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Determinants of ShikaBrown® cocks (Sire Line) Adoption for Upgrading Local Chickens among Poultry Farmers in Kaduna State, Nigeria

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ABSTRACT

This study was carried out to analyze factors influencing the adoption of ShikaBrown cocks for upgrading local chickens in Giwa and Sabon Gari Local Government Areas of Kaduna State, Nigeria. A total of two hundred and one (201) poultry farmers constituting 174 males and 27 females were randomly sampled using a multi-stage sampling procedure. Data were collected with the administration of structured questionnaire and analyzed with inferential statistics. The study covered ten (10) villages (Hayin Gada, Maraban Guga, Mahuta, Kurku, Tsibiri, Salenke, Ungwa Galadima, Bijimi in Giwa LGA, and Karfe and Biye in Sabon Gari LGA.). The variables include age, marital status, level of education, sex, poultry production experience and household size. The result of the analysis showed that, the bulk of poultry farmers (86.6%) were males and only 13.4% were women, who owned and engaged in poultry farming. The study also revealed that, majority of the farmers (94%) were found to be married; about 49% of the farmers have household size was above 10 persons with an average of 13 people per household. The result showed majority (86.6%) of the farmers to be literate in the study area who had one form of formal education or the other. A significant proportion (36%) of the farmers were within the ages of 40- 49 years with a mean age of 48 years, relatively experienced in poultry production. About 79% of farmers spent more than 10 years in poultry production with the mean years of poultry farming experience to be 15 years. The logit regression result showed that age was positive and significant at 5% level, experience in poultry farming was positive and significant at 10% level while, access to credit was positive and significant at 10%. it is recommended that, aging poultry farmers should be given special assistance to augment their physical deficiency, government and NGOs should encourage poultry production / farming by making credit available to the farmers. Government should organize special training schools for the farmers to gain more knowledge in making sound and feasible decisions. The extension agents should explain to the farmers the benefits of membership of cooperatives.

Key words: ShikaBrown® Cocks, Upgrading, Local Chickens.

INTRODUCTION

The animal production component of Nigeria's agricultural sub-sector accounts for 5 – 6% of the overall national GDP and 15 – 20% of the total agricultural GDP between 2009 - 2010 and about 6 - 8% in 2022 (Daily trust, 2022). Poultry, particularly chickens are the most widely kept livestock species in the world and also the most numerous (Moreki, Dikeme, and Poroga, 2010; Prafulla, 2015). Poultry industry in Nigeria is the second largest chicken population in Africa after South Africa, comprising of about 180 million birds, outnumbered all other forms of livestock in Nigeria and are found throughout the country wherever there are human settlements

(Adeyemo and Onikoyi, 2012; Africa Sustainable Livestock 2050, 2018).

Local chickens roams, roost and source their nutritional needs in the confines of a backyard while, the homestead provides water, feeding scraps and rudimentary shelter. Unlike broilers and layers, local chickens are mainly indigenous breeds distinct in their genotype which influences biological parameters such as growth rates, egg production, a robust adaptability to the backyard environment as it predisposes the birds to unique traits (such as strong predator avoidance, disease resistance and other survival instincts). These traits make the system of free-range, semi-scavenging feeding possible. Local chickens are of great importance to the family in many ways such as source of income, nutrition and as a valuable asset. Poor households often consider poultry as the very last asset in the event of economic shocks. Subsistence farmers keep chicken that can produce sufficient meat and eggs for their immediate families, become broody and hatch their own chicks to make the owner independent in eggs, white meat production and supplement their income (Grobbelaar, Suthenand, and Molalakgota, 2010; Mahindra, 2016).

Previous studies assert that upgrading of local chicken is a sustainable way of targeting increased productivity, body weight and egg production in a semi-scavenging poultry production (Mapiye, and Sibanda, 2008; Egali, Dim, Momoh and Gwara, 2010; MdEman, Alam, Emon and Hassan, 2021). Based on these anticipated performance of local (indigenous) chickens when improved technologies are adopted, West African Agricultural Productivity Program (WAAPP) in conjunction with National Animal Production Research Institute (NAPRI) developed a program in 2015 tagged "Cock Exchange Program". It was geared towards upgrading the indigenous breeds which will eventually transform to enhance the living standard of farmers.

Crossbreeding indigenous chickens with exotic breeds improves growth traits, which include traits like live weights, daily gains and feed intake (Kumar, Islam, and Ashraful, 2013). Crossbreeding of the indigenous chickens with an exotic breed tends to improve the egg size of the crossbred progeny due to the positive genetic correlation between body size and egg size. The production performance of the first filial generation (F1) of local birds crossed with improved breed is superior and upgrading can transform local chicks closer to the improved breeds than the direct importation of the improved genotype (Isika, Aganga and Okoh., 2005; Musa, Modupe, Gerald and Olutunmogun, 2018).

