



Impact of the COVID-19 Pandemic and Development Strategies on Broiler Farming in Indonesia: A Review

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Abstract | The COVID-19 pandemic has shaken the world in early 2020. Governments in several countries, including Indonesia, have implemented lockdowns and physical social distancing policies resulting in economic crisis in the long-term period. The pandemic and the government policies thus impacted the broiler industry. This review paper aims to examine the impact of the COVID-19 pandemic on broiler farming and identify potential solutions and strategies to mitigate it. Before the pandemic, the broiler population and broiler meat in Indonesia grew 1.02% and 2.51% respectively. However, during the pandemic, the broiler population and its meat production decreased by 7.90% in 2019 and 1.04% in 2021. The broiler and its meat price decreased in the early pandemic, but they significantly rebounded at the end of the pandemic. Nevertheless, the cost of broilers among farmers has experienced a significant decline of 6.34%, while the price of broiler meat at the consumer level declined by 3.9% during the early pandemic. The crucial impacts of the COVID-19 pandemic on Indonesian broiler production included disruption in supply chains, increased production cost, reduced broiler farm productivity, decreased farmer incomes, and impeded sustainability of broiler farming. Strategies to mitigate these adverse effects include strengthening supply chain resilience, market regulation, market diversification, multi-stakeholder partnerships strengthening, and digital transformation. Our review offers valuable insights into the challenges faced by the broiler industry during the COVID-19 pandemic. Furthermore, this review proposes feasible solutions for a more resilient and sustainable future for the broiler industry in Indonesia.

Keywords | Broiler farming, Broiler industry, Broiler meat, COVID-19, Impacts, Strategies

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INTRODUCTION

The global community was left reeling in early 2020 following the outbreak and spread of the Corona Virus Disease 2019 (COVID-19), which emanated from

China, mainly centered in the Wuhan city (Hafez *et al.*, 2021; Attia *et al.*, 2022). The lockdown and physical social distancing policies restricted anthropogenic activity, including routine work, travel, and social interaction during COVID-19 (Attia *et al.*, 2022; Xiang *et al.*, 2021).

In some countries, consumers bought food in abnormally large quantities to ensure they had emergency stocks in the event of lockdown extensions. Over the long term, lockdown policies have precipitated an economic crisis in multiple countries, including Indonesia. The pandemic has led to a decline in economic activity, driven by reduced productivity and increased unemployment. As the global economic downturn worsens with the ongoing spread of the pandemic, the agricultural and livestock sectors have also been adversely affected (Ozili and Arun, 2020).

Broiler farming represents a particularly vulnerable segment of the agricultural sector in the context of the global economic crisis. This led to a slowdown in the rate of economic growth in Indonesia and a decline in the rupiah-foreign currency exchange rate, resulting in higher prices for the imported agricultural and animal husbandry raw materials necessary for the secondary food industry. Furthermore, the projected economy reduced by 2.97% and 5.30% in the first and second quarters of 2020, respectively (SI, 2020). The pandemic has significantly impacted those population groups in the lower-income brackets (Uddin *et al.*, 2021; Laili *et al.*, 2022). According to some studies, the livestock business was severely impacted by consumer behavior, as reflected in food consumption patterns, and fears of food insecurity (Relawati *et al.*, 2021; Chenarides *et al.*, 2021, Olaimat *et al.*, 2020; Suryahadi *et al.*, 2020). Thus, government policy during the pandemic and its impacts included a support strategy for the agriculture and livestock sectors intended to maintain the availability of staple foods for the community (Rusdiana and Talib, 2020). Although the livestock sub-sector proved generally more resilient than other sub-sectors, it was nevertheless impacted. Using a multi-period multi-modal stochastic poultry supply chain model, it was demonstrated that the COVID-19 pandemic harmed poultry production (Yazdekhasti *et al.*, 2021). For comparative purposes, the pandemic severely impacted chicken production in Myanmar, resulting in the closure of more than 30% of broiler farms (Fang *et al.*, 2021).

The COVID-19 pandemic brought various production challenges for broiler farmers. Based on DGLAH (2023), the COVID-19 pandemic led to a fall in the broiler population in Indonesia from 3.169 billion in 2019 to 2.919 billion in 2020. This decline during the early pandemic was attributed to lockdowns, movement restrictions, and market closures that affected the broiler supply chain (Maples *et al.*, 2021; Weersink *et al.*, 2020). In addition, access to inputs in the form of feed, vaccines, and day-old chicks (DOCs) was complicated by the disruption to broiler supply chains (Palouj *et al.*, 2021; Sattar *et al.*, 2021; Hashem *et al.*, 2020).

