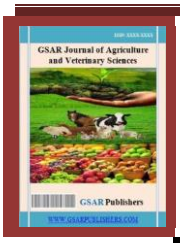

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# LEVEL OF EXPOSURE TO RISK AMONG POULTRY AND PIGGERY FARMERS IN ENUGU STATE, NIGERIA

**By**

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***Abstract***

*The study assessed the level of risk exposure experienced by poultry and piggery farmers in Enugu State, Nigeria. A multi-stage sampling procedure was used to select a sample size of 216 poultry and piggery farmers. However only 205 (108 poultry and 97 piggery) farmers responded accurately to the interview schedule. The interview schedule was administered using kobo collect android data collection application. Variables were analysed using frequency and independent t-test. The result showed that disease outbreak was high risk for poultry and piggery farmers with a risk rating of 13 and 12 respectively. Both farmers (poultry risk rating = 13, 12) and (piggery risk rating = 14, 11) were exposed to a high level of economic/financial risk in the area of theft and high interest loan respectively. There was no significant difference (t = -0.201 p=0.841) in the level of risk exposure between poultry and piggery farmers. The study concluded that poultry and piggery farmers were exposed to similar risk levels, and recommended that The ADP's should increase the presence of extension agents in rural areas to provide guidance, training, and support on best practices in livestock management and risk mitigation.*

***Keywords**: Risk exposure, poultry and piggery farmers*

## Introduction

Risk is an important aspect of the farming business. The uncertainties inherent in weather, yields, prices, government policies, global markets and other factors that impact farming can cause wide swings in farm income, (United States Department of Agriculture Economic Research Service, 2023). Every day, farmers make decisions that impact their operations. Often, these decisions are influenced by elements that are difficult to forecast with perfect accuracy, which carries a risk. As farmers grow more; commercial farming got riskier. To more effectively predict issues and minimize consequences, farmers must comprehend risk and possess risk management abilities. This requires farm risk assessment.

Risk assessments are prepared to develop a holistic management strategy. Assessing risk involves knowing how likely it is that each possible hazard would occur, and what is their expected impacts in terms of farm production or income losses. (Food and Agricultural Organization of the United Nations, FAO, 2019). This procedure is an essential step in putting a safe and healthy management system in place. Among the different sectors of agriculture for which safe and healthy management is required is the piggery and poultry industry.

The piggery and poultry sector, like other sectors in agriculture are exposed to risk. These livestock sectors play important role in the global food production. Poultry production is the primary livestock production for most rural households, and as a result, it creates job and employment opportunities that enhance the income of poor households (Ayoo, 2021). In addition, poultry and pig production contribute to poverty alleviation and increased food security by increasing the need for alternative sources of food (Sayori, et al. 2023). But as important as the sector is, it is also faced with challenges, risks and uncertainties that affect its productivity, sustainability and profitability. Some of the major risks associated with piggery and poultry farming include the spread of diseases leading to death and loss of animals in most cases. Some other risks include market

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fluctuation, unavailability of feeds, unaffordability and unavailability of vaccines. For piggery and poultry farmers to be able to manage and handle risks effectively, they have to be aware and knowledgeable about risks and also acquire risk management skills that will help identify problems and mitigate outcomes (Adeyonu, Abiodun, Enoch, Funmilayo, 2021).

The awareness and knowledge associated with livestock sector is particularly essential for farmers in south-east Nigeria. For example, Enugu has suitable climatic conditions that encourage the rearing of birds and pigs, making it a promising area to carry out these farming activities. As a major source of livelihood activity in the zone, it is pertinent that farmers and prospective farmers should know the risks involved in these sectors and they should also be aware of possible ways to mitigate it. Researches carried out on piggery and poultry production in Enugu state vary from biological to socioeconomic factors that affect production in both sectors. Some of these studies include Economics of Piggery Enterprise in Nigeria: A Case Study of Udi Local Government Area of Enugu State, Nigeria (Onyekuru et al, 2020), Technical Efficiency of Pig Production in Enugu North Agricultural Zone of Enugu State, Nigeria (Ume et al, 2018), Epidemiology of gastrointestinal worm infections in pigs reared in Enugu State, Nigeria, (Bernard et al, 2021), A study of poultry farms in Enugu State Nigeria and mapping of their mechanization needs using Global Positioning System (GPS) and Geographical Information System (GIS) (Ani et al, 2018) amongst many others.

