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EXAMINING THE SOCIOECONOMIC FACTORS AND BIOSECURITY PRACTICES AMONG POULTRY FARMERS IN OSUN STATE, NIGERIA

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Abstract: The poultry industry is confronted with substantial challenges arising from infectious diseases, underscoring the critical role of biosecurity in safeguarding farm operations. This study investigates the socioeconomic characteristics and biosecurity practices of poultry farmers, revealing a pronounced gender disparity, with males predominating and female participation remaining limited. The majority of farmers are married, with family support playing a pivotal role in sustaining production activities. Most respondents possess moderate educational backgrounds that facilitate the implementation of fundamental biosecurity measures. Furthermore, the findings indicate that poultry production is primarily small-scale, involving 150 to 1,000 birds, with farmers having 2 to 11 years of experience in the sector. Despite a basic awareness of biosecurity principles, a lack of extensive practical experience persists, signifying the necessity for enhanced training and capacity-building initiatives. Regression analysis demonstrates that education and experience significantly and positively influence the adoption of biosecurity measures, whereas extension visits exhibit a negative correlation. Strengthening educational attainment, providing targeted training programs, and improving access to effective extension services could substantially enhance biosecurity compliance, thereby promoting greater productivity, resilience, and sustainability within the poultry farming.

Key words: *Poultry farmers, Potential threats, Biosecurity measures, extension services, Osun State, Nigeria*

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INTRODUCTION

The poultry industry is a significant agricultural sub-sector in the economy of most developing nations including Nigeria. It is the most readily available and affordable source of animal protein for most households in Nigeria [1]. According to [2] Nigerian's animal intake of 6 grams per head per day is very low, compared with the global average of 34 grams per day with animal protein constituting only 3% of the mean of an average Nigerian as against the recommended 12% animal protein composition for a healthy lifestyle. [3] emphasized that poultry production remains the most efficient and cost-effective means of making animal protein readily available for consumption among households in Nigeria. It remains the most viable option for improving animal protein consumption for both rural and urban households in Nigeria. [4] reported that the Poultry industry in Nigeria is blessed with myriads of challenges, but diseases in poultry is one of the major threats to the improved productivity of poultry birds in Nigeria. [5] also affirmed that poultry-based food producers' major challenge in Nigeria is the outbreak of poultry diseases. Although Newcastle disease is the most prevalent and frequent poultry disease in Nigeria, others include avian influenza, avian pox, infectious bursal disease, coli septicemia, coccidiosis, and worm infestation. [3]. According to [6], poultry diseases have a negative effect on the production and productivity of poultry birds by reducing the quality and quantity of poultry meat and eggs.

Several authors in the literature have given different definitions to the concepts of bio-security, however, [7] defines bio-security as all preventive measures that are designed and undertaken to minimize the risk of spread of highly infected disease in livestock, including poultry production. The author categorized biosecurity into two components; bio-containment and bio-exclusion. The practice of measures to prevent diseases causing organisms from going into a Poultry farm is known as bio-exclusion, while bio - containment is the use of measures to prevent the spread of diseases from an infected poultry farm to a nearby poultry farm. Similarly, the same classification was adopted by [8], but the word "bio-confinement" was used instead of "bio-containment" However, [9] classified bio-security into three categories; isolation traffic control, and sanitation. In a different view, [10] classified bio-security into segregation, cleaning, and disinfection. It is evident from the above categorization and classification that bio-security is of two fundamental principles, avoiding the entry of the disease-causing agent (bacteria, fungi, and viruses) into the farm and preventing the spread of diseases from an infected farm to the neighbouring farms [11].

According to [12], the practice of bio-security on poultry farms ranges from simple cleaning and disinfecting of poultry farm premises. Bio-security has been found to play an irreplaceable role in the prevention of poultry diseases, and improving poultry farms' productivity [13]. According to [14], most poultry egg farmers in South West Nigeria had inadequate levels of bio-security management, with a poultry illnesses management index of 27%, which substantially impacted the farmers' profit efficiency. [15] reported that effective biosecurity in poultry farms will assist in the improvement of the health status of poultry birds flock, poultry farmers, and consumers. It also reduces the economic performance of poultry farms. The author also affirmed that high vaccines failure in Nigeria is associated with poor storage as a result of epileptic power supply emphasizing the need for biosecurity as the alternative measure of diseases control in poultry farms.

