Aceh Journal of Animal Science (2025) 10 (2): 51-56

Aceh Journal of Animal Science

Journal homepage: www.jurnal.unsyiah.ac.id/AJAS

Pig Management and Biosecurity Measures against African Swine-Fever (ASF) Disease: After the outbreak in Lagos State

Ifeoluwa A. Omodewu[1*], Olufunke O. Oluwole[1], Ayodeji Idowu[1], Ajoke Oyegbami[1], Afolarin Bolaji[1]

[1]*Institute of Agricultural Research and Training, Obafemi Awolowo University, Nigeria.*

ARTICEL INFO

Keywords:
Swine
Virus
Nigeria
Farmer
Disease Introduction
Infections

Received: 11 December 2024
Accepted: 30 April 2025

DOI:10.13170/ajas.10.2.43014

ABSTRACT

This study identified management and biosecurity measures taken against ASF disease before and after the outbreak. A total of one hundred and twenty (120) pig farmers from fifteen communities represented the sample population in Lagos State. A structured questionnaire was used to gather information from farmers, and the data obtained were analyzed using descriptive statistics. The results showed that about 34% of respondents experienced the disease outbreak for the first time, while 66% had previously witnessed an outbreak. However, only 53.3% of the total respondents had experienced an ASF outbreak within the last three years. Management-wise, the majority of farms (90.8%) practiced an intensive management system, while the remaining 9.2% practiced a semi-intensive system. Most farmers (69.7%) sourced their water from boreholes. For health and safety, 35.5% of farmers reported burying their waste. Thirty-eight percent (38%) of respondents claimed occasional use of veterinary services for their livestock. It can be deduced from this study that a lack of adequate knowledge and training on biosecurity, the indiscriminate purchase of stock without quarantining, and reliance on water sources other than boreholes predisposed farmers to the disease. In conclusion, farmers are encouraged to establish strict biosecurity protocols, consistently use veterinary services, and ensure appropriate waste disposal to prevent contracting and spreading the disease.

Introduction

The World Animal Health Information System (WAHIS) of the World Organization for Animal Health (WOAH) recently reported 47 domestic pig losses due to African Swine Fever (ASF) in Europe, with no new outbreak report in Africa, America and Oceania during the period of report (2023) (WAHIS, 2023). In Nigeria, the outbreak occurred between 2019 and 2022, impacting numerous farms (FAO, 2021). ASF has been recognized as a global priority due to its severe impact on food security and livelihoods in developing countries (Uwishema *et al.,* 2022; Ogundijo *et al.,* 2023).

African swine fever is caused by a large, double-stranded DNA virus known as the African swine fever virus (ASFV), which primarily replicates in the cytoplasm of infected cells. ASFV is the sole member of the Asfarviridae family and belongs to the genus Asfivirus (Dixon *et al.*, 2021). ASF affects both domestic and wild pigs, leading to high mortality, significant losses for pig producers, and local and international restrictions on pig trade. The primary control measure for ASF outbreaks is the culling of all pigs on affected and neighboring farms, especially in developing countries like Nigeria, where cluster farming is common (Adedeji *et al.*, 2022). This disease causes massive losses in the swine production industry, which in turn has ridiculous consequences on the economy worldwide. It has become a concern in pig health, welfare, and also possesses detrimental impacts on biosecurity and on farmers' livelihoods. One of the current ways of preventing the disease is through well-structured biosecurity measures because no vaccine has been developed yet to combat the virus in Nigeria.

* Corresponding author.
Email address: omodewuifeoluwa@gmail.com

Printed ISSN 2502-9568; Electronic ISSN 2622-8734

Costard *et al.* (2009) and Bedekelabou *et al.* (2022) defined biosecurity as a series of measures that are interconnected with sound husbandry and management practices. The husbandry methods and management approaches employed on farms should be assessed to identify effective hygienic practices that are suitable for Nigeria's pig farming operations. Ogundijo *et al.* (2023) reported that farmers were not sufficiently prepared to prevent ASF from infecting their farms, and due to low biosecurity measures and a lack of readiness to implement strict protocols, there is a risk of a future ASF epidemic that could result in even greater economic losses. Omowon *et al.* (2019) also reported that farmers' management and biosecurity practices remained inadequate, potentially leading to a high risk of future infections and repeated disease outbreaks. Nigeria is one of Africa's leading pig-producing countries, with 298,000 metric tonnes of pork produced in 2019. Over the past decade, the country's pig industry has grown by 40%, according to the Pig Farmers Association of Nigeria (PFAN) (Kinsley, 2020). The current pig population in Lagos State is challenging to determine precisely, but estimates suggest it could be around 1 million. Oke Aro Farms, the largest pig farm cluster in West Africa, plays a significant role in the state's pig farming industry (Kinsley, 2020).