On the other hand, studies on risk and risk management in Enugu State seem to have focused on the impact of risks in agriculture as an economic sector and ways to manage or mitigate risks. These studies do not have a particular focal point (like a kind of livestock or crop) with which they concentrated on. Studies like Smallholder Farmers Risk Management Strategies and Livelihood implications: Evidence from Nsukka Local Government Area, Enugu State (Amaechi, et al, 2021) centralized on risks in general agriculture. This creates a gap about the levels of exposure to risk among farmers in these industries irrespective of the importance of poultry and pig farming. There seems to be lack of comprehensive studies examining the levels of exposure to risk among poultry and pig farmers. Hence this study was carried out to fill the empirical gap. Specifically the study:

1. assessed the level of risk piggery and poultry farmers were exposed to; and
2. determined the difference between the level of risk piggery and poultry farmers were exposed to.

## Methodology

The study was carried out in Enugu state, Nigeria. The state lies between the geographic coordinates $6.5364^0$N and $7.4356^0$E. The state has six (6) Agricultural zones with eight (8) blocks in each of the zones and eight (8) circles in each block. Piggery and poultry farming is common in the state. The population of the study comprised of all poultry and piggery farmers in the State. A multi-stage sampling procedure was used to select the sample size. In the first stage, three (3) agricultural zones (Udi, Nsukka, and Enugu-Ezike) were purposively selected because of their rural nature and involvement in different farming activities. In the second stage, three (3) agricultural blocks were randomly selected from each of the zones, giving rise to nine (9) blocks. In the third stage, two (2) circles were also selected randomly from each of the nine (9) blocks. Giving rise to a total of eighteen (18) circles that was used for this study. In the fourth stage, a snow-ball sampling technique was used to select six (6) piggery and six (6) poultry farmers from each of the eighteen (18) selected circles which amounted to a total of a hundred and eight (108) piggery farmers and hundred and eight (108) poultry farmers which gave rise to a grand total of two hundred and sixteen (216) respondents for this study. However, only 205 responses were returned accurately and used for the analysis. Data were collected using a structured interview schedule which was administered using kobocollect android application. Data on the level of risk were obtained using the risk matrix. The risk matrix was based on two (2) intersecting factors, which is the likelihood of the risk event and its severity. The likelihood of occurrence was categorized as follows; extremely unlikely (1), unlikely (2), likely (3), very likely (4), extremely likely (5). While the severity was categorized as; trivial injury or property damage (1), minor and first aid injury (2), responsible incident (3), major injury (4), fatality (5) The respondents were asked to rate the likelihood and severity of each hazard. The ratings of each hazard was multiplied by the rating of each severity, and the results gotten from the multiplication gave the risk rating. Ratings between (1-4) were categorized as low risk, medium risk (5-10), and high risk (11-25) (figure 1). Variables were analyzed using frequency and independent sample T-test. IBM SPSS was the statistical software used.

| likelihood of occurrences | Severity | | | | |
|---|---|---|---|---|---|
| | Trivial injury or property damage (1) | Minor and first aid injury (2) | Responsible incidents (3) | Major injury (4) | Fatality (5) |
| Extremely likely (5) | 5 | 10 | 15 | 20 | 25 |
| Very likely (4) | 4 | 8 | 12 | 16 | 20 |
| Likely (3) | 3 | 6 | 9 | 12 | 15 |

