Journal of Interdisciplinary Perspectives
ISSN Print: 2984-8288, ISSN Online: 2984-8385
Vol. 2, No. 6, pp. 43-54, June 2024

Impact of African Swine Fever (ASF) Outbreak on the Socioeconomic Status of Backyard Raisers in Aurora Province

Valin Delfin-Bumatay*, Riosahlie Ylar Madrid
Aurora State College of Technology, Aurora, Philippines

*Corresponding Author email: valindelfin@gmail.com

Date received: March 22, 2024
Date revised: April 15, 2024
Date accepted: April 18, 2024

Originality: 97%
Grammarly Score: 99%
Similarity: 3%

Recommended citation:
Bumatay, V. (2024). Impact of African Swine Fever (ASF) outbreak on the socioeconomic status of backyard raisers in Aurora Province. *Journal of Interdisciplinary Perspectives*, 2(6), 43-54. https://doi.org/10.69569/jip.2024.0084

Abstract. Swine raising has global potential, contributing to many countries' development and industrial progress. However, the swine industry faces numerous challenges, and one significant issue affecting its progress is the prevalence of African Swine Fever (ASF). This study investigated the impact of African Swine Fever (ASF) on backyard raisers in Aurora Province. Using a descriptive research design, the study assessed ASF's influence on raisers' socio-economic characteristics, losses, and coping strategies. Conducted in Central Aurora, it involved 55 backyard raisers during the 2019 ASF outbreak, ensuring demographic diversity through total enumeration. The research instrument, an interview guide, covers personal profiles, ASF-related losses, coping strategies, and pre/post-ASF swine-raising experiences. Results revealed that the ASF outbreak led to a significant decrease in input expenditures, while labor costs for technician incentives decreased, and spending on cleaning and disinfection declined. Some raisers resorted to loans with minimal interest, settling them after compensation receipt, while others arranged payments upon stock sales. During the ASF outbreak, caretakers, previously employed by some raisers, were no longer sustained, resulting in a drastic decline in sales. Overall, the study contributes essential insights for targeted strategies to enhance the well-being of backyard raisers in Aurora Province, emphasizing the need for sustainable disease management practices. Additionally, investing in research and development for ASF prevention strategies is advised for long-term sustainability without vaccines.

Keywords: African Swine Fever; ASF outbreak; Backyard raisers; Socioeconomic status; Aurora Province.

1.0 Introduction

Swine raising has global potential, contributing to many countries' development and industrial progress. Countries such as China, the United States, Brazil, and Germany have established thriving swine industries that play a vital role in their economies (FAO, 2019). However, the swine industry faces numerous challenges, and one significant issue affecting its progress is the prevalence of African Swine Fever (ASF) (Patrick et al., 2020), a highly contagious viral disease that affects pigs (Beltran et al., 2019).

ASF has become a major threat to the swine industry globally, causing significant economic losses and impacting the socio-economic status of swine farmers (FAO, 2020). In the Philippines, the swine industry is particularly important in regions and provinces such as Aurora, which is known for its significant engagement in swine production, particularly among backyard raisers. Backyard raisers, who make up a significant percentage of the swine industry in the country (PSA, 2023), are particularly vulnerable to the disease due to limited resources and a lack of knowledge about biosecurity measures (Cooper et al., 2022).

In July 2019, the Philippines reported its first cases of African Swine Fever (ASF) in Rizal province (OIE, 2020), triggering its spread to provinces like Bulacan, Pampanga, Nueva Ecija, and Cavite. The ASF outbreak led to the culling of 300,000 pigs, causing a 20.8% decline in pork production in 2021 (PSA, 2022). This, coupled with elevated

pork prices, adversely affected vulnerable consumers (Cooper et al., 2022). The government responded with policies like the National Zoning and Movement Plan. Inspired by the success of the National Foot and Mouth Disease Eradication Program, the 1-7-10 protocol was implemented, involving rapid culling, surveillance, and testing (Office of the Secretary, 2020).

The swine industry in the Philippines, including Aurora, has been severely impacted by ASF outbreaks, resulting in a decline in swine production and significant economic losses for farmers and other stakeholders. The first case of ASF in Aurora was noted in December 2019. The epidemiology of this virus kills 76 percent of the total swine population of 15,873 heads in the province, where backyard raisers are most affected. Thus, the livelihoods of the raisers, meat vendors, and processors, as well as the overall swine industry in the province, are significantly affected (PVO, 2020). The province of Aurora needs to address the impacts of ASF, particularly among backyard raisers, to mitigate the negative influences on their socio-economic status. Understanding the specific impacts of ASF on backyard raisers in Aurora is essential to developing targeted interventions and strategies to address the challenges they face in the context of ASF.

Despite the importance of this issue, there is a gap in the literature regarding the specific influences of ASF on the socio-economic status of backyard raisers in Aurora. Therefore, this study was conducted to investigate the impact of ASF on the socio-economic status of backyard raisers in Aurora, Philippines. The findings of this study can contribute to the existing body of knowledge and provide insights for policymakers, researchers, and stakeholders in developing effective strategies and interventions to address the challenges faced by backyard raisers in the context of ASF.