Therefore, it is pertinent to identify the management practices and biosecurity measures put in place before and after the outbreak in Lagos to curtail future ASF outbreaks and determine stop gaps in the biosecurity architecture.

Materials and Methods

The Study Area

The study was carried out in Lagos State, Nigeria. The state is located in the Southwestern part of Nigeria on latitude 6035N and 6.580N, longitude 3.045" E and 3.750E with an estimated population well over 20,665,457 (Adeniyi *et al.*, 2016). The state has a humid tropical climate characterized by distinct dry and wet seasons with moderate mean annual rainfall, which varies between 1381.7 mm and 2733.4 mm (Adeniyi *et al.*, 2016). The state is bounded on the North and East by Ogun State. The state consists of three (Ogundilo *et al.,* 2023) agricultural development zones, namely: the Eastern, far Eastern, and Western zones. Lagos is the most populous city in Nigeria as well as Africa, with an estimated population of 21 million (Ogunbiyi, 2023).

Sampling Procedure

A three-stage (multistage) sampling procedure was used for this study. The first stage involved the purposive selection of all the agricultural zones in the state based on the high number of pig production activities within all the zones. Stage two involved the random selection of five (5) blocks from each of the 3 Agricultural Development Authority zones of Lagos State Agricultural Development Authority (LASADA), and the final stage involved the random selection of eight (8) pig farmers from each block. Figure 1 shows the Lagos research map (Durowoju *et al.*, 2018) in Lagos. A total of one hundred and twenty (120) pig farmers were selected across the state for the study.

Data Collection and Analysis

Information on management systems used, sources of water, and methods of waste disposal was elicited using a well-structured questionnaire. The study was carried out in partnership with the staff of LASADA. Information obtained was subjected to frequency distribution to ascertain the level of pig farmers' involvement using SPSS 20.0.

