BULLETIN OF ENGINEERING SCIENCE, TECHNOLOGY AND INDUSTRY
(BESTI Journal) | ISSN(e): 3025-5821
Website: https://bestijournal.org/index.php/go/index A| Volume 4 No. 4 (2026)

RISK MANAGEMENT TO MINIMIZE BROILER CHICKEN MORTALITY USING THE HOUSE OF RISK METHOD AT UD. ANUGERAH JAYA CHICKEN

Ramzy Fahlevi Putra Tedy [1]*, Marwan [2]
[1,2] Industrial Engineering Study Program / Universitas Potensi Utama, Medan, Indonesia
E-mail: ramzyfahlevi29@gmail.com[1]* , marwan2192@gmail.com[2]

Received: 06/09/2026 | **Revised:** 11/09/2026 | **Accepted:** 30/09/2026 | **Published:** 29/10/2026

Abstract

This study aims to identify risk agents that contribute to broiler Chicken mortality, determine the priority of risk agents based on the level of impact and frequency of occurrence using the House of Risk (HOR) method, and formulate risk mitigation strategies at UD. Anugerah Jaya Chicken. The study uses a quantitative descriptive approach with data collection through observation, interviews, and documentation. Identification of supply chain activities was carried out using the Supply Chain Operations Reference (SCOR) model, while risk analysis used the HOR Phase 1 and HOR Phase 2 methods. The results showed an average broiler Chicken mortality of 5.46% during 13 maintenance cycles. 10 risk events and 10 risk agents were identified that affect the maintenance process. Based on the Aggregate Risk Potential (ARP) calculation, the five priority risk agents are extreme temperature changes (4023), less than optimal health monitoring (3176), less than optimal Biosecurity (2632), poor cage sanitation (2303), and poor cage ventilation (2216). The results of the Phase 2 HOR showed that the mitigation action with the highest Effectiveness to Difficulty Ratio (ETD) was daily Chicken health monitoring, followed by routine cage disinfection and the development of stricter Biosecurity SOPs. Implementing these mitigation strategies is expected to reduce broiler mortality, increase productivity, and improve supply chain risk management at UD. Anugerah Jaya Chicken

Keywords: Broiler Chicken s, House of Risk, Risk Management, Mortality

INTRODUCTION

The livestock sector plays a crucial role in the economy, serving as a vital pillar for meeting the population's demand for animal protein while contributing to the strengthening of national revenue. Among the various key commodities in this sector, broiler chickens stand out due to their advantageous characteristics, such as a very rapid growth rate, a relatively short production cycle, and a continuously surging market demand.

Table 1. Broiler Chicken Mortality Data per Rearing Cycle

Cycle	Initial Population	Mortality Chickens	Mortality (%)	Harvested Chicken
1	550	35	6,36	515
2	600	38	6,33	562
3	650	41	6,31	609
4	700	43	6,14	657
5	750	39	5,20	711
6	800	45	5,63	755
7	850	47	5,53	803
8	900	46	5,11	854
9	950	49	5,16	901
10	1.000	51	5,10	949
11	1.050	53	5,05	997
12	1.100	50	4,55	1.050
13	1.150	52	4,52	1.098

This phenomenon is also observed at UD. Anugerah Jaya Chicken. Data on mortality over 13 rearing cycles show that the initial population increased from 550 birds in the first cycle to 1,150 birds by the 13th cycle. Corresponding to this population growth, the number of chicken deaths ranged from 35 to 53 per cycle. In the first cycle, 35 deaths (6.36%) were recorded, while in the 11th cycle, the number reached 53. Although the overall mortality percentage shows a downward trend—dropping to 4.52% by the 13th cycle—the persistent occurrence of deaths indicates that mortality risk cannot be entirely eliminated. This is a critical point, as a larger population implies a greater potential for loss if the risks leading to mortality are not managed effectively. The root cause of mortality in broiler farming operations lies not merely in the deaths themselves, but in the various sources of risk that can trigger them. These risks may stem from internal or external factors, such as suboptimal temperature and humidity levels in the coop, poor air quality and ventilation, inconsistent biosecurity practices, diseases, issues with feed or water quality, high stocking density, errors in management, or delays in detecting and addressing health problems in the birds. If these risk sources are not systematically identified and prioritized, control efforts may end up focusing solely on the observed consequences rather than the underlying root causes.

Therefore, a risk management approach is required that can identify various sources of risk, understand the relationships between these sources and mortality risk events, and determine the priorities for necessary mitigation actions. One method that can be employed is the "House of Risk" (HOR). This method integrates the concepts of risk assessment and risk management by examining the connections between risk events and risk agents, thereby helping to identify which risk agents should be prioritized for intervention. Subsequently, mitigation actions can be formulated based on the priority levels assigned to these risk agents. UD. Anugerah Jaya Chicken is a trading business operating in the poultry sector, specifically focusing on the sale of broiler chickens. The business is located in the Jalan Palapa area, Pulo Brayan, Medan—a hub for food commodity trading, including fresh chicken meat. This area is well-known as a center for vendors of slaughtered chicken and distributors of poultry products, serving both the general public and culinary businesses throughout the city of Medan.