2.0 Methodology

2.1 Research Design

A descriptive design was employed to collect relevant data to gain a comprehensive understanding of the socio-economic influences of ASF outbreaks on backyard raisers. Semi-structured interviews were conducted using a carefully designed interview guide to gather information on economic losses, coping strategies, and other relevant variables. Open-ended questions encouraged the participants to express their experiences, challenges, and coping strategies in their own words, allowing for a rich and in-depth exploration of the coping mechanisms of backyard raisers during ASF outbreaks.

2.2 Research Participants

This study was conducted in the four municipalities of Central Aurora in the province which include Baler, Maria Aurora, San Luis, and Dipaculao. The respondents of this study were 55 backyard raisers from the specific barangays of the identified municipalities in the province of Aurora (Table 1). The respondents consist of individuals who were actively engaged in swine raising as a source of income and livelihood, raising at most 20 heads. They were the most affected raisers during the first outbreak of ASF in 2019.

Table 1. Distribution of respondents in Central Aurora

MUNICIPALITY	BARANGAY	NUMBER OF AFFECTED FARMERS
Baler	Buhangin	6
	Pingit	9
	Reserva	4
	Sabang	3
	Zabali	8
Dipaculao	Bayabas	4
	Ipil	1
	Mucdol	2
	Salay	3
Maria Aurora	Barangay 1	2
	Florida	1
	Ramada	3
	San Jose	5
San Luis	Barangay 4	3
	Nonong	1
TOTAL		**55**

Source: Municipal Agriculture Office

To obtain a representative sample from the population, total enumeration was employed. The sample aimed to include a diverse range of backyard raisers in terms of their demographic characteristics, such as sex, educational attainment, household size, occupation, and monthly income level. This ensures that the findings of the study can be generalized to the broader population of backyard raisers in the municipalities and barangays.

2.3 Research Instrument

The research instrument utilized was a self-made interview guide designed to gather data on the influence of ASF on the socio-economic status of backyard raisers in specific municipalities and barangays. The questionnaire consists of multiple-choice and open-ended questions that cover various aspects related to the participants' profiles, losses incurred due to ASF, coping strategies employed, and their experiences in swine raising before and during the ASF infestation. To ensure the accuracy and reliability of the data collected, pre-testing was conducted on ten (10) individuals to maintain consistency in administering the survey instrument.

2.4 Data Gathering Procedure

Initially, a comprehensive list of backyard raisers who were affected by the initial ASF outbreak in 2019 was obtained from the Municipal Agricultural Office (MAO) in Baler, Maria Aurora, San Luis, and Dipaculao. Before the commencement of data collection, formal permissions were diligently sought from the Provincial Veterinary Office (PVO) and subsequently extended to the MAOs of the four aforementioned municipalities. Additionally, a courteous outreach was made to the local barangay officials, where a research permit was presented, and their indispensable assistance was enlisted in identifying and reaching out to the prospective interview participants. During the actual interviews, utmost care was taken to ensure the informed consent of each participant, with a comprehensive consent form provided to clarify the research's objectives and safeguard the rights of those involved. The interview questions were thoughtfully translated into the participants' preferred dialect, Tagalog or Ilocano, to facilitate clear communication and foster a conducive environment for data collection. The interviews were conducted face-to-face.

2.5 Data Analysis Procedure

The data collected from 55 participants were systematically organized, coded, and then entered into statistical software for analysis. This process involved structuring the data into manageable formats and assigning codes to different responses. The use of statistical software facilitated efficient and accurate analysis of data gathered from the participants, enabling the extraction of meaningful insights and conclusions from the study.

2.6 Ethical Considerations

Ethical considerations, such as obtaining informed consent from participants, ensuring confidentiality and anonymity, and adhering to ethical guidelines for research involving human subjects, were followed throughout the study.

3.0 Results and Discussio

3.1 Socioeconomic Characteristics of Backyard Swine Raisers

Table 2 shows the socioeconomic characteristics of the respondents, examining key variables including gender, highest educational attainment, household size, occupation, source of income, monthly income level, the number of heads raised before the outbreak, and the source of capital. These insights provide a subtle understanding of the diverse demographic and economic backgrounds of the backyard raisers central to this research.

Also, swine raisers are nearly evenly split between males and females, with 28 (51%) being male and 27 (49%) being female. It implies that both men and women play crucial roles in swine raising. This finding is supported by the outcomes of a separate study conducted by Bollido, Villaluz, & Orale (2022), where males were identified as the predominant swine raisers.

Additionally, the distribution of educational attainment among the respondents shows that most swine raisers, 15 (27%), have attained a college degree, while 11 (20%) have completed their elementary and secondary education. This finding is supported by the previous study by Perey (2017), which showed that highly educated individuals were more likely to raise swine in their backyards.

