

# Food safety of livestock products in the pandemic of Covid-19 in Indonesia

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## Abstract

Pandemic Covid-19 which hit Indonesia since March 2, 2020, has potential adverse effects on food security. Beef, chicken meat and eggs are three livestock products which are included in ten strategic staple foods. This study aims to analyze the food security of beef, chicken meat and eggs in terms of availability, accessibility, and consumption at the beginning of the Covid-19 pandemic in Indonesia. The study was conducted in June 2020 using a secondary data analysis method. The availability of beef, chicken, and eggs is expected to be sufficient to meet domestic demand until August 2020 and record a surplus. The beef price seemed more stable in March (I) and April (IV). Beef prices seemed to increase constantly and reached the highest point in May (IV), and tend to decrease slightly in June (IV). The chicken and egg prices seemed to decrease constantly in April (IV) compared to in March (I). The chicken prices increased again in June (IV), while eggs were stable. Covid-19 pandemic has the potential to reduce the consumption of livestock products.

**Keywords:** *beef, chicken meat, eggs, food safety*

## Introduction

Food can be defined as anything that comes from vegetable and animal biological sources that are destined for human consumption. Food is the most basic human need and its fulfillment is part of human rights. The Indonesian government sets 10 strategic staple foods: rice, garlic, red onion, red chili, bird's eye chili, sugar, vegetable oil, beef, chicken meat and eggs (Prabowo 2014). Vegetable food is the main source of energy, while animal food is the main source of protein. Beef, chicken, and eggs are sources of animal protein with high biological value because they contain all kinds of essential amino acids with the appropriate amount for growth (Ernawati et al 2017).

Law No. 18/2012 on Food mandates that the fulfillment of food as basic human needs is carried out based on food sovereignty, food independence and food security. Food security is defined as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe, and nutritious foods that meets their dietary needs and food preferences for a healthy life” (Barrett 2010). This definition incorporates several needs: availability of food, access to food, and for the food to be culturally appropriate (Havas and Salman 2011). Food security is seen as a system consisting of three subsystems: food availability, food accessibility, and food consumption (Saputri et al 2016; Suryana 2014).

Pandemic Corona Virus Disease 2019 (Covid-19) which hit Indonesia since March 2, 2020, has potential adverse effects on food security conditions and local food systems and their ability to provide affordable and nutritious food to meet existing demands (Rohmani 2020; WFP 2020). The government appeals to the community to work from home with large-scale social

restrictions measures, to keep social and physical distance, as well as partial area lockdown, causing disruption of food supply chain patterns starting from production, distribution, up to consumption. This study aims to analyze the food security of livestock products namely beef, chicken meat, and eggs in terms of availability, accessibility, and consumption at the beginning of the Covid-19 pandemic in Indonesia.

## Materials and methods

### Materials

The commodities studied were three staple foods from livestock products, namely beef, chicken, and eggs. Secondary data on production, imports, prices, and consumption are sourced from the website of the Ministry of Agriculture, BPS (Statistics Indonesia), WFP (World Food Program), FAO (Food and Agriculture Organization), and relevant national and international official institutions, as well as the mass media.

### Methods

The study was conducted in June 2020 using a secondary data analysis method. Data analysis used quantitative description techniques on the availability, accessibility, and consumption of three livestock products namely beef, chicken, and eggs during the first four months (March-June 2020) of the Covid-19 pandemic in Indonesia.

## Results and discussion

### Food a vailability

Food availability means the ability to provide food both from domestic production and imports. Adequacy of food availability is an important aspect of realizing national food security because it can increase access for the community to food. Estimation of the availability, production, and needs of beef, chicken, and chicken eggs are presented in Table 1. The estimation is made with the assumption that Covid-19 will result in (BKP 2020): (1) a 5% decrease in production because the price of production facilities is expensive and the distribution is not smooth; (2) food needs increasing by 5% due to panic buying and people stockpiling food; and (3) the realization of imports falls by 5% because trading restrictions and producing countries imposing restrictions on food exports.

