

The Impact of Covid-19 Pandemic on the Livestock Subsector

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Abstract

The Covid-19 pandemic had an impact on human activities and all sectors globally. This study aims to review the impact of the pandemic on livestock products. Furthermore, data were collected from several literature, websites, national, and international news, relevant to current policies and conditions. The impact on the livestock sub-sector is not measured and includes a decrease in purchasing power and demand for livestock products such as meat, milk, and eggs, decreased profitability, hampered distribution of production inputs such as feed and medicine affect the increasing production costs, veterinary services limitation, hinder the livestock animal and product distribution, disruption on marketing and business downturn. Meanwhile, the positive impact is that farmers created an online-based digital innovation, known as e-commerce, involving product marketing, business, and product diversification. The Government also plays a vital role in demand and price stabilization, which ensures the supply chain sustainability of the products. Therefore, the livestock business can keep running sustainably, especially during the pandemic.

Keywords: Impact, Covid-19 Pandemic, Products, Economic Livestock

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1 Introduction

Corona Virus or Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) belongs to the Coronaviridae family that attacks the respiratory system. This virus is small in size with 65-125 nm in diameter and contains a single-stranded RNA as nucleic material with a length of 26-32 kbs. Additionally, the coronavirus variants include Alpha (α), Beta (β), Gamma (γ), and Delta (δ) [1]. The World Health Organization (WHO) declared COVID-19 a public health emergency [2] because it caused the largest global pandemic in this generation [1], [3] due to its global spread, including in Indonesia.

Comorbidities such as lung disease, heart disease, obesity, and other metabolic diseases worsen the severity of Covid-19 patients [4]. The viral outbreak has a long-term effect on the structural changes in human activities globally [5], the government field [6], socioeconomic [7], biological diversity [8], and food system [9], [10]. Subsequently, efforts to deal with the pandemic through various policies are taken place by the government. The first step involves restrictions on community mobility to prevent transmission and reduce morbidity and mortality rates. However, due to these restrictions, many sectors are affected including the economic sector.

Generally, the top priorities to cope with the Covid-19 pandemic include food system, availability, access, commodities, and security [11] as well as health aspect. Furthermore, livestock is the main contributor of animal protein, which is important for the community [6][12]. Balanced nutrition, especially animal protein, is necessary to support health and live an active, productive, and prosperous life [13], though this is difficult to realize during the pandemic. The livestock represents a segment of the economy [14] and plays an important role in [15] food security, which is affected in this pandemic. Therefore, the impact of the

pandemic on various sectors requires further studies, especially on livestock products.

2 Economic Impacts

The Covid-19 pandemic had an impact on the health and social aspect, as well as the global economic [16], [17], primary (raw material-supplier industry), secondary (product production/processing/manufacturing industry), and tertiary sectors (services provider industry) [18]. This affected the economic sector in developed and developing countries throughout the world [19] and strategies to reduce these economic impacts have been undertaken [20]. Also, the pandemic changed community behavior, working environment, business in many countries, including digitalization and less physical interaction and mobility [4].

Defense and mitigation strategies carried out globally to reduce the transmission rate and deaths from Covid-19 have sparked fears of global economic crisis and recession [18], [21], [22]. However, efforts have been made to resolve this issue, such as lockdown [23], regional quarantine, and large-scale social restriction (PSBB) [24]. The economic impacts in Indonesia vary, are cross-sectoral [17], and interrelated [11]. In addition, the economic contraction was observed by the growth of the national Gross Domestic Product (GDP), which declined sharply in the second quarter of 2020 compared to that of 2019 i.e. 5.32% (y-o-y). This decline due to the pandemic mostly occurred in Indonesia during the second quarter of 2020 [25]. Furthermore, Global Gross Domestic Product fell by 4.3% in 2020, with an expected global recovery of 4.1% in 2021. Figure 1 showed that the economic growth was more affected in 2020, especially in developing countries i.e. -5.8% and -2.1% respectively [26].

The Covid-19 pandemic created a reduction in supply and demand [21] which affected the marketing process [27], causing instability in the economic activity [21]

including livestock's product supply chain [28]. Furthermore, the livestock sub-sector experienced an economic contraction of 1.8% [29]. The gross domestic product of the livestock sub-sector in 2020 was IDR167.1 trillion, which decreased by 0.33% from IDR167.6 trillion in 2019 [30].