Table 2. Socioeconomic characteristics of the respondents

	FREQUENCY	PERCENTAGE
SEX		
Male	28	51
Female	27	49
EDUCATIONAL ATTAINMENT		
elementary undergraduate	3	6
elementary graduate	11	20
secondary undergraduate	8	15
secondary graduate	11	20
college undergraduate	6	11
college graduate	15	27
vocational course diploma	1	2
HOUSEHOLD SIZE		
1 - 3	17	31
4 - 6	33	60
7 - 9	4	7
10 and above	1	2
OCCUPATION		
vending	14	26
farming	16	29
servicing	11	20
government employee	8	15
private sector employee	5	9
none	1	2
SOURCE OF INCOME		
occupation	44	80
farming	22	40
animal raising	4	7
fishing	2	4
overseas Filipino workers	1	2
INCOME LEVEL		
P5000 and below	15	27
P5001 - P10000	21	38
P10001- P15000	7	13
P15001- P20000	7	13
P 20001- P25000	5	9
Above P 25000	15	27
SOURCE OF CAPITAL		
savings	34	62
loan	9	17
lending from relatives and friends	5	9
financial assistance from a government agency	1	2
dispersal from a private organization	3	5
dispersal from a government agency	3	5

Furthermore, the distribution of household sizes reveals that most backyard swine raisers, 60%, fall within the 4-6-member range. The statistical measures further reveal that the mean household size is 4 members, with a standard deviation of 2, indicating that the average household sizes within the study population vary from 4 to 6. This result implies that swine backyard raisers belong to medium-sized families as categorized in the study conducted by Rahman et al. (2014).

Examining the nature of occupations, backyard swine raisers were engaged in a variety of occupations such as farming, 14 (29%), vending, 26 (26%), servicing, 11 (20%), and government employment, 8 (15%). This is contrary to the result of the study by Ritchil et al. (2013) that found the majority were housewives. Occupation is the primary source of income for a substantial majority (44 or 80%). Farming also plays a significant role, with 22 (40%) of the raisers indicating it as a source of income, underscoring the importance of agriculture in the livelihoods of backyard raisers. Animal raising, with four (7%), fishing with two (4%), and one (2%) who relies on income from overseas Filipino work. The results imply that most farmers rely on their work for financial support. The study conducted by Aspile et al. (2016) corroborates this finding.

A significant portion of the backyard swine raisers fall within the P5001-10000 income bracket, representing 21 (38%), while 15 (27%) have monthly incomes both below P5000 and above P25000. Additionally, seven (13%) of

raisers reported incomes in both the P10001-15000 and P15001-20000 categories, showing an even distribution in this middle-income range. Meanwhile, 5 (9%) of the raisers earned between P20001-25000. Generally, the results signify that the swine growers have a marginal gross value not exceeding P180,000 per annum (Aquino, 2020). A significant majority of 34 (62%) rely on personal savings as their primary source of capital. Loans, with 9 (17%), were another notable source of capital; lending from relatives and friends got 5 (9%); private organizations with 3 (5%); and government dispersals with 3 (5%) as well. A smaller percentage of the raisers access financial assistance from government agencies, with 1 (2%). Aspile et al. (2016) cited that the initial capital of the small backyard raisers in their study was drawn from the swine raisers' savings.

3.2 Number of Heads Raised Before the Outbreak

Table 3. Number of heads raised by the respondents

HEADS CATEGORY	FREQUENCY	MEAN	SD
piglets	7	3	2
growers/fatteners	44	15	4
pregnant sow	3	6	5
lactating sow	6	4	3
dry sow	13	2	1

Table 3 displays that growers/fatteners account for the largest proportion raised by 44 farmers, with an average varying from 11 – 19 (mean = 15, sd = 4) heads. Dry sows were raised by 13 farmers, ranging from 1-4 (mean = 2, sd = 1) heads. Piglets were raised by 7 farmers on average, ranging from 1-5 (mean = 3, sd = 2) heads. Lactating sows were raised by 6 farmers, with an average range of 1-7 (mean = 4, sd = 3) heads, and pregnant sows were raised by 3 farmers, with an average range of 1-11 (mean = 6, sd = 5) heads. Out of the 55 respondents, it was observed that the frequency of responses during the interview totaled 73, indicating that some respondents raised multiple stages of swine concurrently. For example, individual farmers mentioned raising piglets, growers/fatteners, pregnant sows, lactating sows, and dry sows, similar to other farmers. However, some respondents exclusively raised either growers or fatteners. Overall, swine raisers maintained an average of 3-9 (mean = 6, sd = 3) heads. Hence, the results denote that growers/fatteners were the most raised hogs in Aurora. This can be accounted for as part and parcel of the total hog produced in Central Luzon, with 42.35 metric tons (PSA, 2023).

3.3 Economic Losses Incurred

This section presents the economic losses incurred by backyard swine raisers who have been significantly affected by the outbreak of ASF.