The availability of beef, chicken, and eggs is expected to be sufficient to meet domestic demand until August 2020 and record a surplus (Table 1). The availability of chicken and eggs can be met from domestic production; however, sufficient imports would be needed for beef. Beef imports are estimated to increase from 109,253 tonnes in March-May to 180,752 tonnes in June-August 2020. The increase in imports was due to an increase in public consumption demand mainly in Ramadan (24 April-23 May) and Eid al-Fitr (24-25 May), and the potential disruption of food production and consumption as a result of the wide spread of Covid-19 (Hermanto 2020); besides, imports of livestock products that have not been able to be fulfilled with domestic production.

**Table 1.** Estimation Availability, Production, and Needs of Livestock Product for March-August 2020 (000 tonnes).

Commodity	Availability			Amounts Available	Estimation Needs	Surplus/(Deficit)
	Stock (Feb '20)	Production Estimation	Import Plan			
Beef Kerbau	14.299	248.826	290.005	553.130	393.840	159.290

Chicken	98.640	1,979.960	0	2,078.600	1,735.810	342.800
Eggs	27.582	2,549.540	0	2,577.120	2,484.140	92.980

Sources: *Damanik (2020) and Hadiutomo (2020)*

Indonesian beef production is currently not sufficient to meet domestic consumption needs. The value of SSR (Self Sufficiency Ratio) of Indonesian beef is 83.2% (Kementan 2019a). This means that domestic beef production only meets 83.2% of the requirement, while the remaining 16.8% must be supplied from imported beef. This dependence on imported beef is mainly fresh and frozen beef. In 2019 Indonesian beef imports from India contributed 45.9% worth USD284 million, from Australia 43.5% worth USD269 million and the United States 5.98% worth USD37 million. The source of Indonesian beef supply is determined by 6.40 million small-scale farmers, 96 feeder cattle importers and 67 beef importers (Rusastra 2014).

The current production of chicken and eggs in Indonesia is sufficient for domestic consumption. The SSR value of chicken and eggs was respectively 99.9% (Kementan 2018) and 99.9% (Kementan 2019b). This means that more than 90% of chicken and egg needs can be met by domestic production. The SSR value shows that Indonesia has on-trend self-sufficient chicken and eggs. The understanding of on-trend self-sufficiency is that at least 90 percent of food needs are met from domestic production, while the remaining 10 percent is met from imports when domestic supply is insufficient (Ariningsih 2014; Handayani et al 2016).

In 2019 Indonesia produced beef, chicken, and eggs each with 490,421 tonnes, 3,495,091 tonnes and 4,753,382 tonnes. The island of Java, which is only 6.70% (129,438 km<sup>2</sup>) compared to the land area of Indonesia (1,910,931 km<sup>2</sup>), is a center for beef, chicken, and egg production, respectively 59.2%, 67.6%, and 60.3%. There is a correlation between livestock production and population distribution. A total of 158 million (58.7%) out of 270 million Indonesians live in six provinces on Java. As much as 90.0% of beef production comes from small-scale livestock business, and the remaining 10.0% is from more commercial farmers (Agus and Widi 2018; Purnomo et al 2017; Rusdiana 2019). In contrast to beef cattle, 60.0% of poultry production comes from industrial farms (closed housing systems), while 40.0% remains in the hands of small and medium farmers (open housing systems) (Ferlito and Respatiadi 2018). Most small and medium scale farmers manage chicken farming in collaboration with large companies through a contract farming system (Fitriani et al 2014).