Research indicates that high stocking density can increase stress levels and coop temperatures, while also impairing air circulation—all of which lead to higher mortality rates among broiler chickens. Furthermore, in a broader context, the risks associated with broiler farming extend beyond production aspects to include the supply chain and operational management. A study by Wibowo et al. (2021) highlights that the distribution process for broiler chickens involves various risk factors—such as stress, overheating, illness, and operational errors—that contribute, directly or indirectly, to increased mortality. This underscores the critical need for comprehensive risk management, spanning the entire process from upstream to downstream. A risk management approach is essential for identifying, analyzing, and mitigating such risks. One method that can be employed is the "House of Risk" (HOR) framework. High mortality rates can stem from various causes, including inadequate farm management practices, fluctuating environmental conditions, and disease outbreaks.

Consequently, the implementation of careful and structured management is crucial to ensure efficient production processes and minimize potential financial losses. Through precise management, it is expected that UD. Anugerah Jaya Chicken will be able to enhance the quality of its output and secure its business continuity amidst increasingly intense competition within the agribusiness sector. The application of the House of Risk method in this study is expected to provide a more systematic overview of the root causes of broiler chicken mortality at UD. Anugerah Jaya Chicken, while also generating proposed mitigation measures that can be implemented to reduce the likelihood of such mortality. Consequently, this research does not merely focus on measuring mortality rates; rather, it seeks to address why mortality occurs, which factors are the most influential, and which actions should be prioritized to minimize these risks. Given the current situation at UD. Anugerah Jaya Chicken—where the mortality rate of broiler chickens has reached concerning levels—and the scarcity of prior research that explores the application of the "House of Risk" approach within the context of micro-scale poultry farming, a systematic and comprehensive risk management evaluation is necessary.

Based on the background information provided, the problem identification for this research is as follows:

1. The high mortality rate of broiler chickens at UD. Anugerah Jaya Chicken, which has the potential to cause financial losses and disrupt the productivity of the farming operation.
2. The lack of clear identification of the risk agents that serve as the primary factors contributing to broiler chicken mortality.
3. The absence of prioritized risk management and structured mitigation strategies to implement improvements for controlling the risks that cause broiler chicken mortality.

Based on the identification of problems in this study, the problem formulations are as follows:

1. What are the risk agents that contribute to broiler chicken mortality at UD. Anugerah Jaya Chicken?

OPEN ACCESS

2. How can it be determined which risk agents should be prioritized, based on an analysis using the House of Risk (HOR) method?
3. What are the appropriate improvement strategies to minimize broiler chicken mortality at UD. Anugerah Jaya Chicken, based on the House of Risk (HOR) method?

The objectives of this study are as follows:

1. To identify the risk agents that contribute to broiler chicken mortality at UD. Anugerah Jaya Chicken.
2. To determine the priority of these risk agents based on their impact level and frequency of occurrence, using the House of Risk (HOR) method.
3. To analyze the relationship between risk agents and risk events, and to formulate appropriate risk mitigation strategies to minimize broiler chicken mortality at UD. Anugerah Jaya Chicken.

LITERATURE REVIEW

Risk Management

In an industrial context, risk management aims to minimize negative impacts and enhance operational effectiveness through risk-informed decision-making. The implementation of risk management is particularly crucial for supply chain and operational systems characterized by high levels of uncertainty (Defriyanti & Ernawati, 2021). Risk management serves as a system for monitoring risks and protecting the assets, property, and profits of a business entity or an individual against potential losses arising from such risks.

Risks in Broiler Chicken Farming

Broiler chicken farming carries a high level of risk, as it is influenced by environmental factors, management practices, and the health of the livestock. Such risks can directly impact mortality rates, productivity, and business profitability. Research indicates that factors such as stocking density, ambient temperature, and stress have a significant influence on the mortality rate of broiler chickens (Dawkins et al., 2020; Abudabos et al., 2022). Furthermore, operational risks—including the distribution and handling of the chickens—also contribute to increased mortality (Wibowo et al., 2021).

House of Risk (HOR) Method

The House of Risk (HOR) method is an approach used to systematically identify and mitigate risks by integrating the concepts of Failure Mode and Effect Analysis (FMEA) and Quality Function Deployment (QFD). This method is widely employed in supply chain risk analysis because it is capable of establishing a link between the causes of risks and their resulting impacts (Fitriani & Nugraha, 2022).