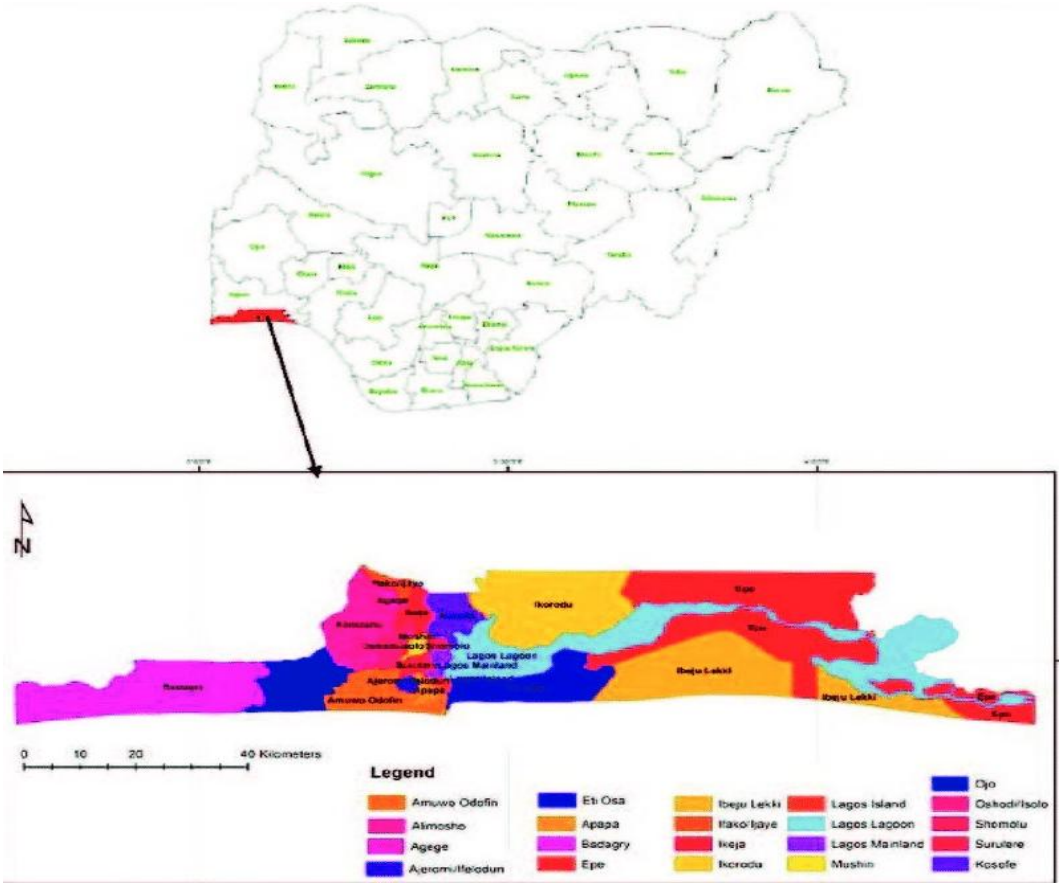


Figure 1. Lagos Research Map (Durowoju *et al.*, 2018)

Results

Figures 2a and 2b respectively show the number of farms that had experienced an ASF disease outbreak before or not, and a number of pigs lost. The results showed that 46.7% of the farms had not witnessed the disease before, while 53.3% had experienced the outbreak of the disease on their farms in the last 3 years, according to Figure 2a. 53.3% of the incidence claimed between 1-30 pigs of the farmers, while 17.1% had between 61-90 pigs affected by the incidence of the ASF in the last 3 years. The study also revealed that a respondent lost between 151-180 pigs due to the outbreak, which had also occurred on his farm in the last 3 years (Figure 2b).

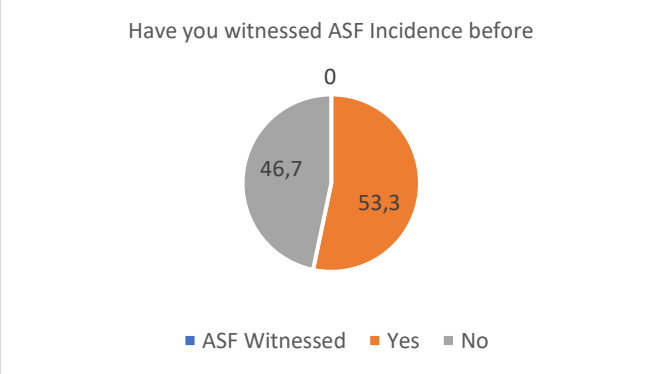


Figure 2a. Farmers who had witnessed ASF incidence before the last attack

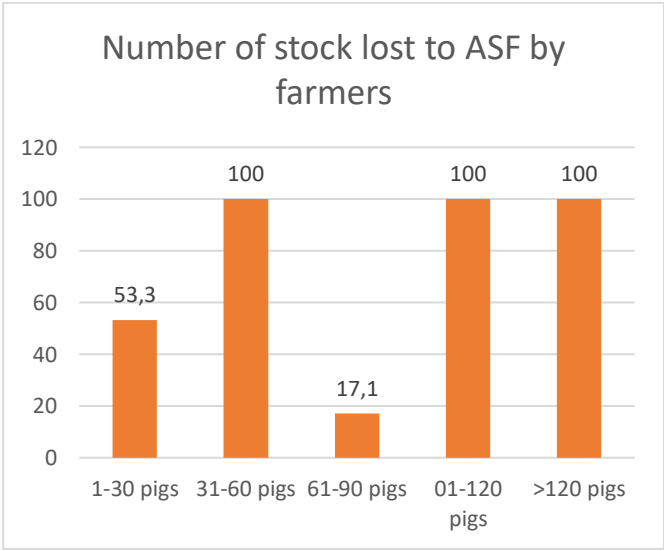


Figure 2b. Number of Pigs Lost to ASF

Figure 3 shows the management system practiced by the respondents. The results revealed that the majority of the farms practiced intensive management (90.8%) system, others (9.2%) practiced semi-intensive system, while none practiced the extensive system of production as shown in Figure 3.