During the pandemic, economic contraction occurred due to a decline in purchasing power [29]. The declining purchasing power and changes in consumption patterns correlate with the economic conditions. Meanwhile, public consumption is the main contributor in supporting a country's economy by 56% [31]. Therefore, a shift in consumption patterns and consumer purchasing power to cheaper foods [14] was implemented by the community, in response to

the declining family economic conditions due to the pandemic. The livelihoods during a pandemic are at stake [9], and loss of household income due to employment termination reduced the discretionary cost, hence the families are vulnerable to fulfilling adequate nutritional intake [32]. This causes the disruption of essential nutrient services [33] and household food insecurity [34], leading to malnutrition [33]. Subsequently, poor nutrition and an unhealthy lifestyle make people vulnerable to the virus, though the government anticipates this condition through various policies. The government was conducted economic stimulus in the form of social assistance in various regions, to ease the burden of the community during the unstable economic condition due to the pandemic [35].

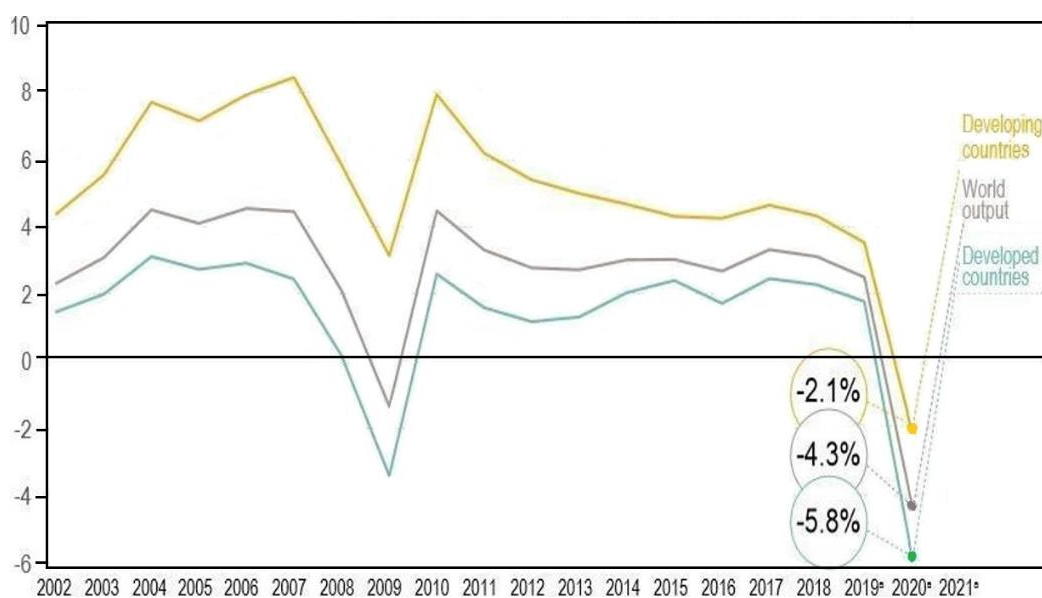


Figure 1. Trend of Global Economic Growth (Annual Percentage Growth). Taken from [26]

3 Livestock Subsector

The Covid-19 pandemic affected the health and economic sectors, including the livestock sub-sectors. Numerous countries have made efforts to overcome the spread of the virus, by enacting policies, such as restrictions on private vehicles, public transportation, personal mobility, and shopping centers such as local markets, supermarkets, and street vendors [5]. The closing of shopping centers affected the commodity exchange [18]. Furthermore, the implementation intensity of these policies

varies in each country and they may affect the agricultural sector including the livestock sub-sector [5]. The global demand for agricultural products and commodities has decreased by up to 20% [18]. This policy was known as the Large-Scale Social Restrictions policy (PSBB) in Indonesia and was recently lifted to the Enforcement of Restrictions on Community Activities policy (PPKM) [36].

The impact of PSBB is observed from the hampering distribution and disruption of two economic sectors, namely consumption and

production [29]. Furthermore, policies restrictions and increasing complicated inspections caused damage to perishable goods such as livestock products, especially meat [18]. The national needs for livestock products are still supported by imported products, though production and distribution activities between countries have been disrupted and limited with the Covid-19 pandemic [29], affecting export/import activities [27]. Also, import restriction has a major impact on countries that depends on them to meet their food products needs, such as meat and milk [37]. The livestock product import value reached US\$3,567.1 million in 2020, which decreased by 9.59% from US\$3,945.6 million in 2019 Statistics Indonesia [36]. In addition, restriction on social mobility and access between regions during the pandemic lead to a low supply of medicines for livestock [18], affected the distribution of animal feeds [38], [39], veterinary services [40], [12], and delay in routine vaccination programs for oral and nail diseases [41]. The distribution of livestock is hindered, causing overstocking and excessive livestock in one area, increasing the potential for stress, and disease prevalence [42].