Risk Event and Risk Agent

According to Pujawan and Geraldin (2009), a risk event is an occurrence or incident that can disrupt operational processes, leading to losses or hindering the achievement of organizational objectives. A risk agent is a cause or source of risk that triggers a risk event. A single risk agent can lead to one or more risk events; therefore, identifying the relationship between the two is a crucial step in the House of Risk method.

Broiler Chicken Mortality

According to North and Bell (2018), the mortality rate of broiler chickens is influenced by various factors, such as the quality of the stock, feed management, environmental temperature, coop ventilation, and disease control. Furthermore, stress resulting from high stocking density and the transportation process also serves as a primary cause for increased mortality rates among broiler chickens.

Supply Chain Risk Management

According to Fan and Stevenson (2023), Supply Chain Risk Management aims to enhance the resilience of the supply chain against various operational disruptions, enabling a company to maintain the stability of its business processes on an ongoing basis.

METHOD

OPEN ACCESS

To analyze and address risk-related issues affecting broiler chicken mortality at UD. Anugerah Jaya Chicken, this study specifically employs a quantitative descriptive methodology using the House of Risk (HOR) technique. This approach was selected to provide a detailed overview of the risks contributing to high mortality rates and to develop strategies for managing them. This research focuses on UD. Anugerah Jaya Chicken, a business entity engaged in the poultry sector—specifically, a broiler chicken sales operation located on Jalan Palapa, Pulo Brayan, Medan, North Sumatra. The company's operations encompass the entire production cycle, ranging from initial rearing and the growth phase—until the chickens reach an optimal size—to the final stage: the sale of chickens ready for slaughter. The selection of the research site was based on several key considerations, namely:

1. The existence of a tangible problem: a high mortality rate among broiler chickens during each rearing cycle.
2. The availability of relevant operational data to support risk management analysis.
3. Ease of access for the researcher to conduct direct observations and interviews with relevant parties.

To analyze the collected data, this study employs the House of Risk (HOR) methodology. Through this approach, the researchers aim to identify, evaluate, and prioritize various risk factors known to contribute significantly to the mortality rate of broiler chickens.

RESULTS AND DISCUSSION

Results

This research was carried out at UD. Anugerah Jaya Chicken, a business engaged in broiler chicken farming. The research aims to identify, analyze and determine risk management strategies that have the potential to cause broiler chicken mortality using the House of Risk (HOR) method. This method was chosen because it is able to identify the most dominant sources of risk (risk agents) and determine priorities for mitigation actions based on the level of risk posed.

The research process began by conducting field observations, interviews with business owners and parties involved in operational activities, as well as studying documentation regarding the broiler chicken rearing process. Based on the results of data collection, information was obtained regarding the flow of raising chickens starting from preparing the cage, receiving DOC (Day Old Chick), providing food and drink, maintaining health, to the harvest process. At each stage, several potential risks were found that could cause an increase in broiler chicken mortality rates.

The data that has been obtained is then analyzed using the House of Risk (HOR) method which consists of two stages, namely House of Risk Phase 1 (HOR 1) to identify and determine risk agent priorities based on value. Aggregate Risk Potential (ARP), as well as House of Risk Phase 2 (HOR 2) to determine the most effective mitigation strategy in reducing priority risks. The results of this analysis are the basis for preparing risk management recommendations that can be implemented by UD. Anugerah Jaya Chicken to reduce the mortality rate of broiler chickens.

Table 2. Results per Rearing Cycle

Description	Value
Number of Cycles	13
Total Chicken Population	11,050 heads
Total Chicken Mortality	589 heads
Average Mortality	5.46%
Lowest Mortality	35 heads
Highest Mortality	53 heads

Sources: UD. Anugerah Jaya Chicken

Based on research conducted at UD. Anugerah Jaya Chicken, data covering 13 rearing cycles—where one cycle represents a full production period, from the arrival of Day-Old Chicks (DOC) in the coop until the time of harvest—were analyzed. Following each harvest, there is a "down time" (a period when the coop remains empty) before the next cycle begins. A single rearing cycle typically lasts between 30 and 35 days. The broiler population consisted of 11,050 birds, with 589 recorded mortalities, resulting in an average mortality rate of 5.46%. This percentage indicates that for every 100 birds raised, approximately five to six do not survive until the harvest. This figure suggests that several risk factors continue to affect the success of broiler farming, particularly those related to the coop environment, the health of the birds, and the implementation of management practices.

The identification process revealed ten risk events that could potentially occur during the broiler chicken rearing cycle. Each risk event was assigned a severity (S) score on a scale of 1 to 10, based on the potential impact

OPEN ACCESS

the event would have on the continuity of farm operations. A higher severity score indicates a greater potential loss for the company. The risk event of high chicken mortality (E1) was assigned a severity score of 10, as it is a primary risk that directly reduces the number of chickens available for harvest. Increased mortality not only lowers production output but also leads to higher production costs—covering feed, vaccines, vitamins, medication, and labor—that cannot be recovered. Consequently, this event is treated as a top priority in this study. The risk event of disease spread within the coop (E4) was assigned a severity score of 9, given that diseases can propagate rapidly within intensive rearing systems. Such outbreaks not only drive up mortality rates but also hinder the growth of surviving chickens, ultimately resulting in lower harvest weights.