The impact of the pandemic on the broiler farming sector

underlines the need for risk mitigation strategies. Mitigated strategies aim to enhance the resilience of the broiler farming sector in the face of unprecedented challenges and to prepare it for future challenges. This review paper aims to examine the impact of the COVID-19 pandemic on broiler farming and identify the potential solutions and approaches designed to mitigate it. It highlights the need for strategic adaptations of broiler farmers in response to disruptions in supply chains. These findings not only immediate recovery efforts but also ensure its readiness to face future challenges of the broiler industry in Indonesia.

THE EXISTING CONDITION OF THE BROILER MARKET BEFORE, DURING, AND AFTER THE COVID-19 PANDEMIC IN INDONESIA

Figure 1 shows broiler population and broiler meat production in Indonesia from 2018 to 2022. It illustrates that before the COVID-19 pandemic (2018-2019), the broiler population and broiler meat production increased by 1.02% and 2.51%, respectively. Meanwhile, during the COVID-19 pandemic (2019-2021), the broiler population and its meat production decreased at an identical rate. They are 7.90% in 2019 and 1.04% in 2021. After the COVID-19 pandemic (2021-2022), the broiler population and broiler meat production rapidly grew by 9.66% and 18.20%, respectively.

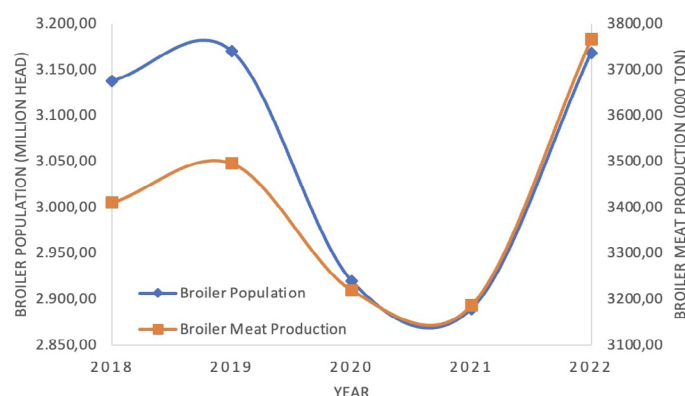


Figure 1: Broiler population and its meat production in Indonesia for 2018-2022 (DGLAH, 2023).

In normal conditions, the growth trend of the broiler population aligns with broiler meat production. Broiler meat production has a higher rate of change than the broiler population. This condition happened before and after the COVID-19 pandemic. However, the growth trend of the broiler population is identical to the growth trend of broiler meat production during the COVID-19 pandemic. That indicates the broiler was slaughtered late during the COVID-19 pandemic. The previous study informed that broiler is kept in pens longer during the COVID-19 pandemic

The weekly average household consumption of broiler meat experienced growth even during the COVID-19 pandemic (Figure 2). However, the growth of this consumption is slight during the early COVID-19 pandemic (2019). It is only 1.87% and increases around 6.42-8.73% afterward (2020-2022). The rise in broiler meat consumption was driven by the growth in the human population (Henchion *et al.*, 2014).

Figure 3 demonstrates the fluctuation of broiler meat prices at the consumer level, before, during, and after the COVID-19 pandemic. The price experienced a decline in the early and mid-COVID-19 pandemic (2019-2020). Eventually, it experienced an upward trend towards the end of the COVID-19 pandemic (2021). However, broiler meat consumption experiences an annual increase (Figure 2). This unmatched pattern between broiler meat consumption and broiler meat price in the consumers is due to the own-price elasticity of broiler meat. According to Widarjono and Ruchba (2021), broiler meat is inelastic demand to the broiler meat's price. That means broiler meat is considered a necessity, so the consumers still buy the broiler meat regardless of cost.