Amount of Input Incurred

Table 4. Amount of inputs incurred by the respondents

INPUTS		BEFORE ASF OUTBREAK	DURING ASF OUTBREAK
Stocks	mean	11,665	8,930
	standard deviation (SD)	10,581	6,197
	minimum	0	0
	maximum	50,000	35,000
	n	46	22
Feeds	mean	9,080	532
	standard deviation (SD)	6,199	631
	minimum	0	0
	maximum	30,000	3,000
	n	23	46
Medicines	mean	25,618	42
	standard deviation (SD)	23,373	306
	minimum	0	0
	maximum	100,000	2,000
	n	55	13
TOTAL	**mean**	**46,363**	**9,864**
	standard deviation (SD)	**40,153**	**7,134**

Table 4 compares the average amounts of inputs incurred by backyard raisers before and during the ASF outbreak. Before the outbreak, the average amount spent on stocks varied from P1,084 to P22,246 (mean = P11,665, SD = P10,581) as disclosed by 46 raisers. However, during the ASF outbreak, this expenditure decreased to an average varying from P2,733 to P15,127 (mean = P8,930, SD = P6,197) coming from the 22 raisers, suggesting that raisers reduced their investments in stocks during the outbreak due to increased uncertainty and risks.

A similar trend is observed for feeds, with an average expenditure ranging from P2,881 to P15,279 (mean = P9,080, SD = P6,199) as mentioned by 23 raisers and a decrease to an average ranging from zero to P1,163 (mean = P532, SD = P631) during the outbreak based from the responses of 46 raisers. This significant drop in feed expenditures reflects the economic influence of ASF on the backyard raisers' ability to maintain their usual level of input. In line with this, Nguyen et al. (2021) found that the feed industry experienced a 30-50% drop in sales following the ASF outbreak.

For medicines, the average expenditure varied from P2,245 to P48,991 (mean = P25,618, SD= P23,373) before the outbreak as declared by 55 respondents and decreased dramatically to an average ranging from P96 to P708 (mean = P402, SD = P306) during the outbreak as disclosed by 13 raisers. This reduction in spending on medicines could be a result of reduced pig populations due to ASF or a shift in focus from prevention to coping with the outbreak.

In total, the data shows a substantial decrease in the total amount spent on inputs during the ASF outbreak, from an average ranging from P6,210 to P86,516 (mean = 46,36, SD = 40,153) before the outbreak to an average varying from P2,730 to P16,998 (mean = 9,864, SD -= 7,134) during the outbreak. This sharp decline in input expenditures is indicative of the financial strain and challenges faced by backyard raisers in managing their operations during the ASF-related disruptions (Wedzerai, 2022). The standard deviation on the order of a thousand pesos for expenses indicates a notable level of variability in the data. Some of the respondents declared zero expenses as they received stocks and feeds free from close relatives who happened to be their financiers.

Labor Cost

The labor costs incurred by backyard swine raisers before the outbreak revealed the average technician incentives amounted to P391 with a standard deviation of P261, based on the 26 raisers. However, during the ASF outbreak, these costs decreased to an average of P310 with a lower standard deviation of P143, based on 11 raisers. This reduction in labor costs for technician incentives could be attributed to several factors, including decreased pig populations due to ASF, changes in work required during the outbreak, or a general economic impact on labor wages. This finding is supported by the result of the study of Hsu, Montenegro, & Perez (2023).

Indirect Expenses

Table 5. Amount of indirect expenses incurred by the respondents

INPUTS		BEFORE ASF OUTBREAK	DURING ASF OUTBREAK
Disinfectants	mean	275	83
	standard deviation (SD)	676	50
	minimum	0	0
	maximum	5,000	300
	n	38	14
Cleaning	mean	141	83
	standard deviation (SD)	117	50
	minimum	0	0
	maximum	800	800
	n	16	14
Electricity	mean	101	356
	standard deviation (SD)	68	124
	minimum	0	0
	maximum	300	500
	n	35	6
TOTAL	mean	517	848
	standard deviation (SD)	861	344

Table 5 presents data comparing expenditures in a swine farming context before and during the ASF outbreak, focusing on disinfectants, cleaning, and electricity. Before ASF, the total average varied from P344 to P1,378 (mean

= P517, SD = P861). The ASF outbreak revealed a substantial impact of ASF on input costs. During the outbreak, an overall average range varied from P504 to P1,192 (mean=P848, SD=P344) expenses for the combined categories. This stark increase in expenses was influenced by the electricity bills.

Before the outbreak, the average expenditure on disinfectants, cleaning, and electricity got an average amount that ranged from 401 to P951 (mean = P275, SD =P676), P24 to P258 (mean=P141, SD=P117), P33 to P169 (mean=P101, SD=6P8). However, during the outbreak, the average spending on cleaning and disinfectants dwindled to a range of P33 to P130 (mean=P83, SD=P50) while the electricity bills surged from P232 to P480 (mean=P356, SD=P124). The substantial downturn in expenditures on cleaning and disinfection is represented by a reduced swine population due to heightened mortality rates, thereby rendering the area constrained for such activities. Conversely, the surge in electricity consumption during the ASF outbreak potentially reflects alterations in farming practices. The National Hog Farmers (2023) emphasizes the need for stringent protocols to mitigate the risk of disease spread particularly considering the significant decrease in expenses related to cleaning and disinfection techniques noted during the outbreak.