Against this background, this study assesses the use of biosecurity among selected poultry farms in Osun state, Nigeria.

MATERIAL AND METHODS

Study area

The study area is Osun State, Nigeria. Osun State widely called "Osun" (pronounced; "O'Shoon") is an inland state in south-western Nigeria. Its capital is Osogbo. Its borders are as follows: Kwara State to the north; Ekiti State and Ondo State to the East; Ogun State to the South; and Oyo State to the West. Osogbo, the capital of Osun, is located 47 km³ north and 4°34' east of the coordinates. The city has 156,694 residents, according to the 2006 Population and Housing Commission Census. Osogbo is centrally located, making it easily accessible from anywhere in the state. It shares boundaries with Ikirun, Ilesa, Ede, Egbedore, and Iragbiji. The approximate distances are 48 km from Ife, 32 km from Ilesa, 46 km from Iwo, 48 km from Ikire, and 46 km from Ila-Orangun.

Population of Study

Osun State's poultry farmers make up the study's population.

Sampling Procedure and sample size

A multi-stage sampling technique was employed in the selection of a representative sample for the study. Osun State is delineated into three agricultural zones by the Osun State Agricultural Development Programme (OSSADEP) Iwo, Osogbo, and Ife/Ijesha Zones. Iwo, Osogbo, and Ife/Ijesha Zones are made up of seven (7), thirteen (13), and eleven (11) local government areas (LGAs) respectively. Stage one involved the purposive selection of Osogbo Zone, from the three ADP Zones in the State due to the high concentration of poultry farmers. Stage two involved random selection of three (3) local government areas from the eleven (13) local government areas in the zone. Stage three involved random sampling of 30 poultry farmers from each of the three (3) selected LGAs to make a total of 90 poultry farmers as the sample for the study.

Method of Data Collection

Primary data were collected for the study. Data were obtained from field survey with the use of well-structured interview schedule administered to the respondents.

Validation and Reliability of Instrument

The reliability of the study data instrument was carried out to test the consistency of the research instrument. The structured interview schedule was pre-tested in selected local government areas outside the Osogbo agricultural zone. The pre-test helped identify faulty questions and ambiguous statements. Necessary modifications and adjustments were made based on the experience gained from the field.

Measurements of variables

Bio-security scores: Bio-security is the sum of all activities undertaken by an individual poultry farmer to minimize the risk of spreading of infectious diseases into farm areas. Bio-security scores were computed a checklist (Table 1). Thirteen (13) risk assessment items (Table 1) were used, with a maximum score of 36.

The higher the bio-security scores of a poultry farmer, the better the level of bio-security. Following [16] and [3], scores were awarded as 0, 1, 2, and 3 for each of the items. Zero (0) is the lowest score for each for each risk item, while 1 and 2 is a moderate score, and 3 is a high score. The aggregation of the scores from each of the risk items constitutes the aggregate bio-security scores for the individual poultry farmers.

Table 1. Indicators of biosecurity measures

S/Nos	Indicators	Definition (please tick)
1.	Regular clearing of poultry surroundings	Bush is not around the poultry buildings () Bush is within 100m of the poultry buildings () Bush is within 50m of the poultry buildings () Bush is very close to the poultry buildings ()
2	Adequate light for birds	Pen is well illuminated () Pen is moderately illuminated () Pen is partly illuminated () Pen is not illuminated ()
3	Quarantine of new birds	New birds are quarantined before introduction () New birds are quarantined on the farm outside pen () New birds are quarantined on the farm inside pen () New birds are not quarantined ()
4	Physical security	The is maximum security () The is moderate security () The security is not enough () There is no security ()
5	Bury/burning of dead birds	Dead birds are buried/burned immediately () Dead birds are buried/burned after few days () Dead birds are buried/burned after a week () Dead birds are not buried/burned ()
6	Regular vaccination of the birds	Birds are vaccinated regularly () Birds are vaccinated randomly () Birds are vaccinated occasionally () Birds are not vaccinated at all ()
7	Isolation of infected birds	Sick birds are isolated immediately () Sick birds are isolated after some days () Sick birds are isolated after a week () Sick birds are treated in the pen ()
8	Regular pen disinfection	Pens are disinfected daily () Pens are disinfected weekly () Pens are disinfected monthly () Pens are disinfected annually ()
9	Packing of the litters on a regular basis	Litters are packed daily () Litters are packed weekly () Litters are packed monthly () Litters are packed annually ()
10	Local Environment: distance from road to farm	The farm is far from a public road and others farms more than 300m () Either other farm or public road are located within 100<300m () Either other farm or public road are located within 50<100m () Both other farm and public road located with 50m ()