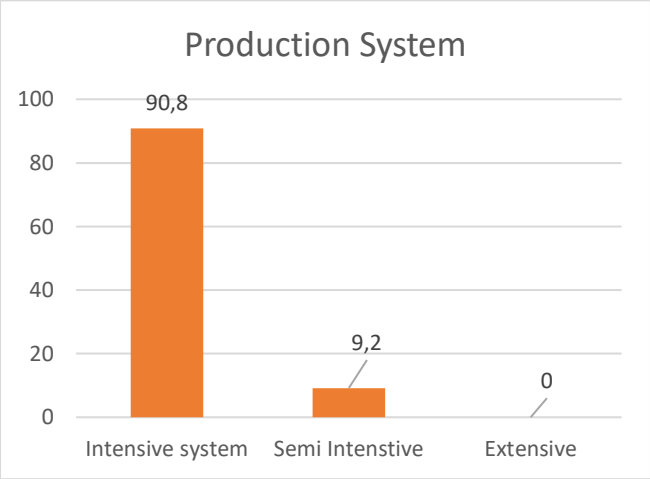


Figure 3. Production System Practiced by the Farmers

Figure 4 shows the source of water as part of health management practices in the prevention of ASF. Figure 4 shows that 69.7% of the farmers' source of water was from the borehole. However, the result also revealed that about 7.9% of the respondents source their water from streams and flowing rivers.

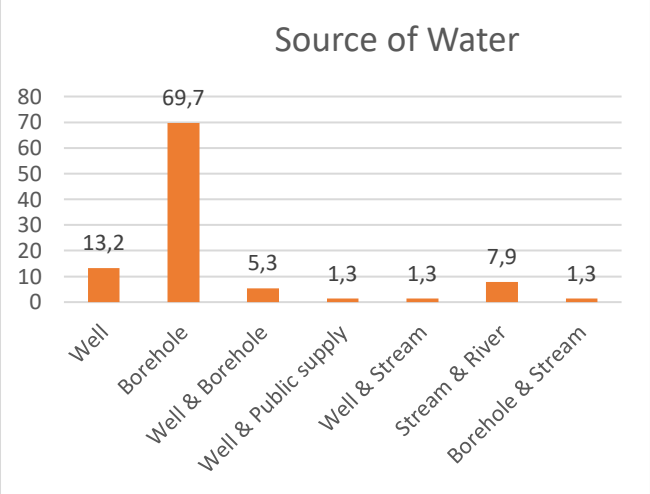


Figure 4. Source of Water as Part of Health Management Practices

The result showing the methods of waste disposal by farmers as a predisposing factor to ASF and means of safeguarding against animal health concerns and ensuring adequate biosecurity is presented in Figure 5. This result revealed that 35% of farmers bury their waste while 28.9% put theirs off through the soak away. However, the result also showed that 5.3% claimed they do not have a specific method of waste disposal.

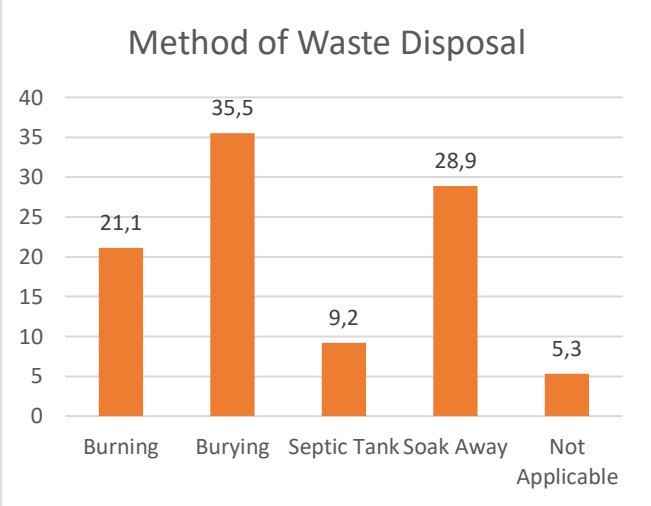
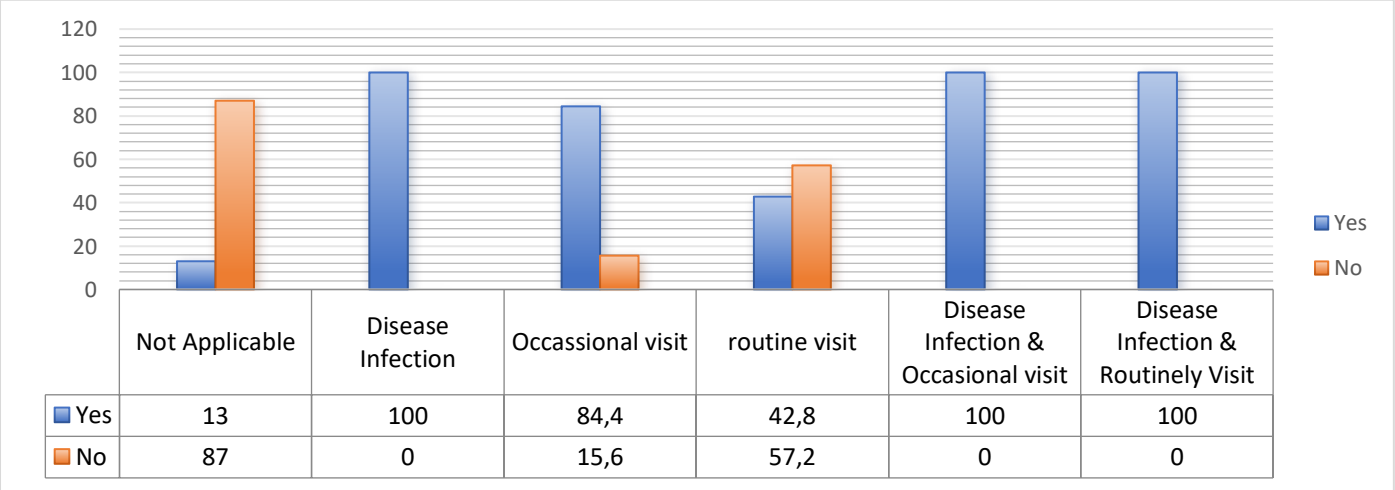