*Corresponding Author: **Arigbo, Precious Obinna.**

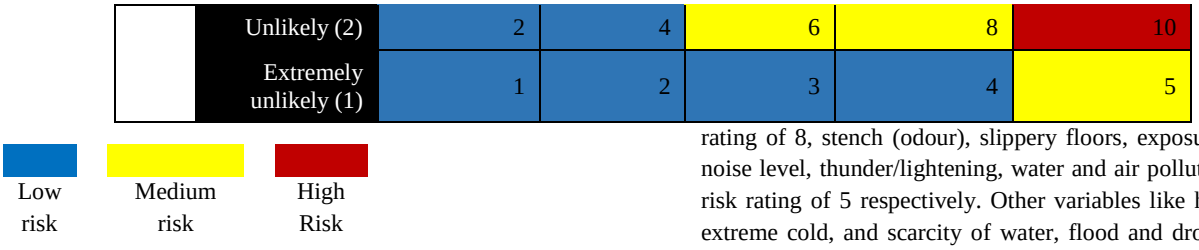


**Figure: 3 Risk Assessment Matrix**

## Results and discussion

## Assessment of respondents' risk level

**Biological risk level**

Result in Table 1 shows that disease outbreak was a high-risk for poultry farmers with a risk rating of 13. This might be as a result of lack of proper regulation in the poultry sector which in turn leads to the importation of different kinds of bird which include breeds that have low disease resistance. This agrees with the findings of Baruwa and Adesuyi (2018) who found that disease outbreak was the most worrisome of all the risks faced by livestock farmers. Furthermore, Table 1 shows that low fertility was a medium risk with a risk level 7, high morbidity and zoonotic diseases were medium risk with a risk rating of 6 respectively. Other medium risks include improper vaccination, predators and antibiotic resistances with a risk rating of 5 respectively. However, Table 1 shows that parasitic infestation was a low risk with a risk rating of 4, unavailability of veterinary services and allergies were low risks with a risk rating of 4 respectively. The mean risking rating for biological hazards in poultry was 5.9. This implies that poultry farmers face a medium (moderate) level of biological risk in the study area.

Conversely, the result in Table 1 shows that disease outbreak posed a high biological risk with a risk rating of 12 in piggery. This finding is relative to that of Afolabi et al, (2022) and Azeez et al, (2021) which stated that the most common risks faced by pig farmers in Nigeria are disease outbreaks and excessive heat. However, the result in Table 1 shows that the respondents experienced medium level of biological risk in the following: low fertility with risk rating of 6, high morbidity with a risk rating of 5 and allergies with a risk rating of 5. This result is expected because many people find the odour from pigs very offensive and some are allergic to it. On the contrary, several variables under the biological risk were low risk. These include zoonotic disease, parasitic infestation, improper vaccination programme, antibiotic resistance, predators and unavailability of veterinary services. The implication is that the frequency of occurance and the severity at which pig farmers experienced either of these hazards were low. The mean level of biological risk was 5.2. This implies that piggery farming poses a medium risk level.

## Environmental risk level

The result in Table 1 shows that none of the variables under environmental risks was a high risk as none of the risk ratings was above 10. However, poultry farmers experienced medium environmental risk in the following areas: dust with a risk rating of 8, stench (odour), slippery floors, exposure to high noise level, thunder/lightening, water and air pollution with a risk rating of 5 respectively. Other variables like heat stress, extreme cold, and scarcity of water, flood and drought were low risk with a risk rating of 3 respectively. This finding agrees with Adeyonu et al, (2021) that flooding was one of the least risk rating experienced by poultry farmers. The mean level environmental risk for poultry farming was 4.3. This implies that poultry farming poses a low level of risk in the study area.

Similarly, the result in Table 1 shows that none of the pig farmers experienced a high environmental risk level, and like the poultry farmers, the medium environmental risk level experienced by pig farmers were thunder/lightening with a risk rating of 8, exposure to high noise level with a risk rating 7, slippery floor and dust with a risk rating 6 and water and air pollution with a risk rating of 5. On the other hand, the pig farmers experienced low risk in the following: heat stress and extreme cold with a risk rating of 4 respectively. Water scarcity had the lowest risk rating of 3. This implies that frequency at which the farmers experienced water scarcity and the severity whenever it happens is very low. This finding is relative to that of Afolabi et al, (2022) and Azeez et al, (2021) which stated that the most common risks faced by pig farmers in Nigeria were disease outbreaks and excessive heat. The mean level of environmental risk was 4.75 approximately 5. This means that piggery poses a medium level of environmental risk.

