The sustainability challenges of the poultry industry during pandemic Covid-19

Ika Yunita and Sawarni Hasibuan

Master of Industrial Engineering Program, Postgraduate School, Universitas Mercu Buana, Jakarta, Indonesia
E-mail: Ikayunita0512@gmail.com

Abstract. Increased awareness of social, economic, and environmental quality is a driving factor for sustainability studies in various industries, including the poultry industry. The poultry industry, especially broiler products, is classified as an industry that has complete supply chain components from upstream to downstream. Covid-19 has had a major impact on the industry, including the poultry industry. In June 2020, Indonesia’s inflation reached 0.18%, and broilers contributed to 0.14% as an implication of the Covid-19 pandemic. This paper aims to identify sustainability challenges in the poultry industry during the Covid-19 pandemic condition. The results of this review literature found various sustainability challenges during the Covid-19 pandemic, including supply chain disruption, oversupply, human welfare, and animal welfare.

1. Introduction
Indonesia is an archipelagic country with the number of islands in 2018 reached 16,056 [1], spreading in various types of climate and land. One of the main sectors in supporting the economy in Indonesia is agriculture. Agriculture is a sector that has repeatedly proven itself a resilient sector to the economic crisis [2]. Agriculture, forestry, and fishery sectors are nature-based business sectors that sell biological commodities. From the distribution of Gross Domestic Product (GDP) in 2015-2018, agriculture, forestry, and fisheries contributed an average of 13.23 % [3], as shown in Figure 1.

In addition to the forwarded economy, the agricultural sector supports the Indonesian people’s nourishment needs. The agricultural industry has four subsectors, namely: crops, gardening plants, farms, and horticultural. The farm subsector is an alternative to meet Indonesian animal protein demand besides the fishery subsector [4]. Poultry makes a considerable commitment to food security and nutrition, providing energy, protein, and essentials micro-nutrients to people, with brief generation cycles and the capacity to change over an extensive run of agri-food by-products and squanders into the meat and eggs consumable by people. Poultry is the speediest developing rural sub-sector, particularly in developing countries [5]. The organization for economic cooperation and development (OECD)/FAO outlook report in 2017 also projected an increase in meat production over the next decade (primarily driven by growth in poultry meat production) [6]. Livestock business development in Indonesia can answer the challenges faced in food security, employment, public welfare, foreign exchange, and the national economy [7].
Increasing concern for quality social, economic, and environment has been a driving factor for sustainability studies in various industries [8,9], including the poultry industry. The poultry industry of broiler products is an agribusiness industry with a complete supply chain component from the upstream to downstream segments. Large companies have developed and controlled industries in the upstream segment ranging from seeds, chicken feed (poultry), and drugs and vaccines, which act as a driving force for input suppliers. In the downstream segment, the agro-industry has developed and processed livestock products into processed products and trades processed cattle products in the domestic and international markets. While in the technical production, chicken farmers are involved in the poultry business as those who produce live chickens ready for sale (livestock) from the maintenance of chicken breeds [10].

![Figure 1. Average GDP distribution in Indonesia in 2015 – 2018 [3].](image)

Covid-19 is a pandemic that is attacking many countries in the world [11]. It has significant impacts on all sectors, including the poultry industry. All available evidence of Covid-19 suggests that SARS-CoV-2 features a zoonotic source [12,13]. Zoonotic diseases, also known as zoonoses, are caused by germs like viruses, bacterial, parasites, and fungi that spread between animals and people [14]. Coronavirus is part of a family of viruses that can cause disease in animals or humans. In humans, some coronaviruses such as the Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) can cause respiratory infections, such as the common cold to more severe illnesses. The most recently discovered coronavirus causes Covid-19. Covid-19 is a contagious disease caused by the most recently discovered coronavirus. This new virus and infection were first found in Wuhan, China, in December 2019. In Indonesia, the Declaration of Special Emergency Situation of Covid-19 Epidemic Disaster was declared by President of The Republic of Indonesia Joko Widodo on February 28th, 2020.

According to Schmidhuber et al. [15], Covid-19 will affect all food system elements, from primary supplies, processing, trade, and national and even international logistics systems. It also affects factor markets, namely labor capital and intermediate production inputs (e.g., pesticides, seeds). The magnitude of this impact will depend on the persistence, spread of the pandemic itself, and economic adjustment and recovery dynamics. On the supply side, very different views remain regarding the duration of shocks, price dynamics, differences in impact between domestic and international markets, differences between countries and commodities, timing and possible pathways for recovery, and policy actions to address various shocks. There is agreement almost everywhere that agricultural demand and trade will slow on the demand side, with a contraction stemming from a slowdown in overall economic activity (GDP growth) and rising unemployment rates.