	Contin. Table 1.	
11	Different types of poultry in farm	Only one type of poultry in the farm () A few types of poultry in the farm, kept in separate housing () A few types of poultry in the farm, free range () Various type of poultry around the poultry sheds ()
12.	Sources of water	Clean water from dugs well (underg.)/artesian well () Clean water from rain water and uncontaminated () Sources: surface water (river, pond) to be treated, e.g. chlorine () Sources: surface water without treatment ()
13.	Sources of feed	Feed provided by the company (commercial feed) () Formulation of feed mixed at the farm using machinery (mini feed mill) () Mixed feed formulated by the farmers () Mixed feed without special formulation ()

Source: Adapted from [16] and [3].

Age: This indicates the number of years that the respondent had lived.

Marital status: The respondent was asked to indicate if single, married, divorced, separated or widowed.

Household size: respondents were asked to indicate number of dependents who feed in the same pot with them.

Family size: respondents were asked to indicate number of their family members.

Religion: respondents were asked to indicate their religion whether as Muslim, Christian, African traditional or atheist.

Educational qualification: were measured in terms of the level of their education that is the level they have acquired in formal education.

Primary occupation: lists of occupation were given to the respondents to pick their primary occupation.

Secondary occupation: respondents were asked to indicate their secondary occupation from the listed options.

Farming experience: The respondents were asked to state their years of experience in farming activities.

Flock size: The respondents were asked to indicate the number of their flock including layers, cockerel and broilers.

Management practices: The respondents were asked to state the management practices employed in their respective farms.

Method of data analysis

To achieve the objectives of the study earlier stated, descriptive statistics such as mean, frequency, percentage, ranking, and ordinary least squares regression analysis were used for data analysis.

Model specification

The significant variables influencing the use of bio-security measures among the poultry farmers was analyzed using multiple linear regression model. The linear regression model is specified as follows;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + et$$

Where: Y = Biosecurity control score measured as the total sum of scores obtained from the number of biosecurity measures practiced by the individual poultry farmers on their farms.

X₁ = Age of the poultry farmer

X₂ = Years of formal education

X₃ = Years of poultry farming experience

X₄ = Years of awareness of biosecurity measures

X₅ = Flock size

X₆ = Extension visits

et = Error term

RESULTS AND DISCUSSION

Table 2 presents the socioeconomic characteristics of poultry farmers in the study area. A significant majority of these farmers are men, with around two-thirds identifying as male. This highlights a gender gap in the poultry farming sector within this sample, revealing that women are underrepresented in this sector. This imbalance can often be attributed to socio-cultural factors, where farming is traditionally viewed as a male-dominated industry, especially in rural areas [17]. Encouraging more women to participate could promote gender equality and lead to greater economic empowerment. However, there are challenges such as limited access to resources, capital, training, and networks that can make it tough for women to break into poultry farming or grow their businesses [18]. The [17] has pointed out the various challenges women face in agriculture, including restricted access to land and financial services. Additionally, [18] has highlighted the need for policies that enhance women's access to education, credit, and land for agricultural activities.

Most (78.9%) of the farmers are married. Only 6.7% are single, while the remainder are either divorced, separated, or widowed. This high percentage of married farmers suggests that family dynamics might play a crucial role in supporting farming operations. Spouses often pitch in with farm work, childcare, or household management, which can boost overall productivity.

The relatively small number of single farmers hints that family obligations might significantly influence the choice to pursue farming, offering stability but possibly making it tougher for younger, unmarried individuals to break into the field. According to the [18], marital status can affect farming success, as a supportive family environment can lead to better productivity on the farm.

