

Factors influencing the use of E-extension tools among commercial layer farmers in Oyo State, Nigeria

Adelakun, O. J., Omotoso, S. O., Boladuro, B. A. and Lawal, B. O.

Institute of Agricultural Research and Training, Obafemi Awolowo University,
Moor Plantation, Ibadan.



Corresponding author:olubunmiadelakun@gmail.com:
+2348061613227

Abstract

The paradigm shift in advisory services of agricultural systems has shed light on the importance of e-Extension tools (e-En) in complementing extension service delivery to solve the problems of extremely low extension agent to farmers' ratio. Hence, in this study the factors influencing the use of e-En tools among commercial layer farmers in Oyo State were investigated. A well-structured questionnaire complemented with an key informant interview guide was used to collect data from a sample size of 210 commercial layer farmers across the study area. The data collected were analysed with descriptive statistics, farm budgeting technique and regression model. The results showed that the majority (45.2%) of the poultry farmers were at their active and productive stage of life. A relatively equal percentage (39.0 and 39.5%) of the farmers had post-primary and tertiary education, respectively. Radio ($\bar{x}=1.00$), mobile phone/telephone ($\bar{x}=0.91$), and television ($\bar{x}=0.74$) were the most used e-En tools. Lack of technical know-how, high cost of the tools and risk of cyber fraud/bully were the most ranked constraints associated with the use of e-En tools. The age, educational attainment, sources of information and extension training visits influenced ($P<0.01$) the use of the tools. The profitability percentage (21.51%) indicated that, for every physical cash generated in sales, the farmer kept 0.22% as profit. Meanwhile, the earned profit-income, the main business factor, did not influence ($p>0.01$) the use of e-En tools. It is recommended that sensitization and training on the use of e-En tools among commercial layer farmers should be intensified for increased productivity and profitability.

Keywords: Factors, Commercial Layer Farmers, e-Extension Tools

Facteurs influençant l'utilisation des outils de vulgarisation électronique chez les agriculteurs pondeurs commerciaux dans l'État d'Oyo, au Nigéria



Résumé

Le changement de paradigme dans les services de conseil des systèmes agricoles a mis en lumière l'importance des outils de vulgarisation électronique (e-En) en complément de la prestation de services de vulgarisation pour résoudre les problèmes de ratio agent de vulgarisation/agriculteurs extrêmement faible. Par conséquent, dans cette étude, les facteurs influençant l'utilisation de l'outil e-En chez les éleveurs de poules pondeuses commerciales dans l'État d'Oyo ont été étudiés. Un questionnaire bien structuré complété par un guide d'entretien a été utilisé pour collecter des données auprès d'un échantillon de 210 éleveurs de pondeuses commerciales dans la zone d'étude. Les données recueillies ont été analysées avec des statistiques descriptives, une technique de budgétisation agricole et un modèle de régression. Les résultats ont montré que la majorité (45,2%) des aviculteurs étaient à leur stade de vie actif et productif. Un pourcentage relativement égal (39,0 et 39,5%) d'agriculteurs avait une éducation post-primaire et supérieure, respectivement. La radio ($\bar{x}=1,00$), le téléphone portable/téléphone ($\bar{x}=0,91$) et la télévision ($\bar{x}=0,74$)

Factors influencing the use of E-extension tools among commercial layer farmers

étaient les outils e-En les plus utilisés. Le manque de savoir-faire, le coût élevé des outils et le risque de cyber fraude/intimidation étaient les contraintes les plus importantes associées à l'utilisation des outils e-En. L'âge, le niveau d'instruction, les sources d'information et les visites de formation en vulgarisation ont influencé ($P<0,01$) l'utilisation des outils. Le pourcentage de rentabilité (21,51 %) indique que, pour chaque argent physique généré par les ventes, l'agriculteur gardait 0,22 % de profit. Parallèlement, le revenu d'activité, principal facteur d'activité, n'influence pas ($p>0,01$) l'utilisation des outils e-En. Il est recommandé d'intensifier la sensibilisation et la formation à l'utilisation de l'outil e-En parmi les éleveurs de poules pondeuses commerciales pour une productivité et une rentabilité accrues.