Figure 5. Methods of Waste Disposal

The awareness of veterinary services and the time of consultation is presented in Figure 6. The result revealed that 38% of farmers claimed to be aware of veterinary services for their stock, but seldom make use of them. Farmers who occasionally utilized veterinary services were 84%. 42% of the respondents claimed to routinely consult veterinary services for their stock, while 57% do not. Farmers (100%) claimed to contact veterinary personnel during disease infection



	Not Applicable	Disease Infection	Occassional visit	routine visit	Disease Infection & Occasional visit	Disease Infection & Routinely Visit
Yes	13	100	84,4	42,8	100	100
No	87	0	15,6	57,2	0	0

Figure 6. The awareness of veterinary services

Discussion

The determination of predisposing factors that exposed farmers to the ASF outbreak is of utmost importance due to the economic losses incurred and the source of livelihood affected. The result showed that the number of farms that had experienced an ASF disease outbreak before or not, and the number of pigs lost, was probably due to the majority of the respondents being new to the pig production enterprise and the lack of exposure to specialized training or mentorship before starting the venture. They were also most likely unaware of the standard operational procedures and protocols needed to achieve bio-safety for mitigating against the spread of the disease prior to the outbreak. Hence, the an increase in the probability of disease outbreaks among communal farms. The higher incidence observed in those that had witnessed the disease attack before may be as a result of some farmers still having surviving animals from previous ASF outbreaks that made the pigs carriers of the virus and highly susceptible to the disease. Weak or a lack of adequate bio-security measures could have also exposed the farmers to the disease outbreak. Revealing that inadequate technical know-how played a strong part in the advent of the outbreak. This corroborates the findings of other authors, who reported that there was low readiness in combating the disease (Omowon *et al.*, 2019; Ogundijo *et al.,* 2023). Thusi *et al.* (2023) also reported low knowledge of farmers on some aspects of ASF. Saka *et al.* (2010) in a similar study recorded 88.4% of farmers who had accepted having had incidences of the outbreak of ASF on their farms before. This study is also synchronous with the findings of Ogundijo *et al.* (2023), where only 34% of farmers experienced losses in four states, while 64% did not. In our study, the highest loss was incurred by a farmer with about 151-180 pigs lost to the outbreak. This clearly indicates that the larger the stock size, the higher the impact of the disease attack on farms, and the larger the animals, the higher the economic loss. Large pig herds without proper quarantine protocols for new replacement stock and strict internal biosecurity measures are at greater risk of African Swine Fever (ASF) infection through the introduction of asymptomatic pigs. It is recommended to strictly adhere to biosecurity measures and minimize movement on pig farms. Awosanya *et al.* (2015) reported that the association between ASF, herd level, sero-prevalence, and source of replacement stock, as well as the effect of herd size on the season of sample collection, has implications for understanding ASF transmission and developing control strategies in Nigeria.