During the pandemic, large-scale livestock companies experienced several obstacles such as limited supply, increased prices for imported production inputs, and delays in delivery of feed supplements or synthetic amino acids products [5]. The feed companies implemented the use of personal protective equipment as part of health protocols, workforce reduction, and social distancing, which reduced the efficiency of the company's performance [37]. Also, an increase in production cost occurred in meat packaging factories during the pandemic, where companies bore additional costs for their sick workers due to this virus, leading to a less productive performance [43]. Although an increase in production costs correlates with an increase in the product price, the demand and purchasing power of the people decreased [43]. The decrease in the amount of livestock and input production increases the contribution of the sub-sector to national inflation [44]. In addition, another impact caused by the pandemic is an increase in the price of feed and medicine due to disruption of the distribution process and limited supply [9]. The disruption to logistics channels and decrease in demand

resulted in reduced sales and lower prices [37]. Also, the demand for beef cattle in production center areas, such as Boyolali decreased due to the decline in purchasing power of the people [29].

The policy of closing livestock markets (especially ruminants) in several countries has consequences for small-scale livestock producers that are unable to sell their animals [37], hence they are re-raised. This condition results in an increase in feed costs and a decrease in the farmer's income [45]. Also, the disruption in marketing causes farmers to raise their livestock for a longer period beyond the marketing age. The implication of these actions include an increase in feed production costs, because the longer the rearing period the higher the feeding costs, resulting in economic losses [41]. Furthermore, farmers rely on grazing for their livestock to meet the required feed and achieve productivity, though the quality of the meat produced is lower [46].

The Covid-19 pandemic caused problems for the broiler farming industry, which is in danger of bankruptcy due to rising feed prices, high transportation costs, and sales below the normal market price standards (-1.81%). Furthermore, the decision to sell at low prices was made by farmers to avoid increasing production costs, especially feeds [44]. Also, broiler production decreased due to the drastic drop in chicken prices [29]. The income of broiler breeders in the Probolinggo Regency decreased by 38% from the normal conditions before the pandemic [47].

The effects of the pandemic are also felt by goat and sheep breeders, though the impact varies greatly. Although the sales of goats and sheep in Pasuruan, Malang, and Banjarnegara regencies were relatively stable during the pandemic, restrictions on business activities, parties, tourism, and other activities caused a decrease in sales during the implementation of the PSBB policy. A dramatic decrease to 50-60% was felt by entrepreneurs in *aqiqah*, a ceremony held by muslim people to commemorate their children's birth, and live goats/sheep producers in Bekasi City and Bogor Regency/City. However, the decline was followed by an increase in processed meat sales in cans up to three times, resulting in business continuity. The sales of goats/sheep for *qurban* (sacrificed animal) during the Eid al-Adha holiday

increased in individual purchasing power and decreased in institutions such as schools, agencies, and Islamic boarding schools [29].

4 Livestock Product

Livestock of the world's population has a very strategic and important role in providing animal protein [12] as well as being a livelihood for millions of Indonesian people, especially those in rural areas [6]. The income elasticity values of animal food products are higher than vegetable products [29]. Meanwhile, the decline of income during the pandemic had an impact on the declining demand for animal food. This led to food product substitution from livestock to other affordable food products, especially during the Covid-19 pandemic. Furthermore, food products from livestock such as meat, eggs, and milk are considered luxurious and expensive for people in the middle to lower economic level [29]. Hence, the purchasing power of these community groups decreases during a pandemic and is substituted with plant-based food products. The community groups with middle to upper economic levels increase the consumption of animal food products to increase their body's immunity against the virus [29]. Table 1 shows the public consumption of livestock products.

Table 1. The Consumption of livestock products per capita per year in Indonesia*

Commodity	Unit	Year	
		2019	2020
Cattle beef	kg/capita/year	0.469	0.469
Broiler chicken meat	kg/capita/year	5.683	6.048
Local chicken meat	kg/capita/year	0.782	0.730
Pork	kg/capita/year	0.261	0.261
Broiler eggs	Eggs/capita/year	2.067	2.124
Local chicken eggs	Eggs/capita/year	0.071	0.063
Duck eggs	Eggs/capita/year	0.035	0.032
Milk	250 ml/capita/year	0.109	0.119

Taken Form [30].

* Consumption of livestock products per capita per year before (2019) and during pandemic (2020).

Table 2. Average Daily Consumption Per Capita of Calories and Protein from Livestock Product in Indonesia Year 2019-2020

Livestock Product	Calories (Kkal)		Protein (gram)	
	2019	2020	2019	2020
Meat	62.19	65.03	3.88	4.05
Eggs and Milk	60.20	60.62	3.42	3.47

Taken Form [30].