The majority of poultry farmers are Christians, making up 53.3%, while Muslims account for 44.4%, and a small 2.3% practice traditional worship. This religious diversity among farmers suggests that poultry farming is a shared activity that bridges different faiths and is widely accepted. This could be significant for community-based poultry farming initiatives, where it's important to handle religious differences with care.

In agricultural settings, religious beliefs can impact work ethics, community cooperation, and the embrace of modern farming practices [19].

Most of the poultry farmers have between 14 to 20 years of formal education, making up 42.4% of the group, while 13.3% have completed 7 to 13 years. On average, farmers have about 9.6 years of formal education. This indicates that a good number of them possess a moderate level of education, which likely helps them adopt modern agricultural techniques and be more receptive to new practices. However, there's still a notable portion, 3.3% who only have a primary education, which might hinder their access to vital technical information or financing options. This highlights the urgent need for targeted training and educational programs, particularly for those with lower educational backgrounds, to boost productivity and efficiency in poultry farming. According to [21], education, especially through agricultural extension services, is essential for enhancing farm productivity and ensuring the agricultural sector thrives.

A significant number of the poultry farmers have families that consist of 1 to 5 members (68.33%), while a smaller group has larger households with 6 to 10 members (29.17%). The trend of smaller household sizes suggests that farming families might not be relying much on their children for labour, which could lead to a greater reliance on hired help or machinery. On the flip side, larger households may have more family members pitching in with farm work, which could help lower labour costs. Additionally, bigger families might face a greater demand for resources and access to essential services like healthcare, education, and housing. According to [19], household size is tied to economic factors, indicating that larger families may experience more financial strain, while smaller households could enjoy a higher income per person.

A significant portion of the poultry farmers (35.6%) are involved in civil service, and 33.3% are working in artisan roles, leaving just 16.7% who consider farming their primary occupation. This trend suggests that for many, poultry farming is more of a secondary occupation, especially in urban or semi-urban areas. It appears that there's not enough full-time focus on agriculture, which might be limiting the sector's growth and innovation. The [20] notes that many farmers in developing countries often have multiple income streams, which helps them be more resilient but also makes them less likely to fully commit to agricultural enterprises.

Layers are the most commonly raised poultry, representing 42.2% of the total, while broilers make up 26.7%, and a mix of both types accounts for 31.1%. The strong emphasis on layers suggests that egg production is a key part of the poultry sector in the study area. By raising both layers and broilers, farmers can diversify their offerings, which helps them adapt to the market's demand for meat and eggs.

This trend underscores the necessity for farmers to be flexible and adjust their operations according to evolving consumer preferences and market prices.

Table 2. Socioeconomic characteristics of the poultry farmers (n = 90)

Gender	Frequency	Percentage
Male	60	66.7
Female	30	33.3
Age (Years)		
20-29	3	3.3
30-39	8	8.9
40-49	32	35.6
50-59	34	37.8
60-69	13	14.4
Mean	50.00 years	
Marital status		
Single	6	6.7
Married	71	78.9
Divorced	4	4.4
Separated	4	4.4
Widowed	5	5.6
Religion		
Christianity	48	53.3
Islam	40	44.4
Traditional worship	2	2.3
Years of formal education		
1-6	3	3.3
7-13	12	13.3
14-20	38	42.4
Mean	9.60 years	
Household size		
1-5	82	68.33
6-10	35	29.17
11-15	3	2.50
Mean	5 persons	
Primary occupation		
Farming	15	16.7
Civil Service	32	35.6
Artisan	30	33.3
Trading	11	12.2
Others	2	2.2
Types of poultry kept		
Layers	38	42.2
Broilers	24	26.7
Both	28	31.1
Management system		
Deep litter	46	51.1
Battery Cage	25	27.8
Both	19	21.1

Contin. Table 2.		
Years of poultry farming experience		
2-11	63	70.0
12-21	23	25.6
22-31	3	3.3
32-41	1	1.1
Mean	10.2 years	
Flock size (Numbers of bird)		
150-1000	79	87.8
1001-5000	9	10.0
5001-10,000	0	0.0
10,001-20,000	2	2.2
Mean	15,000 birds	

Source: Field Survey, 2024.