Outstanding Loan Repayment

Table 6 reveals the average outstanding loan with an average amount that varies from P13,9223 to P54,077 (mean = P34,000, SD = P20,077), indicating a wide range in the loaned amounts among respondents. The average interest rate being charged varies from 0.88% to 3.92% (mean = 2.40%, SD= 1.52%). It is noteworthy that 7 (20%) of raisers reported being able to pay their loans while 4 (6%) were unable to do so. Among the strategy's raisers coped with loan repayment, 5 (9%) paid after receiving compensation, 1 (2%) opted for weekly installments, and another 1 (2%) paid only the interest. Additionally, 1 (2%) saved money from their salaries for loan amortization, 1 (2%) considered reloan options, and 2 (4%) planned to pay once their stocks were sold as their options for non-payment. In alignment with these findings, it is worth noting that the Department of Agriculture (DA) has acted through its Regional Field Offices (RFOs) by committing to fully compensate all farmers whose hogs were culled due to ASF (DA Communications Group, 2021).

Table 6. Outstanding loan repayment of the respondents

PARTICULARS	AVERAGE	STANDARD DEVIATION
Amount loaned (n = 11)	P 34,000	20,077
Interest rate (n = 3)	2.49	1.52
	FREQUENCY	**PERCENTAGE**
Able to pay the loan		
yes	7	20
no	4	6
Ways of paying loan (n = 7)		
after receiving compensation	5	9
weekly installment	1	2
paid the interest only	1	2
Options for non-payment (n = 4)		
saving from the salary for the amortization	1	2
reloan	1	2
pay once the stocks are sold	2	4

Source of Livelihood

Table 7. Sources of livelihood of the respondents

SOURCES	BEFORE ASF OUTBREAK		DURING ASF OUTBREAK	
	FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
Farming	20	36	18	33
Small business	7	13	13	24
Salary	8	14	8	14
Salary and farming	11	20	11	20
Farming and small business	8	14	2	4
Assistance from relatives	1	2	3	5

Table 7 illustrates the sources of livelihood before and during the ASF outbreak. Before the outbreak, farming was the predominant source of income for 20 (36%) swine raisers, followed by salary and farming livelihood with 11 (14%), salary and farming plus small business with 8 (14%), small business with 7 (13%) and assistance from

relatives with 1 (2%). However, during the ASF outbreak, there was a notable shift in livelihood strategies, with farming remaining as the primary source of income for 18 (33%), followed by small businesses with 13 (24%), salary and farming with 11 (20%), salary with 8 (14%) raisers, assistance from relatives with 3 (5%) raisers, and farming and small business with 2 (4%). These shifts signify a transition towards diversified income sources. The predominant source of livelihood of the raisers before and during the outbreak is supported by the findings from Cooper et al.'s (2022) research.

Employment

The employment reveals that before the ASF outbreak, two backyard swine raisers had engaged up to one worker to assist with their backyard raising activities. However, once the outbreak occurred, these raisers were unable to maintain this employment, either having to release their workers or being unable to continue paying their wages due to the financial challenges and the reduction in the number of hogs raised imposed by ASF. The inability to sustain employment during this crisis is indicative of financial hardships and emphasizes the broader repercussions of ASF on the economic stability of the swine industry. This finding is supported by the narratives outlined in the investigation carried out by Cooper et al. (2022).

Sales

Table 8. Sales of the respondents

STATISTICS	BEFORE ASF OUTBREAK	DURING ASF OUTBREAK
Mean	P 25,891	P 7,940
Standard deviation (SD)	P 28,493	P 15,865
Minimum	0	0
Maximum	P 100,000	P 70,000

Table 8 indicates a notable shift in the sales of products by raisers before and during the outbreak of ASF. Before the outbreak, the average sales ranged from zero to P54,384 (mean = P25,891, SD = P28,493). However, during the ASF outbreak, a substantial downturn in sales occurred, with the average falling within a range of zero to P23,805 (mean = P7,940, SD = P15,865). Several raisers reported zero sales, attributing this to the mortality of hogs before reaching the marketable stage, a consequence of the ASF outbreak. The significant drop in sales vividly illustrates the economic setbacks experienced by backyard raisers. This finding is corroborated by the result of the study of Nguyen et al. (2021).

3.4 Adopted Coping Strategies

This section provides a concise overview of the strategies adopted by these raisers, encompassing areas such as input recovery, loan repayment, access to credit, re-operation practices, technical assistance or animal health services, responses to community threats, access to market and market linkages, and the role of policy and government support. These strategies collectively highlight the multifaceted efforts undertaken by raisers to navigate the economic repercussions of ASF and underscore the need for a comprehensive understanding of their resilience during this crisis.

Input Recovery

Table 9 reveals the varied coping mechanisms implemented by farmers to overcome the difficulties arising from the ASF outbreak. Notably, a substantial proportion of 12 (22%) raisers, redirected their focus towards cultivating diverse crops such as palay, vegetables, coconuts, fish, or mushrooms, indicating a shift towards diversified agriculture. Similarly, an additional 12 (22%) raisers relied on a monthly salary for financial support.