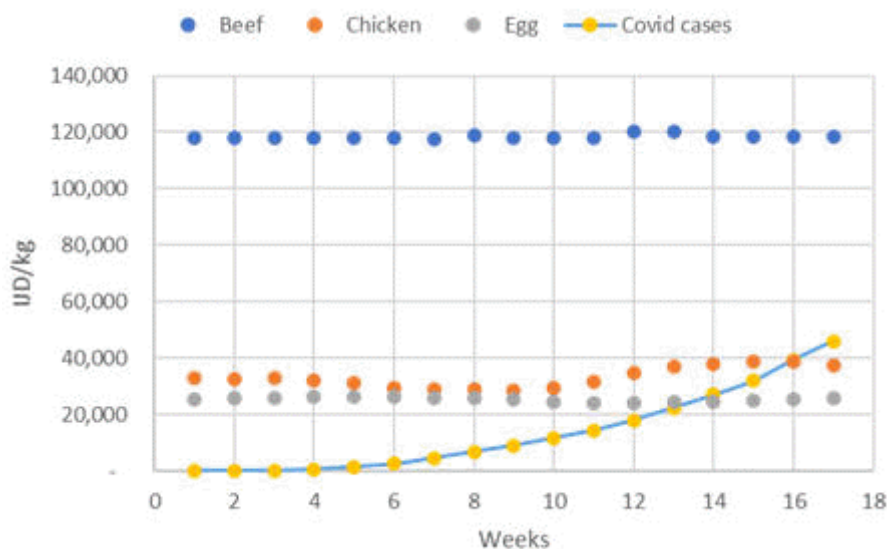
## Food accessibility

Food accessibility from physical and economic aspects is managed through stabilizing food supply and prices. On the physical aspect, food distribution should be seriously concerned due to the geographical location of Indonesia that consists of 17,504 islands. In the economic aspect, food access in Indonesia is constrained by income and the food price fluctuation. Factors that influence price fluctuations on the demand side are religious holidays and public culture, while on the supply side are the prices of production inputs and trade chains (Ilham an Saptana 2019).

Beef prices at the consumer level of IDR66,329/kg (2010), had an average increase of 3.93% per year to Rp116,670/kg (2019). Domestic meat prices are influenced by the volume of imported meat. If the volume of imported meat increases, the price of domestic beef decreases. This is because frozen imported meat is cheaper than local fresh meat. The price of imported beef is USD4.22/kg, equivalent to IDR61,250/kg, IDR30,000-60,000 cheaper per kg compared to the price of domestic beef at IDR90,000-120,000/kg.

The price of chicken at a retail level of IDR24,166/kg (2010 increased 3.93% per year to IDR33,765/kg (2019). The price of eggs increased from IDR15.384/kg (2010) increased 4.75% per year to IDR24,807/kg (2019). Marketing of chicken and eggs mostly relies on traditional markets. Marketing channels involve many distribution points from farmers, traders to consumers. This often causes prices at the farmer level to be very low, even below the cost of production, but at the consumer level, the price is more expensive.

During the Covid-19 March-June 2020 pandemic, the average prices of beef, chicken and chicken eggs were IDR118,362 ± 748, IDR33,141 ± 3,679, and IDR 25,321 ± 708, respectively (Figure 1). Prices of beef and chicken increased respectively 0.03% and 0,89% per week, while eggs decreased 0.096% per week. At the beginning of the Covid-19 pandemic Covid-19 the beef price seemed more stable in March at IDR117,850/kg and April at IDR118,200/kg. Beef prices seemed to increase constantly and reached the highest point in May at IDR120,300/kg as the Eid 'al Fitr holidays approached, and tended to decrease slightly in June at IDR118,400 (Figure 1). Difficulties in securing beef imports increase the likelihood of beef prices rising as the Eid 'al Fitr holidays approach. However, the lower than usual demand may help to dampen price spikes.



*Source:* (PIHPS, 2020)

**Figure 1.** Beef, chicken and egg prices in March-June 2020 (IDR/kg)

The chicken and egg prices seemed to decrease constantly at IDR28.450/kg and IDR25,400/kg in April compared to IDR32,900/kg and IDR25,550/kg in March, respectively. Then, chicken prices increased again at IDR37.400/kg, while eggs were stable at IDR25,900 kg in June. The reduction in chicken and egg prices has been indicated to be caused by an oversupply by the poultry industry since 2019. This has been worsened by the reduced demand due to the implementation of large-scale social restriction measures, including physical and social distancing and restrictions on food-related business operations (restaurants, hotels, and catering services), which began in certain areas as early as mid-April 2020. Foodstuffs experienced deflation of -0.13 percent, indicating a decrease in prices and public demand.

## Food consumption

Food consumption expenditure is an indicator of people's welfare. Engel's law stated that the poorer a family, the greater the proportion of its total expenditure that must be devoted to the provision of food (Clements and Chen 2010; Clements and Si 2018; Gao 2012). This was then extended to whole countries by arguing the richer a country, the smaller the food share. Indonesians' income in 2019 was IDR59.1 million or US\$4,175/capita (BPS 2020), lower than the income of developing countries at USD5,650 and developed countries at USD48,250/capita. Indonesians' per capita expenditure per month was IDR1,124,717, spent on food IDR556,899 (49.5%) (BPS 2019), while those at or below the poverty line spend around 62.8% on food (Ilman 2020). Spending on foods, as much as IDR23,006 (4.13%) was used for meat consumption and IDR32,196 (5.78%) for eggs and milk.