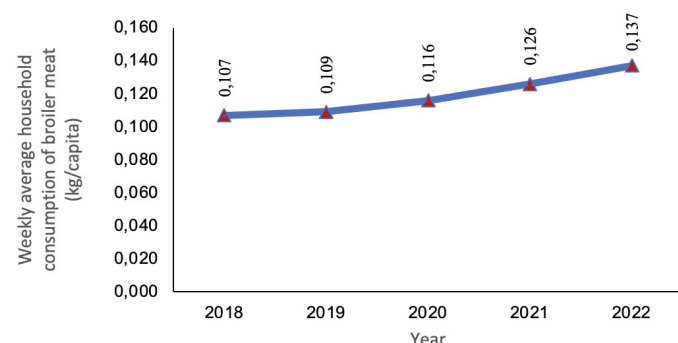


Figure 2: Weekly average household consumption of broiler meat in Indonesia for 2018-2022 (DGLAH, 2023).

The decrease of the broiler price in the producer (farmer) is higher than the broiler meat price in the consumers during the early COVID-19 pandemic period (Figure 3). They are 6.34% for the broiler price in the producer (farmer) and 3.9% for the broiler meat price in the consumers. The broiler price of the producer still decreased by 1.71%, but the broiler meat price of the consumer increased by 0.14% during the mid-COVID-19 pandemic. Those indicated that many gains went to other parties, instead of the farmers during the early and mid-COVID-19 pandemic period (Duguma *et al.*, 2021). This condition started to run in the right direction at the end of the COVID-19 pandemic, when both the broiler price in the producer and the broiler meat price in the consumer increased by 5.80% and 6.31%, respectively.

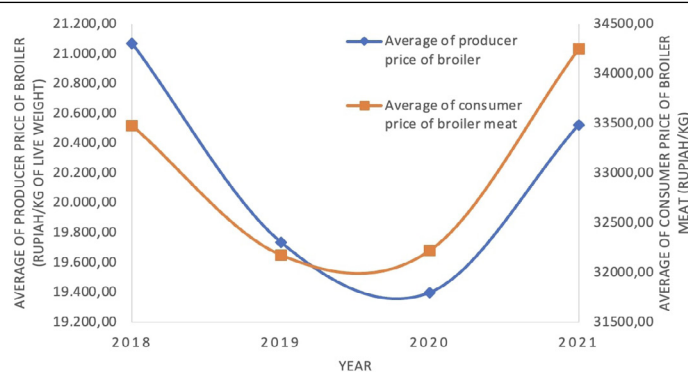


Figure 3: The market price of broiler and broiler meat in Indonesia for 2018-2022 (DGLAH, 2023).

Most of the broiler business in Indonesia is in the type of integrated companies. This type dominates market access and takes a larger share of profits than other business actors (Putri *et al.*, 2018). Another study reports that integrated broiler companies have invested in breeder farms to produce high-quality parent stock and day-old chicks (DOCs), manufacture feed, and establish processing plants for the slaughtering and processing of the broiler (Tey and Arsil, 2020). The integrator companies in Indonesia implemented a contract farming model. Integrators supplied smallholder farmers with DOCs, feed, and technical assistance, while the farmers reared the broilers according to specified standards (Putri *et al.*, 2018). This model empowered integrators to retain authority over the production process. However, during the pandemic, when mobility limitations and workforce reduction were implemented (Chenarides *et al.*, 2021), the integrators experienced difficulties in supplying inputs and technical support to smallholder farmers. It led to a decline in broiler production in 2019-2021 (Figure 1).

IMPACT OF COVID-19 ON BROILER FARMING BUSINESSES

In the early stages of the COVID-19 pandemic, broiler farmers in Indonesia encountered formidable challenges. Disruptions in supply chains led to shortages of essential feedstuffs and labor (Yazdekhasti *et al.*, 2021; Fang *et al.*, 2021). The lockdown policy also decreased sales volumes and incomes of broiler meat traders, leading to a reduction in the number of broiler meat traders and disrupting the distribution of live chickens and chicken meat from farmers to consumers (Prayoga *et al.*, 2021; Yurike, 2022). Additionally, National and international restrictions during COVID-19 pandemic on transportation, trade, and travel negatively impacted the supply of raw materials for livestock farmers (Rahman *et al.*, 2022; Amin *et al.*, 2023).