STATEMENT OF THE RESEARCH PROBLEM

ShikaBrown® breed of chicken was the result of scientific breakthrough of meticulous breeding work at NAPRI which has been tested in all the six (6) ecological zones of the country and was found to perform satisfactorily in terms of adaptability to harsh tropical environment, quality, quantity, meat, egg production, and resistant to tropical diseases (NAPRI, 2012).These qualities made West African Agricultural Productivity Program (WAAPP) carried out the cross-breeding and upgrading program by exchanging ShikaBrown® cocks with indigenous cocks of poultry farmers in ten (10) villages in both Giwa and Sabon Gari Local Government Areas of Kaduna State. The resultant offspring is expected to be physically different from the local breeds. Thus, the objective of this study are to; (i) describe the socio-economic characteristics of indigenous poultry farmers in the study area; (ii) determine the factors influencing the adoption of SB cocks by the poultry farmers.

Hypothesis

Ho: Farmer's socio-economic characteristics have no significant influence on the adoption of

SB cocks for upgrading of indigenous chickens.

MATERIALS AND METHOD

Experimental site

The study was carried out in Giwa and Sabon Gari LGAs of Kaduna State, located in the Northern Guinea Savannah of the vegetation zones between latitude 9º and 12º N and longitude 6º E and 9º E of the prime meridian (Kaduna State Statistical Year Book, 2018). The area has a distinct wet, dry and harmanttan season with annual temperature of 55ºf-95ºf and an average annual rainfall of 500mm-1,323mm (NIMET, 2021).

A multi-stage sampling procedure was used. The first stage purposively used the target population of small-scale poultry contact farmers from the ten (10) villages where the ShikaBrown® cocks were introduced, comprising of; Hayin Gada, Maraban Guga, Mahuta, Kurku, Tsibiri, Salenke, Ungwa Galadima and Bijimi in Giwa LGA, while Karfe and Biye in Sabon Gari LGA. Secondly, Yamane's (1973) formula adopted by Yusuf, Yusuf, Abdurrahman and Dutse (2016) was used to calculate the sample size with ninety five percent (95%) confidence level and five percent (5%) sampling error assumption. In the third stage, a random sampling technique was used to select the required respondents to ensure equal opportunity of being selected. Forty nine percent (49%) of the poultry farmers in each village were randomly selected from the sample frame of each village to achieve two hundred and one (201) poultry farmers required. In Giwa LGA, Bijimi (18), Mahuta (22), Maraban Guga (20), Kurku (23), Salenke (22), Hayin Gada (23), Tsibiri (16), Ungwa Galadima (16) farmers, while Biye (22) and Karfe (20) farmers are in Sabon Gari LGA.

The Yamane's formula is as follows;

$$n_o = \frac{N}{1+N(e)2}$$

Where,

n_o = Sample size

N = Total number of observations (Sample frame)

1 = Statistical constant

e = Level of significance

Therefore,

n_o = ?

N = 405

e = 0.05

$$n_o = \frac{405}{1+405(0.05\ x\ 0.05)}$$

$$= \frac{405}{1+1.0125}$$

$$= \frac{405}{2.0125}$$

= 201.24

= 201

$$\therefore \text{Vno} = \frac{201}{405} X100$$

= 49.629%

Table 1: Population of Sampling Size of Respondents (n= 201)

LGAs	Communities	Sample frame	Sample size (49%)
Giwa	Bijimi	36	18
	Mahuta	44	22
	Maraban Guga	40	20
	Kurku	46	23
	Salenke	44	22
	Hayin Gada	46	23
	Tsibiri	33	16
	Ungwa Galadima	32	15
Sabon Gari	Biye	44	22
	Karfe	40	20
Total	**10**	**405**	**201**

Data were collected with structured questionnaire and analyzed using frequency, and percentages.

RESULTS AND DISCUSSIONS

The sex distribution of indigenous poultry farmers in the study area, Figure 1 below showed, the bulk of poultry farmers (87%) were males and only 13% were females, who owned and engaged in poultry farming.