Indonesian beef consumption was 2.30 kg (2010), increasing by an average of 2.82% per year to 2.56 kg/capita/year in 2019. The consumption is below that of several ASEAN countries, such as Malaysia 4.80 kg, the Philippines 3.10 kg, and Vietnam 9.90 kg. Chicken meat consumption was 12.8 kg (2017), an increase of 10.7% per year to 15.5 kg per capita per year in

2019. Chicken consumption is lower than Malaysia 46.0 kg and Thailand 14.5, and is higher than Vietnam 13.0 kg and the Philippines 12.6 kg. Egg consumption is 6.71 kg (2010), increasing 1.14% per year to 6.49 kg per capita per year in 2019. Egg consumption is also less than Malaysia's 14.4 kg and Thailand's 9.90 kg. Higher prices and lower population incomes cause the consumption of livestock products of the Indonesians to be lower than in neighboring countries.

Food consumption is determined by a multitude of factors: food prices, household income, consumer preferences, availability of substitutes, and the product's share of a household's income (Andreyeva et al 2010). The most commonly used measure of consumers' sensitivity to price and income is known as elasticity of demand (Zandt 2012). It is simply the proportionate change in demand given a change in price or income. Price elasticity of demand is the level of responsiveness of the quantity of products demanded by the consumer when there is a change in the price. Income elasticity of demand refers to the sensitiveness of quantity demanded in the change in incomes. When the relative change in purchased quantity is below the relative change in price or income, demand is inelastic (numerically, the absolute value of price elasticity is below 1.00). In contrast, changes in demand that exceed the relative price or income change reflect elastic demand (the absolute value of price elasticity is above 1.00).

Price elasticity and income elasticity of beef and chicken meat are elastic (Umaroh and Vinantia 2018), while eggs are inelastic (Febrianto and Putritamara 2017). This means that if prices rise by 1% or income falls by 1%, then demand for beef and chicken falls by more than one percent, and vice versa. If prices go up 1% or income falls down 1%, then egg demand will decrease by less than 1%, and vice versa. This is different from developed countries where the price elasticity and income elasticity of the three commodities are inelastic (Andreyeva et al 2010). With the majority of consumers (87,2%) being muslim, beef and chicken are the most common meat proteins in Indonesia.

The Covid-19 pandemic has potentially negative effects on food consumption, especially livestock products. First is increased unemployment. The government estimates that 1.80 million to 4.80 million people may fall into poverty, while 3.00 million to 5.20 million may lose their jobs because of the severe economic impact of Covid-19 pandemic (Akhlas 2020a). Rising unemployment is likely to result in a reduction of purchasing power, coupled with supply chain disruptions for protein-rich items, which in turn will put pressure on household food consumption quality and quantity (WFP 2020). Indonesia's household consumption of agricultural products is predicted to decline 8.29 percent from what it would have been had Covid-19 not occurred (McKibbin and Fernando 2020). There is also a prediction of food consumption decreased by 20 percent and meat consumption to have reduced by more than 30 percent (Adelayanti 2020), and the total monthly chicken consumption fell by 0.14 kg and eggs by 3.73 eggs per person (Ilman 2020). Second, decreased economic growth. Indonesia's economy, which grew 5.02 percent annually in 2019, would shrink by 3.10 percent in the second quarter and grow at zero percent to 1.0 percent this year (Akhlas 2020b). One percent lower growth in the economy would translate into an increase in the extreme poverty and food insecurity rate of between 1.6 percent and 3percent (Vos et al 2020). The downturn in Indonesia's economic growth is estimated to cause the number of poor people and food insecurity in Indonesia to increase by 1.80-9.90 percent (Hermanto 2020).

## Conclusion

- The availabilities of beef, chicken, and eggs are expected to be sufficient to meet Indonesia's domestic demand
- The prices will remain stable across the country
- Consumption has the potential to decrease.

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