Supply chain disruptions led to imbalances between supply and demand (Nicola *et al.*, 2020), affecting the supply of

lower product volumes and making it difficult to control the price of broiler meat due to low supply. Another obstacle, supply chain disruption (Pu and Zhong, 2020), transportation restrictions (Armelia *et al.*, 2020), and feedstuff price increases (Trobos Livestock, 2020) contributed to a rise in feed prices. Similarly, the limited availability of feed ingredients and logistical difficulties impacted the production and distribution of feed, leading to feed price fluctuations (Luckstead and Devadoss, 2020). Worsened by dependence on imported feed has further impacted broiler farming in Indonesia (Armelia *et al.*, 2020). In 2018, the DOC price in Indonesia was IDR 7,249 per chick, and the broiler feed price was IDR 8,596 per kilogram. In 2020, the DOC price decreased slightly to IDR 7,848 per chick, while the broiler feed price saw a significant increase to IDR 10,076 per kilogram (Figure 4). The sharp increase in broiler feed prices in 2020 reflects the compounded impact of the COVID-19 pandemic. The sustained high prices in 2021 further indicate ongoing challenges and adjustments within the agricultural sector in response to the pandemic's economic impact.



Figure 4: Development of production input at the farmer level (data processed from *SIMPONI-Ternak*, Ministry of Agriculture Republic of Indonesia (2024)).

The COVID-19 pandemic also resulted in instability in the prices of input required for broiler farming (Ermanda *et al.*, 2023). This instability was exacerbated by the difference between the government regulation of broiler prices at the farmer level and broiler meat prices at the consumer level. The broiler price decreased at the farmer level while broiler meat increased at the consumer level (DGLAH, 2023). However, the government already set the standard selling price for broilers at the farmer level, but it is still below the cost of production (Hatab *et al.*, 2021). This condition led to bankruptcy for the farmers in Indonesia.

The price of broiler meat in Indonesia has fluctuated over the past few years. In 2018, it was IDR 33,477 per kilogram, which decreased in 2019 and remained relatively stable in 2020. However, in 2021, the price significantly increased to IDR 34,249 per kilogram (Figure 3). The COVID-19 pandemic has had a significant impact on these price trends. The increase in broiler meat prices in 2021 was an effect of

increasing broiler prices at the farmer level.

The COVID-19 pandemic also reduced broiler farm productivity and farmer incomes, impeding sustainability in broiler farming. The impact of the pandemic on broiler production included farmers' inability to achieve their target broiler population growth, decreased meat production, labor productivity, and other externalities (Zaime and Ouahi, 2023). Labor shortages and restrictions on movement also impacted broiler farm operations, reduced broiler production capacity, and increased production costs (Luckstead and Devadoss, 2020; Chenarides *et al.*, 2021). A similar situation in China, the COVID-19 pandemic also resulted in a reduction in farmers' incomes (Jianxiong and Chung-Cheng, 2021).

Overall, the COVID-19 pandemic has had a profound impact on the broiler farming industry in Indonesia. Supply chain disruptions, labor shortages, and transportation restrictions led to increased costs and operational difficulties for farmers. Additionally, the pandemic exacerbated existing issues such as market undersupply, causing significant price volatility and financial losses.

STRATEGIES TO MITIGATE THE IMPACT OF THE COVID-19 PANDEMIC ON BROILER FARMING

The COVID-19 pandemic has revealed significant vulnerabilities in Indonesia's broiler farming. Addressing these challenges requires a comprehensive approach involving government policies, industry practices, and technological advancements. Strategies to mitigate the impact of the COVID-19 pandemic on broiler farming in Indonesia can be formulated through a series of policies and activities involving all relevant stakeholders (Figure 5).

Strengthening supply chain resilience is a crucial strategy to mitigate the COVID-19 pandemic impact of disruptions on broiler farming in Indonesia. A key aspect of this strategy involves diversifying suppliers to reduce dependency on imported feed. Promoting local feed production through developing domestic feed manufacturing industries can provide a more stable and reliable supply chain. Additionally, improving logistics and transportation infrastructure is equally important. This strategy includes upgrading transportation networks and storage facilities to ensure the efficient distribution of feed and broilers (Uyanga *et al.*, 2021). Establishing dedicated transportation channels and simple regulatory processes can ensure the timely delivery of feed or meat chicken supplies. This was intended to counter the market dominance of broiler production integrated companies, which enabled them to influence the market price, despite the state of emergency (Evalia *et al.*, 2023).