Mots-clés : facteurs, agriculteurs de couche commerciale, outils d'extension électronique

Introduction

The livestock production sector comprising several sub-sectors is one of the buoyant agricultural economies that contribute to the Gross Domestic Product (GDP) of Nigeria, with an annual growth rate of 12.7% per annum and assets valued at \$78 billion (FAO, 2020). Among the livestock enterprises, the poultry industry is one of the most viable and commercialized (Apantaku, 2006) sub-sector in Nigeria's agricultural economy that largely supplies animal protein to the growing population. The Nigerian poultry industry has about 180 million birds, which is second only to South Africa in Africa (SAHEL, 2015), producing 454 billion tonnes of meat and 3.8 million eggs per year (FAOSTAT, 2020). Consequent to the awareness of "an egg per day" and the potential from egg consumption, the economy of commercial layer egg production in Nigeria was projected to generate annual revenue of N620 billion and daily revenue of N1.7 billion, if 50 per cent of its population consumes at least, an egg per day for one year (PAN, 2017). Nigeria produced an average of 510 tonnes of eggs and 201,493 tonnes of poultry meat out of total meat production of 1.4 million tonnes daily (World Bank, 2017). In recent years and with the rapid growth of the commercialized poultry sector coupled with the Federal Government of Nigeria "School Feeding Program Initiative", the

Southwestern part of Nigeria, notably, Oyo state has been identified as the epicentre of poultry production for distribution to other parts of the country. Expectedly, the "School Feeding Program Initiative" has created more jobs in the poultry value chain. Despite the profitability of poultry enterprise, the industry is still saddle with numerous challenges of which lack of information needs due to low use of e-En tools anchor (Msoffe, *et. al.*, 2018; Ugwuokeet. *al.*, 2017). The evolving agricultural system and paradigm shift in advisory service delivery have emphasized the use of e-Extension (e-En) tools for dissemination of on-time information needs, complement extension service delivery and solve the problem chain associated with a low ratio of extension agents to farmers. The tools add values to farmers' productivity (Okelloet *al.*, 2014). The tools display the accessed information in form of binary codes, text, graphics, audio, video and animation files. Among the e-En tools are mobile phones, radio (Okello, 2010), television, farmer-usable touch screen information kiosk and all virtual aid tools (Adelakun *et al.*, 2020). Globally, the tools have gained a stand based on their importance and roles in accessing formal and non-formal educational information on sustainable agriculture and food systems (Jackman *et al.*, 2020). Additionally, e-En tools address farmers' poor access to prompt and appropriate agricultural information

that can improve livelihood and promote economic growth (Souter *et al.*, 2005; Zahedi and Zahedi, 2012; Chikuni and Fredy, 2019). According to Afolayan *et al.*, 2021; Akintunde *et al.*, 2020, poor farming experience (Suleiman *et al.*, 2017), technical inefficiency (Ojo, 2003), climate change and adaptation (Ayanlade *et al.*, 2017; Ayanlade *et al.*, 2018; Liverpool-Tasie *et al.*, 2019), high cost of feed ingredients, diseases outbreak could be traced to inadequate extension delivery services and low use of e-En tools, which invariably affects productivity and profitability of the poultry farmers. Hence, the conceptualization of this research to assess the factors influencing the use of e-Extension tools among commercial layer farmers in Oyo State. The specific objectives of this study are to describe the socio-economic characteristics of respondents, identify the e-Extension tools used, constraints associated with the use of the tools, analyze the cost and profitability of respondents and factors influencing respondents' use of the tools in the study area.

Methodology

The study population covered all registered poultry farmers in Oyo State. A simple random sampling technique was used to select two local governments (one rural and one peri-urban) out of the thirty-three Local Government Areas (LGAs). In the selected LGAs, 20% of the registered farmers were selected each and gave 210 respondents. Pre-tested questionnaires were used to obtain information from the selected one hundred and forty respondents in the two LGAs. Data collected were collated and analysed using descriptive and inferential

statistics. Simple frequency counts, percentages and mean were used to summarize the data while Pearson's Product Moment Correlation analysis was used to test the relationship between selected farmers' socioeconomic characteristics and their percipience towards e-extension tools.

