opinion					Total
			Strongly Agreed	Agreed	Neutral	Disagreed	Strongly Disagreed	
Measures of Weight (kg) at Maturity	B11	Count	24	40	28	26	7	125
		Expected Count	20.3	43.3	29.3	28.3	4.0	125.0
	B22	Count	4	43	26	45	7	125
		Expected Count	20.3	43.3	29.3	28.3	4.0	125.0
	B33	Count	38	52	27	8	0	125
		Expected Count	20.3	43.3	29.3	28.3	4.0	125.0
	B44	Count	15	38	36	34	2	125
		Expected Count	20.3	43.3	29.3	28.3	4.0	125.0
Total		Count	81	173	117	113	16	500
		Expected Count	81.0	173.0	117.0	113.0	16.0	500.0
Chi-square calculated = 70.75, df = 12, p-value = 0.000								

Where: B11 represents noiler birds weigh bigger at maturity than most poultry birds, B22 represents noiler attain maturity fast, B33 represents given the same feed they lay down less fat compared to other breeds (broiler and old layer), B44 represents noiler spent layers weigh more compared to other breeds.
Source: Constructed by authors