**Table 1Biological and environmental risk assessment**

| Variable | Poultry Respondents | | Piggery Respondents | |
|---|---|---|---|---|
| | Risk Rating | Risk Level | Risk Rating | Ris |
| **Biological Hazards** | | | | |
| Disease outbreak | 13 | High risk | 12 | High risk |
| Low fertility | 7 | Medium risk | 6 | Medium risk |
| High morbidity | 6 | Medium risk | 5 | Medium risk |
| Zoonotic diseases | 6 | Medium risk | 4 | Low risk |
| Improper vaccination programmes | 5 | Medium risk | 4 | Low risk |

*Corresponding Author: **Arigbo, Precious Obinna.**

| | | | | |
|---|---|---|---|---|
| Predators | 5 | Medium risk | 4 | Low risk |
| Antibiotic resistance | 5 | Medium risk | 4 | Low risk |
| Parasitic infestations | 4 | low risk | 4 | Low risk |
| Unavailability of veterinary services | 4 | low risk | 4 | Low risk |
| Allergies | 4 | Low risk | 5 | Medium risk |
| **Mean** | **5.9** | | **5.2** | |
| **Environmental Hazards** | | | | |
| Dust | 8 | Medium risk | 6 | Medium risk |
| Stench | 5 | Medium risk | 4 | Low risk |
| Slippery floors | 5 | Medium risk | 6 | Medium risk |
| Exposure to high noise level | 5 | Medium risk | 7 | Medium risk |
| Thunderstorms/lightening | 5 | Medium risk | 8 | Medium risk |
| Water and air pollution | 5 | Medium risk | 5 | Medium risk |
| Inadequate farm space | 4 | Low risk | 4 | Low risk |
| Heat stress | 3 | Low risk | 4 | Low risk |
| Extreme cold | 3 | Low risk | 4 | Low risk |
| Scarcity of water | 3 | Low risk | 3 | Low risk |
| Flood | 3 | Low risk | 3 | Low risk |
| Drought | 3 | Low risk | 3 | Low risk |
| | | | **4.3** | **4.7** |

## Physical risk

Entries in Table 2 show that none of the variables under physical hazards were high risk for poultry respondents. However, the farmers experienced medium risk in 3 out of the 5 variables. They include stress/fatigue with a risk rating of 8, animal attack had a risk rating of 5, injuries had a risk rating of 5. On the other hand cuts and inhalation of poisonous chemicals had the lowest risk level with a risk rating 4. The mean level of physical risk in poultry farming was 5.2. This implies that poultry farming poses a medium physical risk.

On the other hand, Table 2 shows that Piggery respondents also recorded stress/fatigue at a significant level, as a medium risk with a risk rating of 8, while animal attack, injuries and inhalation of poisonous chemicals all had a risk rating of 5 and were classified as medium risks. The mean level of physical risk for piggery respondents was 5.4. This implies that pig farming poses a medium level of physical risk

The result in Table 2 shows that both piggery and poultry farmers were exposed to the same risk level of stress. Stress significantly impacts the health of farm workers both physically and mentally. Headaches, dizziness, digestive problems can be as a result of stress. Backaches, high blood pressure, joint pains and muscle tension can also be as a result of chronic stress while depression, insomnia, anxiety, burnout can be as a result of mental stress (Karbowski et al, 2021). Addressing stress is essential for maintaining the wellbeing of farm workers, and also increases productivity.

## Chemical risk

Table 2 further shows that both poultry farmers and pig farmers were exposed to low risk of chemical hazard. All the variables such as exposure to carbondioxide had a risk rating of 4, exposure to expired drugs, exposure to insecticides, exposure to detergents, and exposure to herbicides had a low risk rating of 3 respectively. The mean level of risk was 3.2 for both poultry and pig farmers. The reason for this low exposure is because activities in poultry and piggery farming do not involve the use of chemicals. However, in rare cases few farmers use herbicides to clear weeds around the farm.

## Economic/financial risk

The result in Table 2 shows that theft and high interest on loan were high economic and financial risks for poultry farmers with a risk rating of 13 and 12 respectively. However, the poultry farmers were exposed to medium risk in the area of high cost of production input and high debt with a risk rating of 6 and 5 respectively. While volatility of market prices, unavailability of credit, and unavailability of agricultural insurance firms had a low risk level with risk rating of 4 respectively. The mean level of economic and financial risk for poultry farmers was 6.8 which fell with the category of medium risk, indicating that the poultry farmers were exposed to medium economic risk.

