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ECONOMICS OF EGG PRICE, CONSUMPTION, AND INCOME OF LAYING HEN FARMERS DURING OF COVID-19 PANDEMIC IN CENTRAL JAVA, INDONESIA

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ABSTRACT

Covid-19 pandemic has changed the economic condition that hit agricultural sectors. The study aimed to investigate the condition of egg price, egg consumption, and income of laying hen farmers during the Covid-19 pandemic on in Central Java. One hundred and ten laying hen farmers in Kendal, Central Java, Indonesia, were observed and interviewed. Kendal regency is one of the laying-hen producers in Indonesia. A survey was used to collect data before and during the pandemic. Secondary data were taken from the Ministry of Agriculture. A t-test analysis was used to investigate the effect pandemic on consumption and income. Regression analysis was used to determine the effect of supply, demand, and egg price on laying hen farmer income during the pandemic. Consumption of eggs dropped by 20% due to the pandemic. The egg price declined due to limited transportation and distribution caused by lockdown policy. The pandemic has suppressed the income of the laying hen farmers, thought supply-demand mechanism, as during the pandemic the income sharply dropped. The egg price started increasing in June 2020 after the government relaxed the lockdown. This escalated egg price, laying hen farmers' income, and egg consumption. The increasing supply, demand, and egg price increased farmers' income. The government needs to provide an economic stimulus to make the industry survives, and to ensure the community consumes enough eggs. The stimulus could be a form of subsidy to producers and consumers.

Keywords: *chicken egg, consumption, egg production, laying hen farmers, poultry industry*

BACKGROUND

The agricultural sector is a resilient backbone in Indonesian economic development. The sector has contributed a significant share of the national income and employment of the country (Mariyono, 2020). From the international development perspective, the agricultural sector plays an essential role in achieving the current goals of Sustainable Development Goals (SDGs), particularly food and nutrition security achievement. Food and nutrition security are complementary. This means that achieving food security for development purposes is a necessary condition. However, the achievement *per-se* is insufficient. It should be complemented in a sufficient condition, that is, nutrition security. The sub-sector of food crops has fulfilled food security. One of the potential sub-sectors of agriculture is the poultry industry that supplies egg and meat of chicken. Along with the horticultural sub-sector, this industry takes a position as suppliers of nutritious products to support food and nutrition security (Wijaya et al., 2021a). Nutrition security has been identified as a critical factor in the development process because it is directly related to human resources development (Wijaya et al., 2021b). Nutrition security is key to human resources development. Failures in

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achieving nutrition security will hinder the development process of the country. Studies seeking to determine the effect of economic shocks on food and nutrition security are expected to provide assistance to policy-makers to formulate effective and efficient actions. Economic shocks potentially influence food and nutrition security through supply and demand mechanisms in the market; by means that the shocks change market equilibrium. Currently, one of the big shocks is the Covid-19 pandemic that globally affects the economy.

The poultry industry has a strategic value because it can provide animal protein to meet domestic needs and export opportunities and its role in exploiting employment opportunities. The contribution of the livestock sub-sector to agriculture in 2017 was 15.87%, while the contribution of the livestock sub-sector to Indonesia's GDP contributed 1.57% (Sofyan et al., 2019). The laying chicken business in Indonesia has good prospects for development, especially when viewed from people's nutritional needs. Based on the Regulation of the Minister of Health No.75 of 2013 concerning the national nutritional availability, protein consumption per day per capita is set at 57 grams of protein. Indonesian egg protein consumption has increased from 51.33 grams in 2013 to 62.19 grams in 2018, with an average consumption per capita per day of 3.50 grams (Sofyan et al., 2019). The increase in public consumption of eggs continues to increase annually. Community farms in Indonesia that engaged in laying hens reached 82.4%. Therefore, the poultry business should survive to provide community welfare continually. The business serves as a source of local income through livestock retribution and business tax. Layer chickens support the income of the government.

The laying hen industry is mostly operated by smallholders. For example, laying hen farmers in Kendal Regency have ownership scales below 10,000. The condition of laying hens in Kendal Regency has a very dynamic problem that varies from social, economic, and institutional factors. The problem of social factors faced is that the level of education of laying hens farmers in Kendal Regency is still low so that many farmers have not been able to apply hepta-farming properly and have not been able to develop their business to the fullest. Although the level of education of small-scale laying hen farmers in the Kendal regency is still low, these farmers' experiences vary from one year to 20 years (Sofyan et al, 2019). Factors that influenced the farmers' income were supply, demand, egg price, and distribution process. These factors would influence the laying hen farmer income during the Covid-19 pandemic. This study aimed to investigate the impact of the Covid-19 pandemic on egg supply, egg demand, egg price, and income of laying hen farmers in Central Java, Indonesia.