The risk events of increased financial loss (E7) and declining farm productivity (E10) were also assigned a severity score of 9, as both are direct consequences of high chicken mortality. Higher mortality rates mean fewer chickens are available for market, which in turn reduces the company's revenue. Meanwhile, the risk event of increased medication usage (E9) was assigned a severity score of 6; while it does lead to higher operational costs, its impact can still be managed through appropriate health interventions. In summary, the identification of these risk events provides an overview of various occurrences that could potentially hinder the broiler chicken production process. This information serves as the foundation for identifying the underlying causes, or "risk agents."

The identification process revealed ten risk agents with the potential to increase broiler chicken mortality: suboptimal biosecurity, poor coop sanitation, inadequate coop ventilation, extreme temperature fluctuations, poor quality of day-old chicks (DOC), delayed feeding, declining feed quality, excessive stocking density, delayed vaccination, and suboptimal health monitoring. Each risk agent was assigned an occurrence (O) score on a scale of 1 to 10, based on the frequency with which the risk factor arises during the rearing period. A higher occurrence score indicates a greater frequency of the risk factor. Extreme temperature fluctuations (A4) received an occurrence score of 9, as unpredictable weather conditions frequently cause temperature shifts within the coop. Broiler chickens are highly sensitive to temperature changes, particularly during the early stages of rearing; temperatures that are either too high or too low can induce stress, reduce feed intake, and increase the risk of mortality.

Suboptimal health monitoring (A10) was assigned an occurrence score of 8, as the lack of routine health checks makes it difficult to detect signs of disease at an early stage. Consequently, diseases spread more easily, leading to higher mortality rates. Suboptimal biosecurity (A1) and inadequate coop ventilation (A3) also received an occurrence score of 8, as both factors significantly influence the coop environment. Weak biosecurity increases the likelihood of pathogens entering the facility, while poor ventilation leads to degraded air quality, which compromises the health of the chickens. Identifying these risk agents is crucial, as the "House of Risk" methodology focuses on controlling the root causes of risks rather than merely addressing their consequences.

Formulation of House of Risk (HOR) Phase 1

The primary objective of HOR Phase 1 is to prioritize the risk agents that have the most significant impact on the occurrence of various risk events. In this stage, the relationships between each risk event and its corresponding risk agents are assessed using a scale of 0, 1, 3, and 9. A value of 9 indicates a very strong relationship, 3 denotes a moderate relationship, 1 signifies a weak relationship, and 0 indicates no relationship. For instance, the relationship between a delay in feeding (A6) and an increase in the use of medication (E9) is assigned a value of 1, as its influence is relatively minor compared to other causes. Through the HOR Phase 1 matrix, it is possible to determine the contribution of each risk agent to all the risk events that occur during the broiler chicken rearing process.

Table 2. House of Risk (HOR) Phase 1

Risk event	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**	**A8**	**A9**	**A10**	**S**
E1	9	9	9	9	3	1	1	3	3	9	10
E2	1	3	3	9	9	3	9	3	1	3	8
E3	0	1	3	3	1	9	9	3	0	3	7
E4	9	9	3	3	3	0	0	3	9	9	9
E5	0	3	3	3	3	3	9	3	1	3	8
E6	0	1	1	3	1	3	3	1	1	1	7
E7	3	3	3	9	3	3	3	3	3	3	9
E8	3	3	3	3	3	3	3	3	3	3	8
E9	3	3	1	1	1	0	0	1	9	3	6
E10	9	3	3	9	3	3	3	3	1	9	9

Source: Processed by the author (2026)

The results from the development of the House of Risk (HOR) matrix in Phase 1 serve as the basis for calculating the Aggregate Risk Potential (ARP) value for each risk agent. These ARP values are used to determine the priority of risk sources that must be addressed first. Consequently, risk mitigation efforts can be focused on the risk causes that contribute most significantly to the occurrence of various risk events, thereby making risk control more effective in minimizing broiler chicken mortality at UD. Anugerah Jaya Chicken.