*Corresponding Author: **Arigbo, Precious Obinna.**

Again, Table 2 shows a similar result for the Piggery farmers. Piggery farmers were exposed to high risk of theft and high interest on loan with a risk rating of 14 and 11 respectively. The farmers were exposed to a medium risk in the area of high cost of production and high debt with a risk rating of 8 and 5 respectively. While volatility of market prices, unavailability of credit, and unavailability of agricultural insurance firms had a low risk level with risk rating of 4 respectively. This study agrees with Obiyong et al, (2019) who found that securing institutional loans for pig farmers is often difficult. The mean level of economic and financial risk for pig farmers was 7.1. This implies that pig farmers were exposure to a medium level of economic and financial risk.

**Table 2 Physical chemical and financial/economic risk assessment**

| Variable | Poultry Respondents | | Piggery Respondents | |
|---|---|---|---|---|
| | Risk Rating | Risk Level | Risk Rating | Risk Level |
| **Physical Risks** | | | | |
| Stress/fatigue | 8 | Medium risk | 8 | Medium risk |
| Animal attack | 5 | Medium risk | 5 | Medium risk |
| Injuries | 5 | Medium risk | 5 | Medium risk |
| Cuts | 4 | Low risk | 4 | Low risk |
| Inhalation of poisonous chemicals | 4 | Low risk | 5 | Medium risk |
| | **5.2** | | **5.4** | |
| **Chemical Risks** | | | | |
| Exposure to carbon dioxide | 4 | Low risk | 4 | Low risk |
| Exposure to expired drugs | 3 | Low risk | 3 | Low risk |
| Exposure to insecticides | 3 | Low risk | 3 | Low risk |
| Exposure to detergents and disinfectants | 3 | Low risk | 3 | Low risk |
| Exposure to herbicides | 3 | Low risk | 3 | Low risk |
| | **3.2** | | **3.2** | |
| **Economic/Financial Risks** | | | | |
| Theft | 13 | High risk | 14 | High risk |
| High interest on loan | 12 | High risk | 11 | High risk |
| High cost of production input | 6 | Medium risk | 8 | Medium risk |
| High debt | 5 | Medium risk | 5 | Medium risk |
| Volatility of market prices | 4 | Low risk | 4 | Low risk |
| Unavailability of credit | 4 | Low risk | 4 | Low risk |
| Unavailability of agricultural insurance firms | 4 | Low risk | 4 | Low risk |
| **Mean** | **6.8** | | **7.1** | |

**Difference between the level of risks for poultry and piggery farmers**

The result in Table 3 shows that there was no significant difference (t = -0.201 *p*=0.841) in the level of risk exposure between poultry and piggery farmers. The mean values for poultry (M=200.81, SD=70.38) and for piggery (M=202.83, SD=73.61). The mean score shows that piggery farmers have a slightly higher difference but not significant enough. It is safe to say that both poultry and piggery farmers have similar level of risk exposure. This may be as a result of similar risks like disease outbreak, market price fluctuation, feed costs and many others faced by the farmers which could in turn lead to similar perceptions of overall risk.

**Table 3 Difference in the level of risk exposure between poultry and piggery farmers**

| Enterprise | N | Mean | SD | Mean difference | t | Df | P-value |
|---|---|---|---|---|---|---|---|
| Poultry | 108 | 200.81 | 70.38 | -2.020 | -0.201 | 203 | 0.841 |
| Piggery | 97 | 202.83 | 73.61 | | | | |

## Conclusion and Recommendation

The study concluded that the poultry and piggery farmers were exposed to a high level of risk whenever there is a disease outbreak, however, they had a medium level of biological risk. Similarly both poultry and piggery farmers were exposed to a high level of economic/financial risk in the area of theft and high interest loan. The farmers were exposed to a medium level of physical and economic risk, and low level of chemical risk. There was no significant difference in

*Corresponding Author: **Arigbo, Precious Obinna.**

the level of risk exposure between poultry and piggery farmers. Government, non-governmental organizations and individual organizations should collaborate with financial institutions to develop tailored credit products for small-scale poultry and piggery farmers, with flexible repayment terms and lower interest rates. The Agricultural Development Programmes (ADPs) should increase the presence of extension agents in rural areas to provide guidance, training, and support on best practices in livestock management and risk mitigation.

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