Most of the poultry farmers, about 70%, have between 2 to 11 years of experience in poultry farming, which shows that many are still relatively new to the field. This points to an industry that's evolving, with farmers actively learning and adapting along the way. A smaller group, around 25.6%, has 12 to 21 years of experience, while only a handful have been in poultry farming for more than 20 years. In fact, just 1.1% of farmers boast 32 to 41 years of experience, suggesting that very few have been around long enough to fully master the challenges or to have a comprehensive understanding of how poultry farming has changed over the years. With an average of 10.2 years of experience, it seems that most poultry farmers are in the "early to mid-career" stage, likely still honing their skills and adjusting to new practices and technologies.

Most of the poultry farmers, about 87.8%, are operating farms with between 150 and 1,000 birds. This shows that the majority are engaged in relatively small-scale poultry operations. It aligns well with the typical profile of smallholder farmers, who often deal with various resource challenges, such as limited access to capital, technology, and infrastructure. On the other hand, a smaller group of farmers, around 10%, manage between 1,001 and 5,000 birds, hinting that there's a handful of farmers starting to transition into medium-scale operations, although they still represent a minority. Only a tiny fraction, about 2.2%, have flocks ranging from 10,001 to 20,000 birds, which indicates that large-scale commercial poultry farms are quite uncommon in this sample. The lack of farmers with 5,001 to 10,000 birds suggests that mid-sized operations might be scarce or still developing. The average of 15,000 birds likely skews higher due to the presence of those larger farms in the sample, even though most farmers are small-scale.

Awareness and practices of biosecurity measures among the poultry farmers

Table 3 presents the distribution of poultry farmers according to how long they've been aware of bio-security measures.

A significant majority, 71.1%, have been aware for just 1 to 10 years, which hints that these measures have only recently started to catch their attention. On average, farmers have been aware of bio-security for about 12.30 years, meaning that the typical poultry farmer has had this knowledge for just over a decade. Only 25.6% of farmers have been aware for 11 to 20 years, and a mere 3.3% have been in the loop for 21 to 30 years.

This trend suggests that many poultry farmers are still catching up on bio-security practices. Given that a large chunk of farmers (71.1%) have less than a decade of awareness, it's clear that more training and awareness programs could play a crucial role in enhancing their understanding and practices regarding bio-security. The small percentage (3.3%) of farmers with 21 to 30 years of awareness might imply that bio-security hasn't been a top priority in the poultry industry, highlighting the need for better integration of these measures into long-term farming practices

Table 3. Distribution of the poultry farmers according to their awareness/practices of bio-security measures

Years of awareness	Frequency	Percentage
1-10	64	71.1
11-20	23	25.6
21-30	3	3.3
Total	90	100

Mean= 12.30 years

Source: Field Survey, 2024.

Level of use of bio-security measures among poultry farmers

Table 4 shows the spread of bio-security scores among poultry farmers, providing information on the bio-security measures they have in place. A significant portion of farmers, about 71.1%, scored between 26 and 30, with an average score of 27. This points to the fact that most poultry farmers are maintaining a moderate level of bio-security. The smaller number of farmers scoring in the 31-35 range suggests that only a handful have adopted the highest bio-security standards, while the larger group in the 20-25 range indicates that some farmers are operating with lower bio-security practices. With an average score of 27, it's clear that bio-security is somewhat prioritized, but there's definitely room for improvement.

The fact that many farmers fall within the 26-30 score range shows that bio-security is taken seriously by most, yet it may not be fully aligned with the best practices in the industry. While measures like quarantining new birds, controlling farm access, and disinfecting equipment are likely in place to some extent, there may still be gaps, particularly in disease prevention and management. The notable number of farmers in the 20-25 range suggests that some are working with minimal or incomplete bio-security measures, putting them at a higher risk for disease outbreaks that could jeopardize poultry health and overall farm productivity.