Results and discussion

Presented in Table 1 are socio-economic characteristics of the commercial layer farmers. The result showed that 45.2% were between the age ranges 41 to 50 years with a mean of 43.50. This shows that most of the farmers were in their productive stage of life, and this supports the findings of Hina *et al.* (2015), that more youth and young adult are predominantly involved in the poultry business due to the energetic nature of the enterprises. Seventy-five per cent were male, which implies that men are actively involved in management activities which corroborates the findings of Okohe *et al.* (2010) that men are actively involved in scaled-up poultry business than women. The majority (90%) were married, more than half (61.4%) had farming experience of 6 to 10 years. The average flock size per commercial layer farmer is ≥ 500 birds with an average percentage of 24.73%. This implied that the farmer operated a medium-scale farm with 200-500 birds as described by Aladejebiet *et al.* (2019). The household size of the farmers was 5 to 8 persons with a percentage of 66.7% and 39.5% had tertiary academic achievement. This agrees with the findings of Jackman *et al.* (2020), which posited that due to economic gain in commercialized poultry business, more people with higher academic attainment are now into the enterprise.

Factors influencing the use of E-extension tools among commercial layer farmers

Table 1: Socio-economic characteristics of the commercial layer farmers (n=210)

Variables	Frequency	Percentages
Age		
20-30	24	11.4
31-40	47	22.4
41-50	95	45.2
51-60	39	18.6
-	5	2.4
Sex		
Male	158	75.2
Female	52	24.8
Marital Status		
Single	13	6.2
Married	189	90.0
Divorced	5	2.4
Widow	3	1.4
Household Size		
1-4	48	22.9
5-8	140	66.7
>8	22	10.5
Farming Experience		
0-5	23	11.0
6-10	129	61.4
>10	58	27.6
Flock Size (birds)		
0-200	23	11.0
201-400	45	21.4
401-600	62	29.5
601-800	49	23.3
801-1000	31	14.8
Educational attainment		
No Formal Education	9	4.3
Primary School	36	17.1
Secondary School	82	39.0
Tertiary Education	83	39.5

Source: Field survey, 2019

The costs and profitability of the commercial layer farmers are in Table 2. It showed the mean value (N1,520,606.43) of the total revenue, total variable cost (N1,101,645.10) and total fixed cost (N91,803.76). The results implied that an average commercial layer farm in the study area earns a gross margin of N418,961.33 per month with a 21.51% net gross margin of the money invested in the business. The

net gross margin revealed that over 70% accounted for the total variable cost of commercial layer production. Therefore, the farmers in the study area made a profit at the end of their production cycle, which might be the reason behind more farmers' engagement in commercial layer farming. This finding agrees with Bukunmi and Yusuf (2015) and Tijani (2012) who posited that the poultry egg production business is highly profitable, all things being equal.

Table 2: Costs and profitability of the commercial layer farmers (n=210)

Items	Mean (₦)	Standard Deviation
Sales receipt/Month		
Income from Egg	504,771.43	244.33
Income from Meat	1,011,900	439,791
Droppings (waste)	3935.00	1,710.30
Total Revenue	1,520,606.43	
Variable Cost		
Feed	409,459.29	178,026
Vaccine and Medication	14,097.71	9,866.80
Labour	72000	27070.70
Birds (Point of Lay)	562,142.86	244,328
Transport	27,080.95	15,771.72
Electricity	16,864.29	7,329.85
Total Variable Cost	1,101,645.10	
Total Fixed Cost (TFC)	91,803.76	37,219.22
Profitability		
Profit margin (TR-TVC)	418,961.33	
Net gross margin (GM-TFC)/TR*100	21.51%	

TFC = (Rent, Pen house, Feeder, Drinker, Gas cylinder/Stove, Weigh Balance, Bowls)

Source: Field survey, 2019

The type of e-extension tools used by the farmers (Table 3) showed that radio ($x = 1.00$), mobile phone/telephone ($x = 0.91$) and television ($x = 0.74$) were the most used and ranked 1st, 2nd and 3rd respectively. This implies that most of the farmers are still using the traditional way of accessing extension information. This supports the findings of Oyenekeet *al.* (2016) that radio and television are the most used tools by farmers in the country for accessing

extension information. The findings also revealed the technicality of operationalization of the tools ($x = 1.50$), cost-effect of the tools ($x = 1.10$) and cyber-fraud/bully ($x = 0.80$), respectively were constraints to the use of the tools. This is in line with the findings of Adelakun *et al.* (2020) who reported that the lack of technical know-how of farmers hinders their uses as e-Extension tools for optimum productivity.