During pandemic Covid-19, poultry industry markets become more uncertain from January 2020 to May 2020. The national average price of a live bird at the farm level increased below the reference price, depending on the farmer level’s live bird production. The Covid-19 pandemic since March 2020 affected the demand for broilers to decrease, increasing live bird prices at the farmer level to plummet and increasing rates significantly to reach IDR 9,000 per kg. It has caused several companies engaged in poultry, especially broiler chickens, to reduce their production numbers. When pandemic Covid-19, chicken meat demand increased, but the cage’s available chicken stock lacked, so it became expensive.
In June 2020, inflation of 0.18% contributed to the leading commodity that came from broiler chicken meat by 0.14%, with a price increase of 11.02% [16] (see Figure 2). Agriculture is one of the most important sectors in human development related to food security. This article identified the sustainability challenges in the poultry industry, which are expected to be input for stakeholders.

![Figure 2](image_url)

**Figure 2.** Retail price of broiler chicken meat May 2019 – June 2020 (IDR) [16].

2. Methods
This study analyzed articles, reports, and academic journals in the Scopus and Google Scholar databases and verified organization. The subject area was the poultry industry used to define the scope of journals as the literature material. The journals search used keywords with the terms such as poultry, sustainability, and Covid-19 were stated in the title, abstract, and keywords from January 2020 to July 2020. Each paper was screened to assess whether its content was fundamentally relevant regarding sustainability challenges in the poultry industry.

3. Results and Discussion

3.1. Supply chain disruption
During the Covid-19 pandemic, all aspects of life tend to be new normal situations. The government appeals to the community to do homework (working for home) and maintain physical distance (social/physical distancing). Also, several local governments’ policies that implement partial regional quarantine and carry out activities in the crowd have made a new situation change in almost all aspects of life, including changes in food supply chain patterns. The work system or pattern in the food sector has changed significantly during the Covid-19 pandemic, starting from the production process to consumption, from upstream to downstream [17,18]. From a production or upstream perspective, farmers and food producers are starting to feel changes in input supply and adjust production protocols to ensure food quality and safety amid the Covid-19 pandemic, especially in contaminated areas. Disruption of supply chains also happened in veterinary medicine production because these medicines’ active pharmaceutical ingredients are located in China [19]. Foodstuffs’ mobilization will also experience some errors where it occurs; the pattern of changing supply lines becomes more towards modern markets and online-based markets.

3.2. Oversupply of livestock product
During the pandemic, production and distribution capacity decreased, and customers supplied a larger safety stock; meanwhile, overall consumer confidence declined [20,21]. Chicken farmers suffered losses because the sector that absorbed chicken products was not operating, such as HoReCa (hotel, restaurant, and catering) and businesses related to chicken meat processing [22,23]. It is due to the policies related to limiting activities to prevent the spread of the Covid-19. Before the pandemic, HoReCa can absorb more than 50% of total demands. However, during the Covid-19, the absorption of HoReCa stopped and turned to household consumption [24]. Covid-19 will surprise the final food demand with a decrease in overall purchasing power, especially for the increasing number of unemployed [25].
3.3. Human welfare
The health and safety of workers become one of the main concerns for sustainability. Large-scale social restrictions (LSSR) has caused many workers to get stressed because of this uncertain condition. Many people lost their job [26], and physical distancing can significantly affect workers’ mental health [27–30]. Everyone working at the “front line” of the food supply chain, such as drivers, farmers, processors, distributors, or retail employees, undertakes these activities with considerable risk. As of 31st May 2020, it was reported that at least 17,358 cases and 91 deaths related to Covid-19 had occurred among US meat and poultry processing workers [31]. Biosecurity, biosafety, hygiene, and sanitation procedures must be run properly to avoid contamination [32,33]. Markets that sell live animals can pose a public health hazard by allowing zoonotic diseases to spread, especially if they are poorly regulated and allow close mixing of different species [12].

3.4. Animal welfare
Covid-19 can also disrupt a country’s ability to prevent and control animal diseases because they allocate resources to deal with a pandemic and reduce socio-economic activities [19]. FAO also explains that Covid-19 directly or indirectly interferes with activities to keep livestock healthy, including preventing and controlling animal diseases. Overstocking animals on farms can increase stress and the prevalence of animal diseases and disrupt animal welfare standards. The disruption of the supply of active pharmaceutical ingredients results in disruption of the supply of veterinary medicines.

4. Conclusions
This article identified the challenges sustainability caused by the Covid-19. Those challenges include supply chain disruption, oversupply, human welfare, and animal welfare. Overcoming those challenges requires good cooperation between all stakeholders in making effective and efficient policy, strategies, and joint commitment in its implementation. It is expected that we can pass the Covid-19 pandemic together.

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