RESEARCH METHODS

Kendal Regency is a laying hen producer in Central Java. 70% of the total egg production in Central Java is supplied from the Kendal regency (Sofyan et al. 2019). This study surveyed 110 laying hen farmers while the research was carried out before the Covid-19 pandemic and after the Covid-19 pandemic. A descriptive quantitative approach and field observation were used in the study. Descriptive quantitative was used to analyze data by describing the collected data. The location of the study was Kendal Regency, Central Java, Indonesia. The location selection used the purposive sampling method.. Secondary data was taken from the Ministry of Agriculture. An independent t-test was used to determine the differences in consumption and income laying hen farmer between before and after the Covid-19 pandemic. The variables observed were egg consumption, egg supply, egg price, and income of laying Hen farmer before and after the Covid-19 pandemic hit Indonesia from September 2019 to July 2020. Regression analysis was used to determine the effect of supply,

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demand, and egg price on laying hen farmers' income during the Covid-19 Pandemic. This study uses an independent sample t-test with the SPSS version 22 to prove the impact of the Covid-19 pandemic.

RESULT AND DISCUSSION

As shown in Table 1, majority of the respondents passed from senior high school (78%), the egg production was 268 kg month $^{-1}$ and the experience of layer raising was 11 years.

Tabel 1. Socio-economic Characteristics

Respondent characteristics	Value
Scale of ownership (heads)	4,233
Age (year)	46
Educational Background (%)	
Junior high School	14
Senior High School	78
Tertiary school	8
Egg production (kg month^{-1})	268
Experiences (year)	11

Source: Primary Data

As shown in Table 2, the supply number decreased would decrease the income of layer hen farmer during the Covid-19 pandemic. Demand number decreased would decrease the income, and the egg price increase would increase the income. However, this is due to the fact that although the price rises, layer hen farmers are unable to sell to area consumers due to transportation restrictions.

Tabel 2. Factors Influencing the Income during Covid-19 Pandemic

No	Item	Regression coefficients	p-value
1	Constant	0.878	0.003
2	Supply number (kg)	-437	0.000
3	Demand number (kg)	-878	0.000
4	Egg price (IDR)	0.750	0.000

Source: Primary Data

Table 3. Impact of Covid-19 Pandemic on Parameters.

Item	Before COVID-19 pandemic	During COVID-19 pandemic	p value
Egg price (IDR)	19,600	17,360	0.019
Income (IDR)	40,597,000	-21,900,000	0.005
Egg consumption (kg)	67,873	48,870	0.003

Source: Primary Data

As shown in Figure 1, egg price after the Covid-19 pandemic decreased in March-May 2020, because the government imposed high HSDD. Imposing HSSD made Indonesian people stay at home, study from home, and work from home. This condition suppressed the egg price to decrease from March to May 2020.

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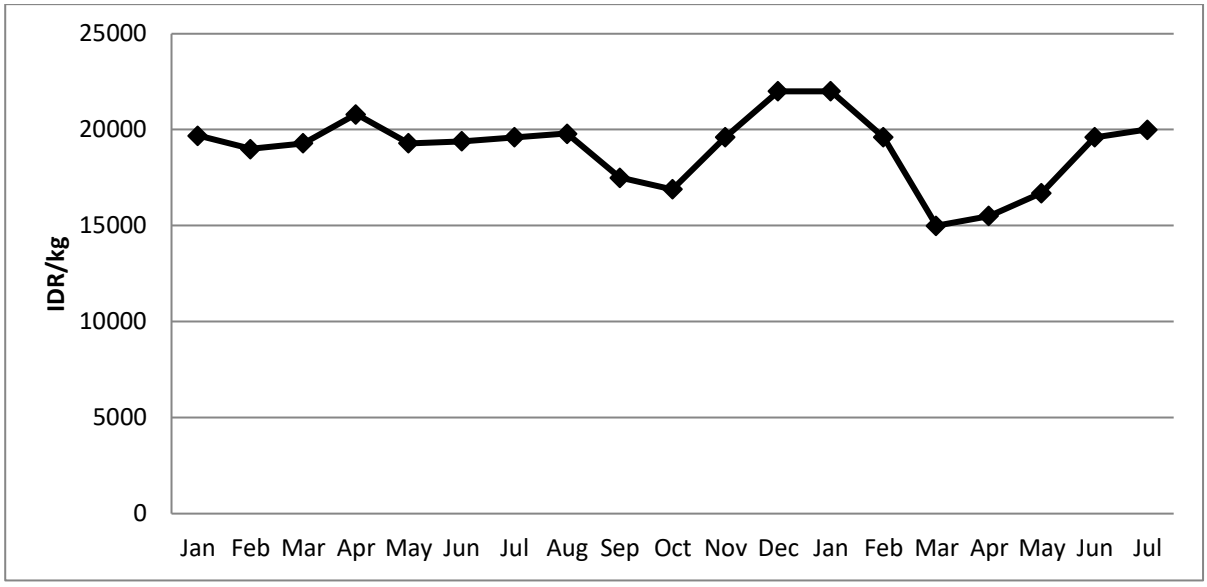