Bio-security measures play a vital role in poultry farming, helping to ward off diseases like avian influenza and Newcastle disease, which can spread like wildfire in farms that aren't well-protected. Farmers with lower bio-security ratings are at a greater risk of disease outbreaks, which can lead to significant financial losses [22]. There's a clear connection between improved bio-security and the financial health of poultry operations. Farms that prioritize strong bio-security practices often see a drop in costs related to disease outbreaks, including veterinary bills, bird losses, and production hiccups [23]. The presence of farmers with lower bio-security scores highlights the need for training programs that boost awareness and encourage the adoption of best practices. Extension services could be instrumental in helping farmers grasp the importance of various bio-security measures and how to put them into action effectively.

According to the [22], it's vital to have effective biosecurity measures to stop infectious diseases from entering and spreading in poultry. These measures involve managing the movement of people and animals, keeping equipment sanitized, and ensuring the farm is clean. The World Organization for Animal Health [23] states that farms with strong biosecurity practices are more resilient against the economic and productivity losses that can occur during disease outbreaks like avian influenza.[22] also found that smallholder farmers often face hurdles in putting strict biosecurity measures into practice due to limited resources, insufficient knowledge, and inadequate infrastructure. This is reflected in the moderate biosecurity scores in the Table, which show that while many farmers implement some biosecurity practices, fully adopting them can be challenging. A report from the [24] highlights the importance of education and extension services in boosting farmers' biosecurity knowledge and practices. Farmers with limited access to these services often score lower in biosecurity, as seen in the 20-25 score range.

Table 4. Level of use of bio-security measures among poultry farmers

Bio-Security Scores	Frequency	Percentage
20-25	24	26.7
26-30	64	71.1
31-35	7	2.2
Total	90	100

Mean score = 27

Source: Field Survey, 2024.

Multiple regression analysis results

Regression analysis of the variables influencing the practice of bio-security measures by the poultry farmers in the study area is shown in Table 5. The R^2 has a value of 0.66. The results show that the variables in the model account for around 66% of the variation in the utilization of bio-security measures. Given the relatively high value, it may be concluded that the model fits the data well. The Adjusted R^2 is 0.59 in value. This further demonstrates the significance of the factors under study, this value maintains a high fit even after accounting for the number of predictors in the model. The F value is 13.23 and statistically significant at 1% level (p -value < 0.01), indicating that the model as a whole is statistically significant and that the factors analyzed do contribute to explaining the variation of in the use bio-security measures.

The age of poultry farmers does not have a significant effect on their use of biosecurity measures. This is backed up by a high p -value of 0.400, which exceeds the standard significance level of 0.05, indicating that age is not a major factor in adopting these practices. While age may not directly affect a farmer's willingness or ability to implement biosecurity, other factors like education and experience might carry more weight. Although older farmers could be less inclined to adopt new practices, in this case, age does not appear to be a significant determinant.

Years of formal education has a strong and positive influence on farmers' use of biosecurity measures. With an impressive t -value of 16.66 and a p -value below 0.01 (0.000), this factor plays a significant role in how biosecurity is practiced among the farmers. It seems that the more educated someone is, the better they are at putting biosecurity measures into practice.

Education really drives the adoption of best practices, including those related to biosecurity. Farmers who have higher education levels tend to be more aware of the importance of biosecurity and are better equipped to implement the necessary steps. Similar conclusions were drawn by [18], highlighting how crucial education is for raising awareness about agricultural practices and biosecurity.

Poultry farming experience plays a crucial role in how well farmers practice biosecurity measures. With a high t-value of 11.31 and a p-value of 0.000, this factor has a significant effect. Farmers who have spent more years in the field are usually better at implementing effective biosecurity practices. Their experience helps them understand the various risks tied to poultry farming, like disease outbreaks. Consequently, these seasoned farmers are more inclined to take steps to prevent illness and keep their farms healthy. As noted by [21], those with more experience tend to be more proactive in embracing improved practices, based on their knowledge of the farming landscape and the associated risks [26].

The number of years a farmer has been aware of bio-security measures does not affect how they use those measures, as shown by the p-value of 0.692, which is well above the 0.05 significance threshold. Even if farmers have known about bio-security for a long time, it does not mean that they have put these practices into action effectively. Simply being aware is not enough to motivate farmers to adopt bio-security measures. Other elements, like access to resources, proper training, or incentives, might play a bigger role in turning that awareness into real action.