Table 3: Type of e-extension tools used by farmers (n=210)

E-extension tools	Mean	SD	Rank
Radio	1.00	0.00	1
Mobile phone/Telephone	0.91	0.49	2
Television	0.80	0.40	3
Prints	0.74	0.44	4
Virtual aid tools/Computer (all agriculture sensor tools)	0.01	0.12	5
Perceived Constraints			
Lack of technical know-how			
High cost of the tools	1.50	0.87	1
Exposure to cyber fraud/bully			
Lack of quality information/content	1.10	0.35	2
Lack of technical equipment and support services	0.80	0.85	3
	0.39	0.49	4
Non-conducive environmental condition	0.13	0.50	5
	0.02	0.14	6

Source: Field survey, 2019

Factors influencing the use of E-extension tools among commercial layer farmers

With regards to factors influencing the use of e-extension tools (Table 4), age, educational status, sources of information and number of extension training visit, influenced ($p < 0.01$) the use of the tools while the household size, stock density, income, and farming experience were not significant ($p > 0.01$). This showed that age (X_1), educational status (X_2), sources of information (X_7) and the number of extension training visit (X_8) had direct relationship with the use of the tools on poultry production. The negative inference from sources of information and age's coefficient showed that the use of the tools decreases as sources of information and age increases. This might imply that younger aged farmers tend to explore new initiative or innovations that will increase their profit margin. The educational status, a backbone of cognizance enlargement, though

significant showed negative inference from its coefficient (the higher the educational attainment the lower the use of the tools). This could be associated with the constraints caused by the operationalization of the tools. This corroborates several findings (Wawireet *et al.*, 2017; Subhrajyotiet *et al.*, 2019), that higher educational status significantly influenced the adoption of new technologies. Also, the T-ratios showed that extension training visit (X_8) had a positive significant relationship with the use of the tools while stocking density, income, farming experience and household size were not significant with the use of the tools. This contradicts the findings of some authors (Lawalet *et al.*, 2009; Okoedo-Okojie and Omoregbee, 2012; Olaniyi, 2013) that income, household size and farming experience had no significant relationship with farmers' use of e-Extension.

Table 5: Regression analysis of factors influencing the use of the tools

Variable	Estimated parameter	Coefficient	Standard errors	Beta	t-values	Significant levels
Constant	X_0	5.811	1.245		4.667	0.001
Age	X_1	-0.310	0.010	-0.221	-3.010	0.003**
Educational status (years)	X_2	-0.371	0.107	-0.229	-3.481	0.001**
Household size	X_3	0.002	0.048	0.002	0.035	0.972
Stocking density	X_4	-0.036	0.059	-0.037	-0.605	0.546
Income/Month	X_5	-6.469E-8	0.000	-0.031	-0.013	0.990
Farming experience (years)	X_6	-0.017	0.028	-0.041	-0.622	0.535
Sources of information	X_7	-0.949	0.256	-0.435	-0.3711	0.001**
Number of Extension training visit	X_8	0.656	0.220	0.239	0.298	0.003**

Source: Field study, 2019. Dependent variable= use of e-E tools, n=210, **Significant at 1%.

Conclusion

Findings from this study revealed that age, educational attainment, sources of information and extension training visits statistically influenced the use of e-Extension tools among the commercial layer farmers. The high percentage of profitability of farmers' net income was not statistically influenced by the use of e-Extension tools. However, there is need for intensified sensitization and training of

commercial layer farmers on the use of e-En tools for prompt information on management practices, increased productivity and profitability.

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Received: 10th June, 2021

Accepted: 27th September, 2021