Table 3. Aggregate Risk Potential (ARP) Calculation Results

Code	*Risk agent*	O	ARP
A1	Biosecurity is not optimal	8	2632
A2	The sanitation of the cage is not good	7	2303
A3	Cage ventilation is not good	8	2216
A4	Extreme temperature changes	9	4023
A5	DOC quality is not good	6	1506
A6	Delay in feeding	6	1320
A7	Feed quality decreases	5	1580
A8	Excessive cage density	7	1519
A9	Delay in vaccination	5	1240
A10	Health monitoring is not optimal	8	3176

Source: Processed by the author (2026)

Based on the calculation results, extreme temperature fluctuations (A4) yielded the highest ARP value of 4023. This indicates that temperature variation is the most dominant risk factor contributing to increased mortality in broiler chickens. Furthermore, suboptimal health monitoring (A10) had an ARP value of 3176, followed by inadequate biosecurity (A1) at 2632, poor coop sanitation (A2) at 2303, and deficient coop ventilation (A3) at 2216. According to a Pareto analysis, these five risk agents account for the largest share of the total risk, making them the primary focus for developing mitigation strategies.

Formulation of the House of Risk (HOR) Phase 2

The House of Risk Phase 2 aims to determine the most effective mitigation actions for reducing the risks that were prioritized in HOR Phase 1. The development of HOR Phase 2 involves linking each priority risk agent with alternative preventive actions.

Table 4. House of Risk (HOR) Phase 2

Mitigation	A4	A10	A1	A2	A3	D
PA1 Biosecurity SOP	1	3	9	9	3	4
PA2 Routine Disinfection	1	3	3	9	3	3
PA3 Temperature Sensors	9	3	1	1	9	6
PA4 Daily Monitoring	3	9	3	3	3	3
PA5 Worker Training	1	9	3	3	1	4
PA6 Stocking Density Management	3	3	1	1	9	5
PA7 DOC Evaluation	1	1	3	1	1	5
PA8 Vaccination Schedule	1	9	1	1	1	4

Source: Processed by the author (2026)

Based on the identification results, several alternative mitigation measures were obtained, namely preparing stricter Biosecurity SOPs, carrying out routine cage disinfection, installing automatic temperature and humidity sensors, monitoring chicken health every day, training workers regarding early disease detection, setting cage density according to standards, evaluating the quality of DOC from suppliers, and preparing a structured vaccination schedule. Each mitigation action is then assessed based on its level of effectiveness in reducing risk and the level of difficulty in implementing it. The results of this assessment are used as a basis for calculating the Effectiveness to Difficulty Ratio (ETD) value.

Table 5. ARP Data

Risk agent	ARP
A4	4023
A10	3176
A1	2632
A2	2303

OPEN ACCESS

A3	2216

Source: Processed by the author (2026)

Based on the identification process, several alternative mitigation measures were determined: developing stricter biosecurity standard operating procedures (SOPs), implementing routine disinfection of poultry houses, installing automated temperature and humidity sensors, conducting daily health monitoring of the chickens, training workers in the early detection of diseases, managing stocking density in accordance with established standards, evaluating the quality of day-old chicks (DOC) from suppliers, and establishing a structured vaccination schedule. Each mitigation measure was then assessed based on its effectiveness in reducing risk and the level of difficulty involved in its implementation. These assessment results served as the basis for calculating the Effectiveness to Difficulty Ratio (ETD).

Table 6. Effectiveness to Difficulty Ratio (ETD) Data Results

Code	Preventive Action	TE	D	ETD	Priority
PA4	Daily health monitoring	62106	3	20.702	1
PA2	Routine enclosure disinfection	48912	3	16.304	2
PA1	Biosecurity SOPs	64614	4	16.153,5	3
PA5	Staff training	49628	4	12.407	4
PA3	Automated temperature sensors	70614	6	11.769	5
PA8	Vaccination schedule	39758	4	9.939,5	6
PA6	Management of stocking density	46476	5	9.295,2	7
PA7	Evaluation of day-old chick (DOC) quality	19614	5	4.903,5	8

Source: Processed by the author (2026)

Based on the Effectiveness to Difficulty Ratio (ETD) values, the mitigation measure of daily chicken health monitoring (PA4) stands as the top priority, as it possesses the highest ETD value (20.702). This indicates that the measure offers high effectiveness in reducing primary risk factors while requiring a relatively low level of implementation effort. Following this, routine coop disinfection (PA2) and the development of biosecurity standard operating procedures (SOPs) (PA1) rank as the second and third priorities, respectively. Conversely, the evaluation of day-old chick (DOC) quality (PA7) has the lowest ETD value, making it the final priority for implementation. Consequently, this prioritization—based on ETD values—can serve as a guide for UD. Anugerah Jaya Chicken in determining a phased risk mitigation strategy, aligned with their available resources.