The daily consumption of calories and protein per capita before (2019) and during the pandemic (2020) in Indonesia showed that it is lower compared to developed countries. According to Table 1, the level of public consumption of livestock products before and during the pandemic varies between commodities, while the average daily consumption of calories and protein per capita obtained from livestock products in Indonesia increases (Table 2). Hence, the government has provided the citizen's needs during the pandemic, such as distributing food package assistance, including livestock products, to the citizens

The average national retail price of livestock products increased, but the demand and purchasing power tends to decline, especially for the lower and middle class. Also, the global demand for livestock products in several communities during the pandemic has decreased [5]. The decline in public demand for the product correlates with the selling price and the farmer's income, which has decreased [45], as observed in the broiler eggs commodity. Table 3 showed that the retail price of the eggs based on national statistical data is IDR24,758.00/kg, though the price ranges from IDR12,000/kg - IDR16,000/kg in the field. Hence, farmers suffer losses because the selling price is not comparable to the production cost which reaches IDR17,000. Conversely, the opposite occurs in the community, where the price of eggs decreases while the people's purchasing power increases.

Table 3. The Average National Retail Prices of Livestock Products Year 2019-2020*

Commodity	Unit	Year	
		2019	2020
Broiler Chicken Meat	Kg	32,172.00	32,217.00
Beef	Kg	117,910.00	120,423.00
Chicken Eggs	Kg	23,544.00	24,758.00

Taken Form [30].

* The average national retail prices of livestock product before (2019) and during pandemic (2020).

The Covid-19 pandemic has impacted on the chicken meat supply, due to the disruption of the production and distribution system. Furthermore, the large price disparity between regions, unstable price movements, declining

consumption, and purchasing power, hampering imported raw materials for production, and decline in labor, worsened the condition of broiler farms [44]. Restrictions and closing of several economic sectors such as hotels, restaurants, catering businesses, and others related to chicken meat processing also triggered a decline in demand. The small-scale broiler breeders made efforts to continue their business by direct selling or direct sales from farmers to consumers, though the sales obtained cannot be achieved in a short time, especially in large volumes.

During the Covid-19 pandemic, the demand for beef varied between regions. However, before the pandemic, Indonesia agreed to import beef as much as 200,000 tons from India, with 5,000 tons to be imported before Ramadan. This plan was suspended due to the implementation of a lockdown policy in India [48]. Due to the difficulty in obtaining beef commodities, Indonesia has opened up import opportunities with other countries such as Australia, New Zealand, and Spain [48]. The decline in demand and sales level of livestock products (4-40%) occurred in pork and poultry commodities in America, Mexico, and Costa Rica [5], due to the closing of offices, restaurants, and tourism sectors [41]. Furthermore, meat supplies and higher storage costs have increased due to low demand and continuous production processes, hence affecting profit margins [5]. This condition occurred between mid-March to May, while the consumption level of pork and poultry returned to normal from June onwards [5].

The pandemic had an impact on dairy farmers in Iraq, causing difficulties in accessing marketing, excess supply of milk, and falling prices [46]. Meanwhile, limited storage capacity damaged milk, resulting in large losses of about 50% [46]. The farmer's inability to sell milk led to the sale of other livestock commodities to meet production costs [46]. Subsequently, the hampered distribution and low prices of milk at the producer level [12] affected dairy farmers in Bangladesh. The Bangladesh Dairy Farmers Association reported that about 12-15 million liters of unsold milk lead to a huge loss, estimated at US\$6.7 million [12]. Hence, milk production experienced several disruptions due to difficulty in carrying out maintenance,

production, and export activities, especially high-value cheese products [14].

5 Conclusion

The negative impact of the Covid-19 pandemic on the livestock sub-sector include a decrease in purchasing power and public demand for livestock products, decreased profitability of farmers, reduced the distribution of production inputs such as feed and medicines, increasing production cost, limited veterinary services, hampered livestock distribution and products, disruption of marketing aspects, and businesses downturn. However, the positive impact on the livestock sub-sector during this pandemic is that farmers created a breakthrough in online-based digital innovation, popularly known as e-commerce, in marketing their products, conducting business, and generating products diversification. The use of digital mechanisms is supported by the government to facilitate information and create new business models for farmers and/or breeders as well as to ensure business sustainability. The pandemic has made livestock product manufacturers improve their risk mitigation capabilities, including diversifying their businesses and conducting online marketing. Meanwhile, the government through its policies plays a vital role in stabilizing demand and prices as well as ensuring the supply chain sustainability of livestock products, by setting up the products as priority food sources.

6 Declarations

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6.2 Author Contributions

Hamdi Mayulu: Creation of the idea, and Writing-Original Draft; Endang Sawitri: Validation, Writing-Review, and Investigation; Irsan Tricahyadinata: Editing

6.3 Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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