Flock size does not play a big role in how bio-security measures are used, as shown by the p-value of 0.669. Larger flock size does not mean that the bio-security practices will be any better or worse. The fact that it is not significant indicates that the size of the poultry operation does not directly influence whether bio-security measures are adopted. Smaller farms can be just as likely to implement these measures as their larger counterparts. This suggests that things like education, experience, and outside support might matter more important than the size of the farm itself.

The number of extension visits has a negative influence on the practice of bio-security measures, as highlighted by a p-value of 0.000. The negative coefficient of -0.089 suggests that, rather unexpectedly, an increase in extension visits may not be effectively encouraging bio-security practices. One interpretation could be that extension services are not sufficiently focused on bio-security or may not be effectively reaching farmers.

Table 5. Results of multiple regression analysis

Variables	Coefficient	Standard error	t-value	Probability
Age (X ₁)	0.002	0.006	0.40	0.400
Years of formal education (X ₂)	0.110	0.006	16.66	0.000***
Years of poultry experience (X ₃)	0.147	0.013	11.31	0.000***
Years of awareness of bio-security measures (X ₄)	-0.006	0.016	-0.40	0.692
Flock size(X ₅)	-7.16e-06	0.000	0.43	0.669
Extension visits (X ₆)	-0.089	0.022	-4.30	0.000***
Constant	1.883	0.355	5.31	0.000

R²= 0.66, Adjusted R²= 0.59, F value= 13.46 *Significant at 1% level,
Source: Data Analysis, 2024.

Alternatively, farmers might be getting extension visits that emphasize other farming areas, such as crop cultivation or general management, instead of bio-security. There could also be issues with how extension services communicate bio-security measures or the quality of these visits.

CONCLUSIONS

The poultry farming industry in the study area shows a mix of average educational achievement and a heavy reliance on family support. Nonetheless, there is a distinct need for better integration of bio-security practices, especially through enhanced education and improved extension services. Also, gender imbalance and the prevalence of small-scale operations create additional challenges. Thus, the following are recommended;

1. There is a need to promote women involvement in poultry farming through the implementation of policies and initiatives that will encourage them, especially in access to resources, training, and financial support.
2. Extension services should be revised and improved to focus on biosecurity practices, and make them reach the poultry farmers promptly and effectively.
3. Poultry farmers with low educational background should be trained to boost their capacity to adopt biosecurity measures.
4. Poultry farmers should be supported to facilitate their transition from part-time to full-time poultry farming by giving them access to capital, resources, and training.

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ISPITIVANJE SOCIO-EKONOMSKIH FAKTORA I PRAKSI BIOSIGURNOSTI IZMEĐU UZGAJAČA ŽIVINE U DRŽAVI OSUN, NIGERIJA

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Apstrakt: Industrija živinarstva suočava se sa značajnim izazovima uzrokovanim bolestima, što naglašava važnost biosigurnosti u zaštiti farmi.

Ovo istraživanje analizira socio-ekonomske karakteristike i prakse biosigurnosti između uzgajivača živine, pri čemu otkriva izraženu rodnu neravnotežu, -većina farmera su muškarci, što ukazuje na ograničeno učešće žena u živinarstvu.

Većina uzgajivača je u braku, a porodična podrška ima ključnu ulogu u poslovanju. Farmeri uglavnom imaju srednji nivo obrazovanja koji im omogućava sprovođenje biosigurnosnih mera, a većina se bavi malim obimom proizvodnje, sa 150 do 1.000 jedinki živine, i poseduje između 2 i 11 godina iskustva u živinarstvu.

Ipak, iako uzgajivači poseduju osnovno razumevanje biosigurnosti, mnogi nemaju dovoljno praktičnog iskustva, što ukazuje na potrebu za dodatnom obukom i podizanjem svesti.

Rezultati regresione analize pokazuju da obrazovanje i iskustvo pozitivno utiču na usvajanje biosigurnosnih praksi, dok učestalost poseta poljoprivrednih savetodavaca ima negativan uticaj na njihovu primenu.

Poboljšanje obrazovanja, ciljane obuke i unapređenje pristupa savetodavnim uslugama mogli bi značajno doprineti većem prihvatanju biosigurnosnih mera, čime bi se povećala produktivnost i održivost proizvodnje na živinarskim farmama .

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