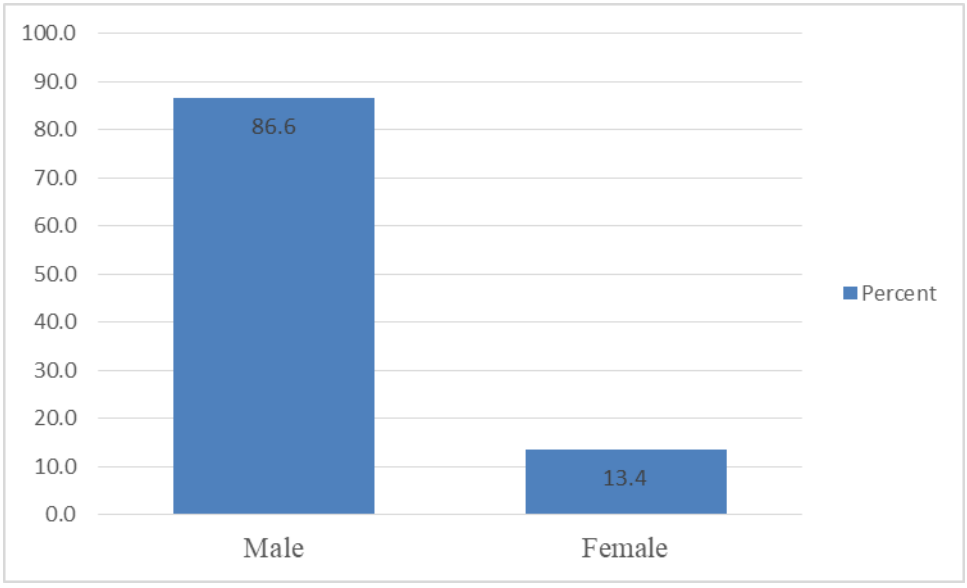


Figure 1: *Sex of poultry farmer*

Result in Figure 2 revealed that, majority (86.6%) of the farmers are literate who had one form of formal education or the other. This could be due to awareness and presence of many formal institutions within the State and its proximity to the rural areas. It implied that, there is potential for increase in adoption since literate household heads have better ability and knowledge to access and absorb new information, which in turn influence the decision to adopt new technologies. This finding supports Cooker *et al.* (2018) noted that, level of education is expected to influence farmers' adoption of agricultural innovations and decision on various aspects of farming. Another significance of education is that it enhances farmers' ability to make accurate and meaningful management decision. This finding supports that of Nurudeen (2012).

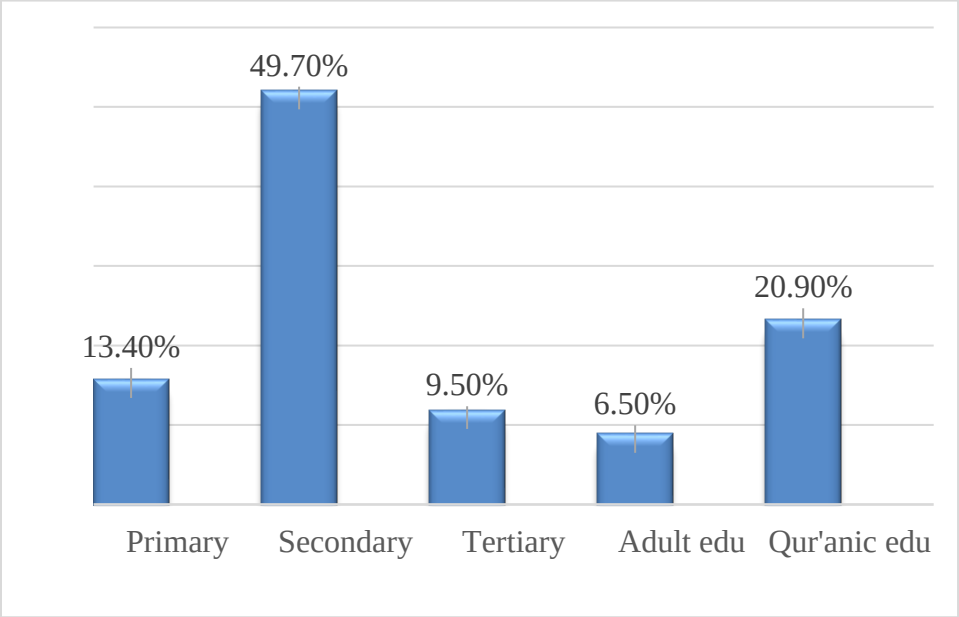


Figure 2: *Educational level of poultry farmers*

The result presented in Table 2 revealed that, about 36 percent of the respondents were within the ages of 40-49 years with the mean age of 48 years. This signifies (mean age group) the household heads can said to be active and virile in the study area. This is in agreement with the result of Abanigbe, Oladoja, Jaji and Onasanya (2015) that, famers within active age will be willing to intensify or diversify their income into more productive ventures that could improve their livelihood. Furthermore, about 49% of the farmers have household size above 10 persons per household with an average of 13 people per household. This indicates that, there is likelihood of reduced cost of labor, as adequate family labor will be available for farming operations *ceteris paribus*.