Table 9. Respondents' coping strategies to recover inputs

STRATEGIES	FREQUENCY	PERCENTAGE
Adopted alternative livestock species (goat/ chicken/cattle)	2	4
Shifted to planting and selling plants	1	2
Focused on farming (palay/vegetable/coco farm/fish/mushroom)	12	22
Engaged in small businesses (local food/street food)	11	20
Limit expenses	8	15
Relied on monthly salary	12	22
Engaged in servicing jobs	1	2
Nothing else can be done	8	15

A significant segment of 11 (20%) raisers embraced an entrepreneurial approach to income generation by engaging in small businesses such as selling local food or street foods near their residences. Moreover, an equal number of 8 (15%) raisers opted to limit their expenses as a coping strategy while some expressed a sense of resignation, perceiving no other viable alternatives amidst the challenges posed by the outbreak. Furthermore, 2 (4%) raisers chose to explore alternative livestock species like goats, chickens, or cattle, and one raiser (2%) transitioned to planting and selling plants while another raiser pursued a servicing job. This data reflects the resourcefulness of the backyard swine raisers to sustain their livelihoods and recover from the crisis. This finding is supported by the result of the study conducted by Penrith et al. (2023).

Loan Repayment

Table 10. Respondents' coping strategies for loan repayment

STRATEGIES	FREQUENCY	PERCENTAGE
Continued regular loan payments as originally scheduled	1	2
Deferred loan payments with the lender's approval	1	2
Restructured the loan terms or negotiated with the lender	1	2
Applied for other financial assistance programs	1	2
Took portion from salary	1	2
Saved money from farming	1	2
Paid after receiving the compensatory assistance	1	2

Table 10 presents that among the seven backyard swine raisers, their strategies varied to meet their financial obligations. One (2%) chose to maintain regular loan payments as initially scheduled while another (2%) opted for deferred payments with the lender's approval, indicating a negotiated arrangement. Restructuring loan terms through negotiation with the lender was undertaken by a third-raiser (2%), reflecting a proactive approach to financial management. Additionally, one (2%) raiser explored external financial assistance programs, while another (2%) utilized a portion of their salary for loan repayment. Some (2%) respondents tapped into savings generated from farming activities, while another (2%) chose to settle the loan after receiving compensatory assistance. A contrasting story was shared during the production of the process matrix in the Network Mapping activity conducted by Cooper et al. (2022) that a participant had taken a loan from the bank to start his pig farm with their house serving as collateral and could no longer service the loan.

Access to Credit

Table 11. Respondents' coping strategies to access to credit

STRATEGIES	FREQUENCY	PERCENTAGE
Maintained a good relationship with the "Suking" Agri Supply (input trusted supplier)	7	13
Keep updated with the credit programs of both private and government sectors	4	7
No plan to avail of credit	9	16
Through acquaintances	3	6
No response	32	58

Table 11 reveals that the highest portion of respondents (58%) did not provide a specific response regarding their credit access strategies. Of the 11 raisers who utilized loans, 7 (13%) emphasized the importance of maintaining favorable relationships with trusted input suppliers, known as "Suking" Agri Supply. Additionally, 4 (7%) raisers kept themselves updated with credit programs offered by both private and government sectors to access credit resources. However, a substantial portion of 9 (16%) raisers expressed no intention to avail credit during this period. A smaller subset of 3 (6%) raisers relied on their acquaintances to access credit. This data emphasizes the varied strategies adopted by raisers to secure credit and highlights the significance of strong relationships with input suppliers in facilitating access to crucial financial resources during challenging times caused by ASF. This result is supported by the findings of the study conducted by Bayudan-Dacuycuy et al. (2020).

Re-operation Practices

Table 12 illustrates that a significant portion constituting 21 (38%) raisers, declared that they were no longer engaged in swine raising. Among those who opted for alternative strategies, 15 (27%) raisers chose to repurchase stock but only after a substantial waiting period of six months or more. Furthermore, 13 (24%) raisers conveyed their intentions to raise swine again in the future. Additionally, some (6 or 11%) raisers reduced the number of purchased stocks. These strategies reflect the diverse responses of raisers to the economic impact of ASF, including

reevaluating their involvement in swine raising or adopting more cautious and staggered approaches to re-entering the industry. The prevalence of backyard swine raisers exiting the industry primarily due to the challenges posed by the ASF outbreak is supported by the conclusions drawn from the study conducted by Sayruamyat (2022).

Table 12. Respondents' coping strategies for their re-operation practices

STRATEGIES	FREQUENCY	PERCENTAGE
Purchase another stock after six (6) months and beyond	15	27
Reduced the number of purchased stock	6	11
No longer engaged in swine-raising	21	38
Plan to raise soon	13	24

Technical Assistance/Animal Health Services

Table 13. Respondents' coping strategies for technical assistance/animal health services

STRATEGIES	FREQUENCY	PERCENTAGE
Maximized the use of social media to ask for assistance through searching	6	11
Seek the help of the patronized Agri supply directly through text messages	11	20
Self-know how medication	16	29
Call the technician from the MAO/private feed companies	22	40

Table 13 delineates the approaches taken by a notable 22 (40%) raisers to seek assistance, predominantly by directly reaching out to technicians from the Municipal Agriculture Office (MAO) or private feed companies. Moreover, 16 (29%) raisers demonstrated self-sufficiency by relying on personal knowledge for medication, indicating a degree of self-sufficiency in addressing the health needs of their livestock. Another 11 (20%) raisers sought assistance by directly texting their patronized agricultural suppliers. Additionally, 6 (11%) raisers embraced the use of social media to seek assistance through online searches. Most responses imply a reliance on professional guidance and expertise. The outcome of Garcia's (n.d.) research on swine production aligns with and reinforces this finding.