The practice of majorly intensive management system falls in line with the findings of several reports (Ironkwe and Amefun (2008), Nwachukwu and Udegbunam (2020), Ogundijo *et al.* (2023) and Ekakoro *et al.* (2023) where majority of farmers practised an intensive system of production. The adoption of the intensive system of management and care must have arisen due to the keeping of exotic breeds of pigs by the majority of the farmers.

The majority of farmers sourcing their water from individual boreholes suggests a less predisposing factor from the water source, as a drilled borehole is safer than open water sources like rivers and streams that could contain contaminants and pollutants, thereby exposing the animals to diseases and infections. However, the 2.6% sourcing their water from both well/public supply and well/stream/flowing rivers poses a risk. As the usage of shared wells and watering materials like fetchers, ropes and buckets as well as clustering around the well to draw water, clearly erodes biosecurity, thereby resulting in an avenue that could be an easy medium for disease transfer from farm to farm, since farm clusters are the most common in the study locations. In the same vein, the usage of water from streams/flowing rivers or public water supply also predisposes animals to diseases, as the water could have been contaminated before getting to the farm/point of usage. It has been reported that water and feed intake can be a possible source of ASF transmission (Niederwerder *et al.*, 2019). Nevertheless, biosecurity of pig farms requires attention to sanitize drinking water from risky sources such as rivers, wells, etc., and ensuring safe storage systems for feed to prevent contamination.

The method of waste disposal by the farmers to evaluate predisposing factors and safeguard against animal health concerns and ensure adequate biosecurity revealed that the use of septic tanks, soakaways, and burying of waste, if properly carried out, could reduce the risk of disease transmission from waste. Proper waste management in this context means far away from the farm, away from water and feed sources, taking into consideration that all the farm equipment used is properly cleaned and disinfected after the exercise. In the case of disposal of dead pigs, it is expected that the pig be examined by a veterinary professional away from the farm in a veterinary clinic or as so prescribed by the veterinary expert/animal diseases diagnostic regulatory agency depending on the severity of the situation and the cause of death be determined to safeguard both human and animals. Just like it was recommended by Omowon *et al.* (2019) that infected carcasses must be burnt or buried in deep graves dug very far away from

the farm and the farm staff and equipment used be thoroughly disinfected to prevent diseases transfer. The result obtained from the awareness of veterinary services and time of consultation calls for increased efforts in sensitization of pig farmers on routine consultation with experts to evaluate the health status and biosecurity standing of their farms thereby safeguarding their farms against disease outbreak.

Conclusions

It can be concluded that non-adherence to strict biosecurity protocols, usage of contaminated water by some farmers, improper disposal of waste and infected animal and their products, as well as the cluster farming system of pig farmers, predisposed them to the disease and re-occurrence of the disease in the study area.

Recommendation

Government enforcement of compliance with biosecurity protocols by the authorized agencies. Also, the discouragement of the cluster farming system of pigs curbs disease transfer from farm to farm. Training of pig entrepreneurs and their farm staff on establishment and compliance to biosecurity protocols to enhance production and prevent disease outbreak and transfer. The development of pig farmers' association in combating the disease, sensitization, and to obtain good breeding and replacement stock from a reliable research institute.

Acknowledgments

The author would like to express sincere gratitude and appreciation for the assistance provided by the LASADA staff during the study.

References

Adedeji, A.J., P.D. Luka, R.B. Atai, T.A. Olubade, D.A. Hambolu, M. A. Ogunleye, C. Masembe. 2022. First-time presence of African swine fever virus genotype II in Nigeria. Microbiol. ResourceAnnouncements, 10(26) e00350-21.

Adeniyi, T.A., O.O. Oyebanji, P.A. Adeonipekun. 2016. Floral Diversity in the wetlands of Ibeju-Lekki Area, Lagos, Nigeria. Ife Journal of Science, 18(3): 729-737

Awosanya, E.J., B. Olugasa, G. Ogundipe, Y.T. Grohn. 2015. Sero-prevalence and risk factors associated with African swine fever on pig farms in southwest Nigeria. BMC Veterinary Research, 11:1-11.