Table 2: Socioeconomic Characteristics of poultry farmers

Socioeconomics	Frequency	Percent
Age		
20-29	8	3.98
30-39	36	17.91
40-49	72	35.82
50-59	51	25.37
≥60	34	16.92
Total	201	100
Mean	48	
Household size		
1-5	-	-
6-10	58	28.86
11-15	98	48.76
16-20	39	19.40
>20	6	2.99
Total	201	100
Mean	13	

Socio-Economic and Institutional Factors Influencing the Adoption of ShikaBrown® cocks

The estimated coefficients of the logit result, along with the standard error, t-values and marginal effect are presented in Table 4. The likelihood ratio test was -31.620 with 9 degree of freedom significant at ($p \leq 0.01$). This implies that the entire variables included in the logit model are jointly significant in influencing farmers' decision to adopt ShikaBrown® cocks technology. Therefore, the socio-economic and institutional characteristics of farmers have a significant effect on their decision to adoption. The result further showed that age, poultry experience, and credit are statistically significant determinants of ShikaBrown® cocks adoption. The marginal effects from the model, which measure the expected change in probability of a particular choice being made with respect to a unit change in an independent variable, are also reported in Table 3.

The coefficient of age (0.144^{**}) was found to be positive and significant at 5% level indicating a direct and strong relationship with adoption of ShikaBrown® cocks technology. A plausible explanation to this is that, knowledge and skills in agriculture, such as production, operation, and management, increase with age and farmers tends to be willing to adopt new production methods in order to increase production. The marginal effect of 0.003 shows that, one extra year of age increases the probability of adopting ShikaBrown® cocks technology by 0.3%.

Poultry farming experience (0.162^{*}) is positive and significant at 10% level, with a marginal

effect of 0.004 indicating that a unit increase in farmers experience will result in the increase of adopting ShikaBrown® cocks technology by 0.4%. Experience in poultry farming increases the marginal value of the probability of adopting ShikaBrown® cocks technology, relative to the marginal value of not adopting ShikaBrown® cocks technology. This is expected that, farmers with many years of experience will be able to make sound decisions that are technically feasible, as regards to allocation of resources and management of their farm operations that is economically worthwhile. The more the number of years of production by the farmer, the more knowledge and skills gained which in turn brings about efficiency. Farmers who have gained a lot of farming experience also have the capacity of maximizing their output and profit at minimum cost.

Access to credit coefficient (3.808*) was positive and significant at 10% as expected, implying that farmers who had access to credit are more likely to adopt ShikaBrown® cocks technology than those with no access to credit. If members of farmers' households have access to credit, then the probability of adopting ShikaBrown® cocks technology is expected to increase by 46.9%.This finding is in line with Asogwa *et al* (2014), who assert that, credit is a very strong factor that is needed to acquire or develop any enterprise; its availability could determine the extent of production capacity. It also agrees with the findings of Chah, Irohibe and Itodo (2014), who noted that access to micro-credit could have prospects in improving the productivity of farmers and contributing to uplifting the livelihoods of disadvantaged rural farming communities. However, sex (-1.234), education (-0.271) and cooperative membership (-1.380) were negative and not statistically significant.

Table 3: Factors Influencing the Adoption of ShikaBrown® Cocks

Adoption	Coefficient	Standard Error	t-value	Marginal effect
Age	0.144**	0.062	2.33	0.003
Household size	0.055	0.124	0.44	0.001
Education	-0.271	0.255	-1.06	-0.007
Poultry experience	0.162*	0.884	1.84	0.004
Sex	-1.234	0.913	-1.35	-0.052
Credit	3.808*	2.227	1.71	0.469
Cooperative membership	-1.380	0.972	-1.42	-0.036
Extension contact	0.517	1.256	0.41	0.013
Constant	10.644**	4.566	2.33	-
Diagnostics variable				
No of observation	201			
LR chi^2 (9)	10.26			
Prob> chi^2	0.2472			
Pseudo R^2	0.1396			
Log Likelihood	-31.620			

*Note: ***, ** and * significant at 1%, 5% and 10% levels of significance*

CONCLUSION AND RECOMMENDATIONS

The study found majority of the farmers to be in their active age who are literate and with a household size of 13 people. Factors such as age ($p<0.05$), credit received ($p<0.01$), experience in poultry farming ($p<0.10$) were positive and influences the adoption of ShikaBrown® cocks. Thus, these factors are of utmost importance in the adoption and sustainability of SB cocks adoption in the study area. Based on the result of this study, it is recommended that, since age was positive (0.144) and significant, aging poultry farmers should be given special assistance to augment their physical deficiency, credit received was positive (3.808) and significant, therefore, government and NGOs should encourage poultry production / farming by making credit available to the farmers. Education on the other hand was negative (-0.271) and being a strong ingredient to adoption of a technology, government should organize special training schools for the farmers to gain more knowledge in making sound and feasible decisions. Cooperative membership was also negative (-1.380), therefore, the extension agents should explain to the farmers the benefits of membership of cooperatives.

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