Access to Market and Market Linkages

Table 14. Respondents' coping strategies to access to market and market linkages

STRATEGIES	FREQUENCY	PERCENTAGE
Called the backyard slaughterer	13	24
Sold to adjacent barangay	5	9
Through the help of the feed company technicians	8	15
Posted on Facebook	1	2
Sold to patronizing buyers	26	47
No sales yet	2	4

Table 14 illustrates that nearly half, specifically 26 (47%) raisers, successfully sold their products to patronizing buyers. Some raisers explored alternative avenues such as backyard slaughterers, with 13 (24%) opting for this approach while 8 (15%) sought the assistance of feed company technicians to access markets. Additionally, 5 (9%) raisers sold their products to adjacent barangays while 2 (4%) raisers reported no sales yet. Only one (4%) raiser resorted to social media by posting on Facebook for product promotion. The predominant sales strategy underscores the crucial role of established buyer relationships in driving sales, a perspective that is emphasized when comparing these findings with Cooper et al.'s (2022) insights gathered from an interview with a local meat butcher.

Policy/Government Support

Table 15. Respondents' coping strategies to policy/government support

STRATEGIES	FREQUENCY	PERCENTAGE
Full acceptance	42	76
Had to accept because there were policemen and soldiers around	3	6
Just thought of the promised compensation for the damaged	2	4
All the reasons above mentioned	3	6
Stayed calm yet hurting inside	5	9

Table 15 provides insights into the attitudes of raisers towards government policies and support during the ASF outbreak. A significant majority, comprising 42 (76%) raisers, reported full acceptance of government policies and support. Meanwhile, 5 (9%) raisers reported staying calm externally while hurting inside, and 3 (6%) raisers accepted the policies due to the presence of law enforcement. Another subset of 3 (6%) raisers cited multiple reasons for their acceptance, potentially combining trust in the policies with the assurance of compensation. A small group of 2 (4%) raisers mentioned considering the promised compensation for the damages as a factor in their acceptance. This data reflects the complex interplay of acceptance, compliance, and emotional responses among raisers in the context of government interventions during the ASF outbreak. The findings imply a sense of trust and compliance with the implemented measures, as affirmed by the study conducted by Xu, Zhou, Qiu, Li, & Zhang (2021).

4.0 Conclusion

The findings from this study shed light on the intricate challenges encountered by backyard swine raisers in Aurora. Predominantly male, college-educated individuals in medium-sized households, these raisers heavily depend on farming as both their primary occupation and main income source. The ASF outbreak has had profound economic impacts, leading to significant reductions in sales and necessitating practical adjustments in farm operations.

Amidst these challenges, raisers have demonstrated resilience through various adaptive strategies. Many have diversified into alternative farming activities to mitigate losses, while others have implemented diverse loan repayment strategies to manage financial burdens. Interestingly, a notable proportion of raisers have opted to discontinue swine raising altogether, signaling a shift in livelihood strategies in response to the crisis.

Notably, proactive measures such as seeking technical assistance and leveraging loyal buyers for product marketing illustrate efforts to navigate the crisis effectively. Furthermore, the acceptance of government policies, particularly the massive culling initiative for ASF prevention, underscores raisers' cooperation for the collective well-being of the swine industry.

These results underscore the complexity of the challenges faced by backyard swine raisers and highlight the urgent need for targeted interventions to enhance their resilience and sustainability. Moving forward, it is imperative to develop and implement tailored support measures that address the specific needs of these raisers, ensuring their long-term viability in the face of crises like the ASF outbreak.

5.0 Contributions of Authors

This research is solely authored by the researcher.

6.0 Funding

This work received no specific grant from any funding agency.

7.0 Conflict of Interests

The author declares no conflicts of interest about the publication of this paper.

8.0 Acknowledgment

The authors acknowledge all the experts who took part in this study, and men and women pig farmers who participated and openly shared their experiences to for the success of this study.

9.0 References

Aquino, A. P. (2020, July 16). Republic Act 7607: Empowering Smallholder Farmers in their Economic Endeavors. FFTC Agricultural Policy Platform (FFTC-AP). https://ap.fftc.org.tw/article/.

Aspile, S. C. K. C., Manipol, N. E. P., Despositorio, D. P. T., & Aquino, N. A. (2016). Profitability of swine enterprises by scale of operation and production system in two hog-producing towns in Bulacan, Philippines. Journal of Economics, Management & Agricultural Development, 2(2), 79-95.