CONCLUSION

Based on the research regarding Supply Chain Risk Management Analysis to Minimize Broiler Chicken Mortality using the House of Risk (HOR) method at UD. Anugerah Jaya Chicken, several conclusions can be drawn as follows:

1. Identification using the Supply Chain Operations Reference (SCOR) model and the House of Risk (HOR) method reveals 10 risk agents that could potentially increase broiler chicken mortality: suboptimal biosecurity (A1), poor coop sanitation (A2), inadequate coop ventilation (A3), extreme temperature fluctuations (A4), poor quality of day-old chicks (DOC) (A5), delayed feeding (A6), declining feed quality (A7), excessive stocking density (A8), delayed vaccination (A9), and suboptimal monitoring of chicken health (A10). These risk agents contribute to various risk events, such as high mortality rates, the spread of disease, stunted growth, reduced harvest quality, and increased financial losses. The research also indicates an average mortality rate of 5.46% over 13 rearing cycles, highlighting the need for systematic risk control to reduce chicken mortality.
2. Based on the Aggregate Risk Potential (ARP) calculations in Phase 1 of the HOR method, five risk agents have been identified as the top priorities for risk control. The risk agents with the highest Aggregate Risk Potential (ARP) values are extreme temperature fluctuations (A4) at 4023, followed by suboptimal health monitoring (A10) at 3176, inadequate biosecurity (A1) at 2632, poor coop sanitation (A2) at 2303, and inadequate coop ventilation (A3) at 2216. The high ARP values for these five risk agents indicate that they occur frequently and have a significant impact on the emergence of various risks during the broiler-rearing process. Consequently, these five risk agents are the primary focus for developing mitigation strategies.
3. The results of the House of Risk (HOR) Phase 1 analysis show that each risk event is influenced by one or more risk agents; therefore, controlling the root causes of these risks is more effective than merely addressing their consequences. Based on the HOR Phase 2 results and the Effectiveness to Difficulty Ratio (ETD) calculations, eight priority mitigation actions have been identified: daily broiler health monitoring (PA4),

OPEN ACCESS

routine coop disinfection (PA2), the development of stricter biosecurity Standard Operating Procedures (SOPs) (PA1), staff training on early disease detection (PA5), the use of automated temperature and humidity sensors (PA3), the creation of a digital vaccination schedule (PA8), maintaining stocking density according to established standards (PA6), and evaluating the quality of day-old chicks (DOC) from suppliers (PA7). Based on the ETD values, the highest-priority mitigation action is daily broiler health monitoring, with an ETD value of 20,702; this measure offers high effectiveness in reducing several key risk agents while presenting a relatively low level of implementation difficulty. Implementing these mitigation strategies is expected to reduce broiler mortality rates, enhance farm productivity, and improve supply chain risk management performance at UD. Anugerah Jaya Chicken.

Based on the discussion and conclusions of this study, the following recommendations are provided:

1. For UD. Anugerah Jaya Chicken
   UD. Anugerah Jaya Chicken is advised to prioritize the control of the five primary risk agents with the highest Aggregate Risk Potential (ARP) values: extreme temperature fluctuations, suboptimal health monitoring, inadequate biosecurity, poor coop sanitation, and insufficient coop ventilation. Recommended measures include developing and consistently implementing biosecurity standard operating procedures (SOPs), conducting regular coop disinfection, increasing the frequency of poultry health monitoring, optimizing coop ventilation and temperature control, and—if resources permit—utilizing temperature and humidity monitoring equipment. Furthermore, the company should periodically evaluate the performance of day-old chick (DOC) suppliers and the quality of feed to minimize risks stemming from external factors.
2. For Farm Workers
   Farm workers are expected to exercise greater discipline in adhering to operational procedures, particularly those concerning biosecurity, coop sanitation, vaccination, scheduled feeding, and daily poultry health checks. It is also essential to periodically enhance staff competence through training on early disease detection, the handling of sick birds, and effective coop management, ensuring that potential risks can be identified promptly before they escalate into significant losses.
3. For Future Researchers
   Future research should consider expanding risk management analysis by employing alternative methodologies for comparison—such as Failure Mode and Effects Analysis (FMEA), the Analytical Network Process (ANP), the Analytic Hierarchy Process (AHP), or a Fuzzy House of Risk approach—to allow for a more comprehensive assessment of risk priorities. Additionally, future studies could broaden the scope to include broiler farms of different scales or integrate economic aspects, mitigation costs, and supply chain performance analysis. This would yield recommendations that are more practical and applicable for decision-making in the management of broiler farming operations.

REFERENCES

Abudabos, A. M., Samara, E. M., Hussein, E. O. S., Al-Ghadi, M. Q., & Al-Atiyat, R. M. (2022). Impacts of heat stress on broiler performance and immune response. *Poultry Science, 101(3), 101–109.*

Alfariz, M. A. (2025). Prototipe Monitoring Controling Suhu dan Kelembaban Pada Kandang Ayam Petelur Berbasis Internet Of Things (IoT). *JURNAL TEKNOLOGI INDUSTRI, 14(2), 64-70.*

Andika, S. (2026). *Pengelolaan Risiko Operasional Peternakan Ayam Broiler Pada Peternakan Ayam Semi Close House Ishaq= Operational Risk Management of Broiler Chicken Farms at Ishaq's Semi-Closed House Chicken Farm* (Doctoral dissertation, Universitas Hasanuddin).