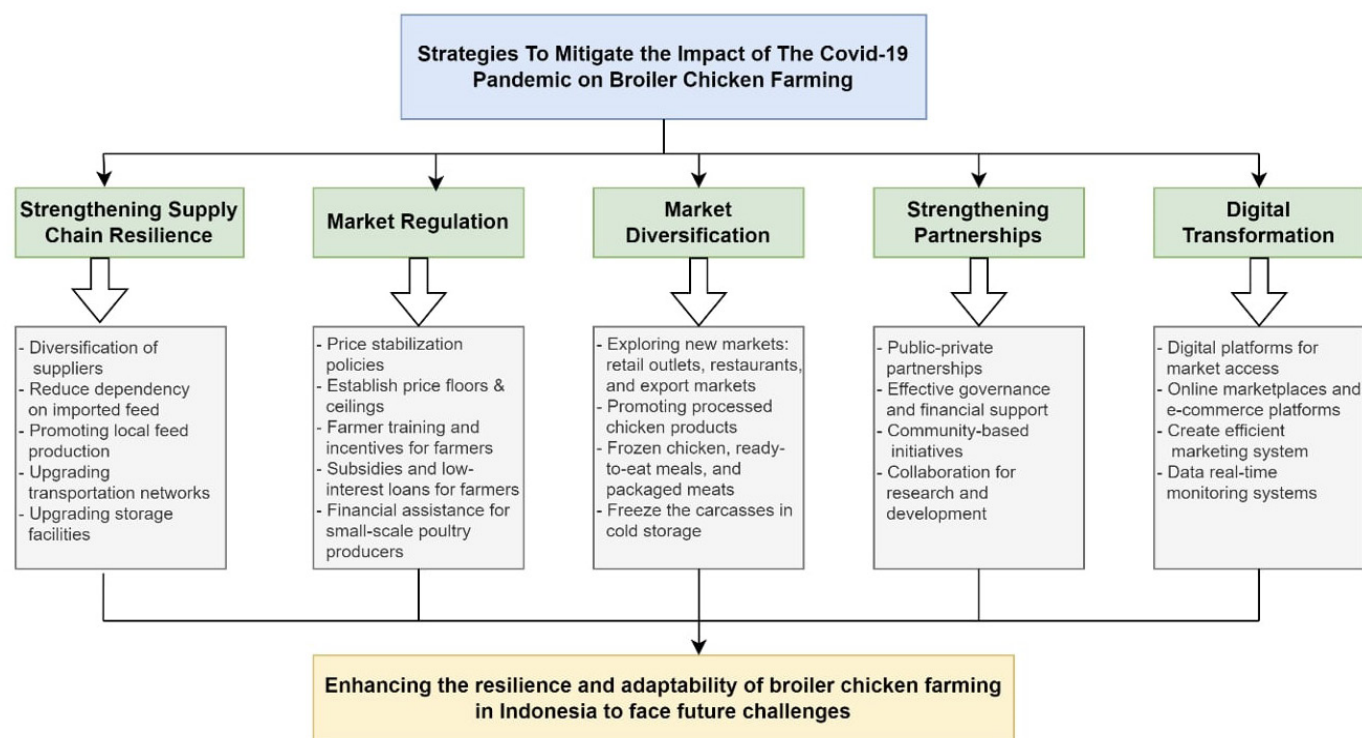


Figure 5: Strategies to mitigate the impact of COVID-19 pandemic on broiler farming in Indonesia.

Market regulation also became an essential strategy to stabilize broiler prices during and after the COVID-19 pandemic in Indonesia. Implementing effective price stabilization policies can help ensure that broiler meat prices remain fair for both farmers and consumers. The government can establish price floors and ceilings to prevent extreme fluctuations and provide market stability. Additionally, providing financial support, such as subsidies and low-interest loans, is crucial for broiler farmers during the COVID-19 pandemic (Alawode, 2020). Farmer training and incentives for farmers also become strategic initiatives supporting the recovery of broiler farming post the COVID-19 Pandemic (Biswal *et al.*, 2021; Swain *et al.*, 2020). Financial assistance for small-scale poultry producers is also crucial (Agboola *et al.*, 2021). These strategies can help broiler farmers maintain their operations during the COVID-19 pandemic and recover more quickly.

Market diversification is an imperative strategy to counteract the impact of the COVID-19 pandemic on broiler farming in Indonesia. Exploring new markets, both domestically and internationally, presents an opportunity to mitigate the impact of demand fluctuations caused by the COVID-19 pandemic. Broiler farmers can broaden their customer base and enhance market resilience by identifying and developing new market channels, such as retail outlets, restaurants, and export markets. Strategies to enhance market diversification also need to consider the creation of new marketing channels and supply chains (Bamidele and Amole, 2021).