Bayudan-Dacuycuy, C., Magno-Ballesteros, M., Baje, L. K. C., & Ancheta, J. A. (2020). Towards a more sustainable financing of small farmers and fisherfolk's agricultural production (No. 2020-38). PIDS Discussion Paper Series.

Bollido, M. E., Villaluz, R. J. G., & Orale, R. L. (2022). Emerging Supply Chain of Pork and the Opportunities for Small-Scale Raisers in Catbalogan City in the Philippines. Sarhad Journal of Agriculture, 38(4), 1370-1380.
Cooper, T. L., Smith, D., Gonzales, M. J. C., Maghanay, M. T., Sanderson, S., Cornejo, M. R. J. C., ... & Salvacion, O. P. (2022). Beyond numbers: Determining the socioeconomic and livelihood impacts of African swine fever and its control in the Philippines. Frontiers in veterinary science, 8, 734236.
Department of Agriculture (2021). DA set to pay in full all ASF indemnification, totaling P2B. Official Portal of the Department of Agriculture. https://www.da.gov.ph/da-set-to-pay-in-full-all-asf-indemnification-totaling-p2b/
Department of Agriculture (2021, November 21). DA set to pay in full all ASF indemnification, totaling P2B. Official Portal of the Department of Agriculture. https://www.da.gov.ph/da-set-to-pay-in-full-all-asf-indemnification-totaling-p2b/.
FAO (2020). African Swine Fever: Managing the Risk to the Livelihoods of Smallholders. Food and Agriculture Organization of the United Nations. Available at: http://www.fao.org/3/ca8680.
FAO (2019). African swine fever situation in Asia update. Retrieved from http://www.fao.org/ag/againfo/programmes/en/empres/news_260219b.html.
Hsu, C.-H., Montenegro, M., & Perez, A. (2023). Space–Time Dynamics of African Swine Fever Spread in the Philippines. Microorganisms, 11(6), 1492. https://doi.org/10.3390/microorganisms11061492.
National Hog Farmer (2023). Studies: Protect your pigs from ASF. Retrieved from: https://www.nationalhogfarmer.com/hog-health/studies-show-need-for-vigilant-african-swine-fever-on-farm-prevention.
Nguyen-Thi, T., Pham-Thi-Ngoc, L., Nguyen-Ngoc, Q., Dang-Xuan, S., Lee, H. S., Nguyen-Viet, H., ... & Rich, K. M. (2021). An assessment of the economic impacts of the 2019 African swine fever outbreaks in Vietnam. Frontiers in Veterinary Science, 8, 686038.
Office of the Secretary (2020). Guidelines on Swine Depopulation African Swine Fever (ASF) Confirmation.
OIE (2020). African swine fever: trade impacts and implications for food security. Retrieved from https://www.oie.int/en/animal-health-in-the-world/african-swine-fever/african-swine-fever-trade-impacts-and-implications-for-food-security/.
Penrith, M.-L., van Heerden, J., Pfeiffer, D. U., Oļševskis, E., Depner, K., & Chenais, E. (2023). Innovative Research Offers New Hope for Managing African Swine Fever Better in Resource-Limited Smallholder Farming Settings: A Timely Update. Pathogens, 12(2), 355. https://doi.org/10.3390/pathogens12020355.
Perey, E. P. (2017). Determinants of sustainability of backyard pig farming in the Philippines. International Journal of Advanced Research, 5(4), 1055-1064.
PSA (2023). Special Release Livestock and Poultry Production in Aurora: 2021. Philippine Statistics Authority. Retrieved August 22, 2023, from https://rsso03.psa.gov.ph/article/special-release-livestock-and-poultry-production-aurora-2021.
PSA (2022). Swine Production Report, January-December 2021. Philippine Statistics Authority.
PVO (2020). ASF Epidemiology in Aurora Province.
Rahman, M. S., Khatun, M., Rahman, M. A., Azam, M. G., & Sultana, S. (2014). Assessing the impact of credit on rice production and food security on farm households in Bangladesh. Int J Innov Res Dev, 3, 300-308.
Ritchil, C. H., Faruque, M. O., Tabassum, F., Hossain, M. M., & Bhuiyan, A. K. F. H. (2013). Socio-economic status of pig rearers and management system of native pigs in Bangladesh. Indian J. Anim. Sci, 83(11), 1226-1228.
Sayruamyat, S. (2022, March 30). Thai Swine Industry during African Swine Fever Outbreak in Asia. FFTC Agricultural Policy Platform (FFTC-AP). https://ap.fftc.org.tw/article/3011.
Wedzerai, M. (2022). ASF Philippines: Socio-economic and livelihood impacts. Pig Progress. https://www.pigprogress.net/world-of-pigs/country-focus/asf-philippines-socio-economic-and-livelihood-impacts/.
Xu, B., Zhou, L., Qiu, C., Li, Y., & Zhang, W. (2021). What Determines Pig Farmers' Epidemic Coping Behaviors: A Qualitative Analysis of Endemically Infected Areas in Relation to African Swine Fever. Veterinary Sciences, 8(11), 266.