Anggraini, A. D., Adiyastiti, B. E. T., Kurniawan, T. N., & Syaifuddin, A. (2024). Evaluasi Penerapan Biosekuriti Pada Pemeliharaan Ayam Pedaging Sistem Open House. *Journal of Applied Research Animals Science, 5(1), 1-6.*

Ardiansyah, N., & Nugroho, S. (2022). Implementasi Metode House of Risk (HoR) pada Pengelolaan Risiko Rantai Pasok Produk Seat Track Adjuster 4L45W. *Prosiding SENIATI, 6(1), 156-166.*

Azis, A. R. (2026). *Biosekuriti peternakan: prinsip dan aplikasi.* Kamiya Jaya Aquatic.

Bukhori, I. B., Widodo, K. H., & Ismoyowati, D. (2015). Evaluation of poultry supply chain performance in XYZ slaughtering house Yogyakarta using SCOR and AHP method. *Agriculture and Agricultural Science Procedia, 3, 221-225.*

Dawkins, M. S., Roberts, S. J., Cain, R. J., Nickson, T., & Donnelly, C. A. (2020). Early warning of welfare problems in broiler Chicken s using automated measures. *Animal Welfare, 29(2), 187–195*

OPEN ACCESS

Defriyanti, A., & Ernawati, D. (2021). Analisis dan mitigasi risiko pada supply chain dengan pendekatan metode House of Risk (HOR) di PT. XYZ. *JUMINTEN, 2(6), 36-47.*

Delipinar, G. E., & Kocaoglu, B. (2016). Using SCOR model to gain competitive advantage: A Literature review. Procedia-Social and Behavioral Sciences, 229, 398-406.

Farihin, A., Kusmaria, K., Irawati, L., & Ulfah, M. (2026). Analisis Risiko Produksi Usaha Ayam Broiler Kemitraan PT New Hope di Lampung Timur. Mimbar Agribisnis: Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis, 12(2), 3381-3394.

Faroque, M. O., Prank, M. R., & Ahaduzzaman, M. (2023). Effect of Biosecurity-based interventions on broiler crude mortality rate at an early stage of production in the small-scale farming system in Bangladesh. Veterinary Medicine and Science, 9(5), 2144-2149.

Fauzan, M., & Santoso, B. J. (2024). Peran Manajemen Risiko dalam Meningkatkan Kinerja Mesin Filling Emulsion dengan Pendekatan House of Risk (HOR). Benefit: Jurnal Manajemen dan Bisnis, 9(2), 168-183.

Fitriani, D., & Nugraha, A. (2022). Risk mitigation analysis of fish cracker supply chain using House of Risk and SCOR model. Jurnal Sistem Teknik Industri, 24(1), 33–41.

Hakim, R. L., Mahfudz, L. D., & Muryani, R. (2021). Penambahan nukleotida pada ransum broiler yang dipelihara pada suhu lingkungan berbeda terhadap performa organ imunitas. Jurnal Sain Peternakan Indonesia, 16(2), 164-170.

Hariono, H., Priyambodo, D., Ulupi, N., & Afnan, R. (2024). Penerapan kesejahteraan hewan dalam manajemen ayam broiler. Jurnal Peternakan Indonesia (Indonesian Journal of Animal Science), 26(2), 98-111.

Humayra, N. J., Nuraeni, D., Rukmawati, M., & Djuanda, G. (2025). Implementasi manajemen risiko supply chain UMKM hijab menggunakan metode house of risk (HOR) di usaha mikro kecil dan menengah (UMKM). Penerbit Tahta Media.

Ibrahim, A. M. (2026). MANAJEMEN RISIKO PRODUKSI DAN PEMASARAN USAHA AYAM BROILER MANDIRI DI PASAR WAJO, PULAU BUTON. Jurnal Risalah Kebijakan Pertanian dan Lingkungan, 13(1), 10.

Istadi, I., Afriadie, C., & Pratiwi, A. A. R. (2025). Analisis Mitigasi Risiko pada Proyek Konstruksi Rehabilitasi Jaringan Irigasi DI Cikaduwen. Jurnal sosial dan sains, 5(11), 7790-7806.

Jannaah, P. D. R., Ernawati, D., & Nugraha, I. (2026). Supply Chain Risk Management Analysis Using the House of Risk (HOR) and Analytical Network Process (ANP) at PT XYZ. Jurnal Ilmiah Global Education, 7(2), 1600-1615.

Marddani, O. R., Hidayatuloh, S., Saputro, R. A. T., & Niami, K. (2025). Measuring Supply Chain Performance of Broiler Distributors and Producers Using SCOR and AHP Methods. JRSI (Jurnal Rekayasa Sistem dan Industri), 12(01), 10-15.