Additionally, promoting processed chicken products can add value to the industry and open new revenue streams. Through the production and marketing of value-added products like frozen chicken, ready-to-eat meals, and packaged meats, farmers can cater to diverse consumer preferences and increase market penetration. The Indonesian government, in supporting the strategy of market diversification, through The Directorate General of Livestock and Animal Health, Ministry of Agriculture, launched a program to purchase broilers from production farmers and freeze the carcasses in cold storage to increase the time between slaughter and purchase. According to Zhang *et al.*, (2017), demand for chilled and frozen poultry meat is growing, which has led to the appearance of more modern poultry processing plants in Asia. The pandemic induced changes in consumer behavior, with increased concerns about food safety, hygiene, and the traceability and origin of poultry products, prompting some consumers to shift from fresh chicken to frozen products (Chenarides *et al.*, 2021; Janssen *et al.*, 2021; Wachyuni and Wiweka, 2020; Chang and Meyerhoefer, 2021). This product diversification was also implemented in Africa to face the change in the behavior of broiler producers and consumers (Agboola *et al.*, 2021).

Strengthening partnerships and collaboration is another fundamental strategy to mitigate the impact of the COVID-19 pandemic on broiler farming in Indonesia. Collaboration between the government, private sector, and academic institutions can lead to developing and

implementing innovative solutions. Public-private partnerships can support research and development efforts, enhance market access, and provide financial and technical assistance to broiler farmers. Effective governance and financial support can create a conducive environment for reviving the poultry sector (Biswal *et al.*, 2021; Swain *et al.*, 2020). As a form of implementing this strategy, Indonesia has endeavored to apply the strategy of strengthening partnerships and collaboration. This aligns with the findings of Suryana *et al.* (2020), who stated that the Indonesian government launched partnerships with several companies to facilitate the distribution of livestock products.

Using digital platforms for market access can revolutionize the way broiler farmers connect with consumers, reducing reliance on traditional intermediaries. Online marketplaces and e-commerce platforms offer opportunities for direct sales, enabling broiler farmers to reach a broader customer base and obtain better pricing. The government could support a marketing system that brings producers and buyers closer together (Rahman *et al.*, 2021). Improved linkages between producers, businesses, and consumers, and broader access to finance and training are strategies in the efforts to recover broiler farming post the COVID-19 pandemic (Sattar *et al.*, 2021; Rahman *et al.*, 2021). Moreover, embracing data real-time monitoring systems empowers farmers to make informed decisions regarding production, inventory management, and market trends. By implementing these strategies, Indonesia's broiler farming can enhance its resilience and adaptability in the face of future challenges.

The farmer corporation needs to be developed to ease the implementation of the suggested strategies. Furthermore, capacity building for the farmer, such as training to formulate broiler feed based on local feedstuff, produce derivative products of broiler meat, and sell the product in the online marketplace, should be a routine agenda to prepare the knowledge and skill of the farmer to face the force majeure in the future.

CONCLUSION

The COVID-19 pandemic negatively impacted the broiler industry, including disruption in the supply chain, increased production cost, reduced broiler farm productivity, decreased farmer incomes, and impeded sustainability in broiler farming. This review finds some new insights facing an emergent condition such as strengthening supply chain resilience, market regulation to stabilize chicken prices, creating new marketing channels, and opening new revenue streams to promote healthier foods through mod-

ern processing to the broiler industry. In addition, farmer capacity building and multi-stakeholder partnerships are needed to prepare the readiness of the farmer to face force majeure in the future. Multi-stakeholder collaboration, including the government, the private sector, and farmers, is pivotal in providing training and financial support, such as subsidies and low-interest loans.

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NOVELTY STATEMENT

There has been no comprehensive review of the COVID-19 pandemics impact and development strategies on broiler farming in Indonesia. Explore the core of the Indonesian poultry sector, where the country's broiler farming landscape has been transformed by the combination of local governmental actions and the global crisis. This review reveals the various implications of the pandemic and government strategies on the sector's sustainability and resilience. From supply chain disruptions to economic upheavals, each chapter reveals a new layer of complexity, encouraging stakeholders to investigate novel solutions and strategic interventions.

AUTHOR CONTRIBUTION

SR: conceptualization, methodology, writing-original draft, and writing-review and editing. TK: conceptualization, resources, writing-original draft, and writing-review and editing. PP: methodology, resources, and writing-original draft. DAK, LP, YW, AH, NP, NA: resources, writing-original draft, and writing-review and editing. PAI: supervising, reviewing and editing. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declare there is no conflict of interest regarding the manuscript.

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