Bedekelabou, A., P.E. Talaki, K.F.X. Dzogbema, M. Dolou, M. Savadogo, M.O. Seko, R.B. Alambedji. 2022. Assessing farm biosecurity and farmers' knowledge and practices concernSing antibiotics and antibiotic resistance in poultry and pig farms in Southern Togo. Veterinary World, 15(7): 1727-1737.

Costard, S., F.J. Zagmutt, T. Porphyre, D.U. Pfeiffer. 2015. Small-scale pig farmers' behavior, silent release of African swine fever virus and consequences for disease spread. Scientific Reports, 5(1): 17074.

FAO. 2021. National agrifood systems and COVID-19 in Nigeria: Effects, policy responses and long term implications. Rome.

Dixon, L.K., P.C. Nash, C.L. Hawes, L. Netherton. 2021. African Swine Fever Virus (Asfarviridae), Editor(s): Dennis H. Bamford, Mark Zuckerman,Encyclopedia of Virology (Fourth Edition), Academic Press, 2021, Pages 22-33.

Durowoju, O.S, J.N. Edokpayi, O.E. Popoola, J.O. Odiyo. 2018. Health Risk Assessment of Heavy Metals on Primary School Learners from Dust and Soil within School Premises in Lagos State, Nigeria. IntechOpen.

Ekakoro, J.E., M. Nawatti, D.F. Singler, K. Ochoa, R. Kizz, D. Ndoboli, D.B. Ndumu, E.M. Wampande, K.A. Havas. 2023. A survey of biosecurity practices of pig farmers in selected districts affected by African swine fever in Uganda. Frontiers in Veterinary Science. 10:1245754.

Ironkwe, M.O., K.U. Amefule 2008. Appraisal of indigenous pig production and Management practices in Rivers state, Nigeria. Journal of Agriculture and Social Research, 8(1): 1-7.

Niederwerder, M.C., A.M. Stoian, R.R. Rowland, S.S. Dritz, V. Petrovan, L.A. Constance, J.T. Gebhardt, M. Olcha, C.K. Jones, J.C. Woodworth, Y. Fang, J. Liang, T.J. Hefley. 2019. Infectious Dose of African Swine Fever Virus When Consumed Naturally in Liquid or Feed. Emerging Infectious Diseases, 25(5): 891-897.

Nwachukwu, C.U., C. Udegbunam. 2020. Rural pig production and pork consumption in Imo State, Nigeria. Nigerian Journal of Animal Science, 22(1): 165-185.

Ogunbiyi, T. 2023. Lagos and the 2023 Census. Vanguard.

Ogundijo, O.A., O.O. Omotosho, A.I. AL-Mustapha, J.O. Abiola, E. J. Awosanya, A. Odukoya, S. Owoichi, O. Oyewo, A. Ibrahim, T.G. Orum. M.B. Nanven, M.B. Bolajoko, P. Luka, O.K. Adeyemo. 2023. A multi-state survey of farm-level preparedness towards African swine fever outbreak in Nigeria, Acta Tropica, 246, 106989.

Omowon, A.A., O.B. Daodu, A.M. Omowon, I.I. Bello. 2019. Knowledge, attitude and practices of pig farmers post African swine fever outbreaks in Ogun and Oyo states of Nigeria. Sokoto Journal of Veterinary Sciences, 17(4): 14 - 24.

Saka, J.O., A.O.K. Adesehinwa, M.K. Ajala. 2010. Incidences of African swine fever (ASF) disease and its associated implication in pig production in Lagos state Nigeria. Bulgarian Journal of Agricultural Science, 16(1): 80-90.

Thusi, N.M., K. Malepe, C.A. Mbajiorgu, J.W. Oguttu. 2023. Knowledge, Attitude and Practices Towards African Swine Fever in Uthukela District, Kwazulu Natal, South Africa: A Community Based Cross-Sectional Study. Applied Ecology & Environmental Research, 21(6).

Uwishema, O., E. Chalhoub, S.C. Zahabioun, C. Khoury, T.H. Al-Saraireh, B.K. Bekele, R.M. Mwazighe, H. Onyeaka. 2022. The rising incidence of African swine fever during the COVID-19 pandemic in Africa: efforts, challenges and recommendations. International Journal of Health Planning and Management, 37(1): 561.

World Animal Health Information System of the World Organization for Animal Health (WAHIS). 2023. African Swine Fever.