Maulana, M. I., Garnida, D., Setiawan, I., & Yudantara, Y. (2024). Kajian Performa Ayam Broiler Berdasarkan Iklim Mikro Pada Kandang Closed House Evaporated Cooling Pad System. Janhus: Jurnal Ilmu Peternakan Journal Of Animal Husbandry Science, 8(2), 74-86.

Mie, W., & Rakhman, A. (2024). Pengukuran Kinerja Supply Chain dengan Pendekatan Scor Model pada PT XYZ. Co-Value Jurnal Ekonomi Koperasi Dan Kewirausahaan, 15(5).

Mustafa, F., Negoro, Y. P., & Andesta, D. (2025). Analisis Risiko Dan Analisis Keputusan Solusi Proses Material Return Pada Gudang Menggunakan Metode House of Risk (HOR) Dan Metode Analytic Network Process (ANP):(Studi Kasus: PT. ABC). Jurnal Teknologi dan Manajemen Industri Terapan, 4(4), 2076-2084.

Nuningtyas, Y. F., Natsir, M. H., Marwi, F., Hermanto, F. E., & Tono, M. (2026). Potensi Pemanfaatan Artificial Intelligence pada Peternakan Unggas. Universitas Brawijaya Press.

Prabowo, A., Wahyuni, E. S., Tanjung, Y., Wijaya, M. R., & Adam, A. A. (2025). *Manajemen Pemasaran (Strategi Pemasaran Era Digital: Menguasai Tren dan Teknologi Sebagai Konsep Baru Meningkatkan Penjualan)*. Serasi Media Teknologi.

Pratama, R., & Sari, D. P. (2020). Penerapan metode House of Risk untuk mitigasi risiko pada sistem distribusi produk pangan. Jurnal Logistik Indonesia, 4(2), 85–94.

Pratiwi, L. E., & Suprapti, I. (2022). Analisis Risiko Peternakan Ayam Pedaging Supriadi Farm. Jurnal Pertanian Cemara, 19(1), 53-64.

Pujawan, I. Nyoman., & Geraldin, L. H. (2009). House of risk: a model for proactive supply chain risk management. Business Process Management Journal, 15(6), 953-967.

Puji, A. A. (2024). Pemetaan, Pengendalian Dan Sistem Pendukung Keputusan Mitigasi Risiko Rantai Pasok Proses Bisnis PT. XYZ. JISI: Jurnal Integrasi Sistem Industri, 11(2), 145-158.

OPEN ACCESS

Putri, A. F. B., Marimin, M., & Saptono, I. T. (2018). Strategy for Increasing Working Performance of Broiler in The Integrated Poultry Industries: Study Case in Sierad Produce Co. Indonesian Journal of Business and Entrepreneurship, 4(3), 261. https://doi.org/10.17358/ijbe.4.3.261

Putro, Y. L., & Wahid, A. (2023). Analisis Risiko Supply Chain Ikan Teri Menggunakan Metode Hor (House Of Risk) Pada TPI. Lekok Pasuruan. Metode: Jurnal Teknik Industri, 9(2), 85-94.

Rohman, G. A., & Isnaini, A. R. (2025). Otomatisasi Pengendalian Suhu dan Kelembaban Berbasis Internet of Things pada Kandang Ayam Potong: Internet of Things Based Automation of Temperature and Humidity Control in Broiler Chicken Coops. MALCOM: Indonesian Journal of Machine Learning and Computer Science, 5(2), 558-565.

Saputra, A., & Wahyudin, W. (2026). Analisis rantai pasok di PT ABC dengan pendekatan scor model untuk meningkatkan efisiensi produksi. JENIUS: Jurnal Terapan Teknik Industri, 7(1), 41-49.

Sari, M., Nugroho, A., & Putra, D. (2023). Pengaruh penerapan Biosecurity terhadap tingkat mortalitas ayam broiler. Jurnal Ilmu Ternak, 23(1), 45–52.

Setyadi, A., Rimawan, E., Kristanto, I., & Rohmah, P. E. (2022). A proposed conceptual framework of Supply Chain Operations Reference (SCOR) model in Indonesian industries: a literature review. SINERGI, 26(3), 385-396.

Utami, S. W., & Sari, A. P. (2025). Integrasi Analisis House Of Risk Dengan Solusi Digital Climate-Smart Agriculture Pada Sistem Peternak Ayam Broiler Skala Kecil Di Daerah Tropis. Partner, 30(3), 309-322.

Wibowo, T. J., Handika, F. S., & Syah, A. S. (2021). Pengelolaan rantai pasok ayam dengan metode House of Risks. Tekinfo: Jurnal Ilmiah Teknik Industri dan Informasi, 10(1), 1-14.

Widiarta, I. P. G. D., Qamara, C., Yulianti, K. D., Minarsi, A., Suharto, P., Adiputra, K. D. D., ... & AS, A. N. (2026). Pengantar Ilmu Peternakan. Star Digital Publishing.

OPEN ACCESS