Figure 1. Egg Price January 2019 – July 2020

As shown in Figure 2, the income of laying hen farmers during March – May 2020 decreased and reached the lowest point in May 2020. The condition happened because the consumption of eggs decreased, which tended to suppress the egg price. The income only started increasing in June 2020 because there was a Muslim festival. The income of laying hen farmers at the beginning of the Covid-19 pandemic decreased, this was because they had to be able to cover operational costs, but they were unable to sell eggs at a reasonable price, they were only able to sell eggs locally, selling eggs outside of areas such as Jakarta and Semarang difficult due to transportation restrictions.

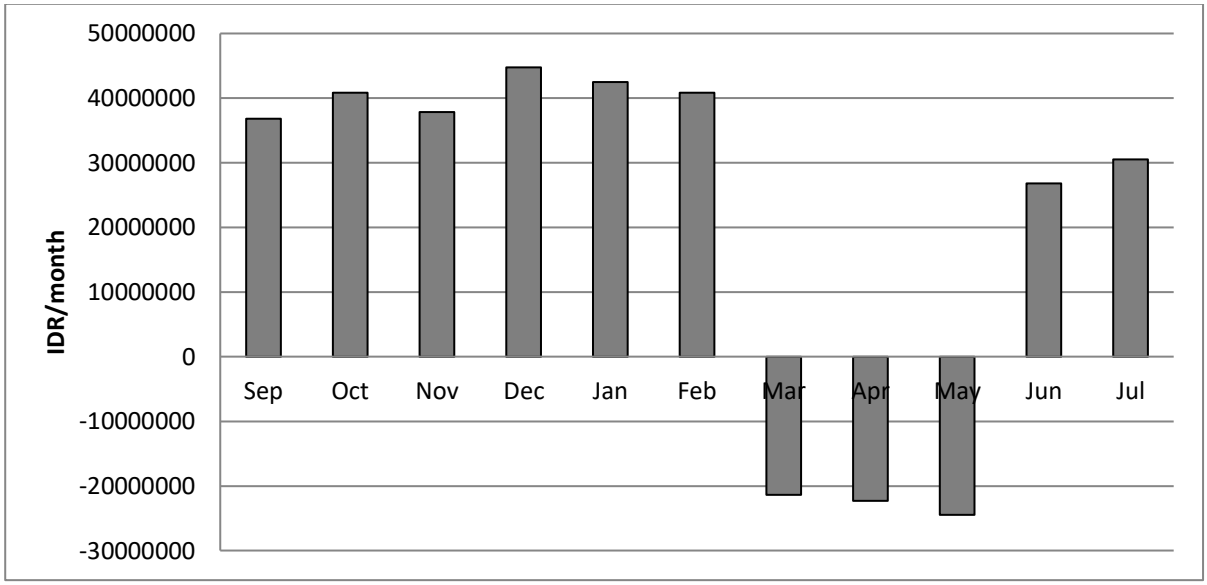

Figure 2. Income of Laying Hens Farmers, September 2019-July 2020

As shown in Figure 3, egg consumption decreased in the Covid-19 pandemic because of the HSSD policy. The government insisted that people stay at home and work from home, so many companies, shops, markets, malls were closed. This condition contributed to the decrease in egg consumption.

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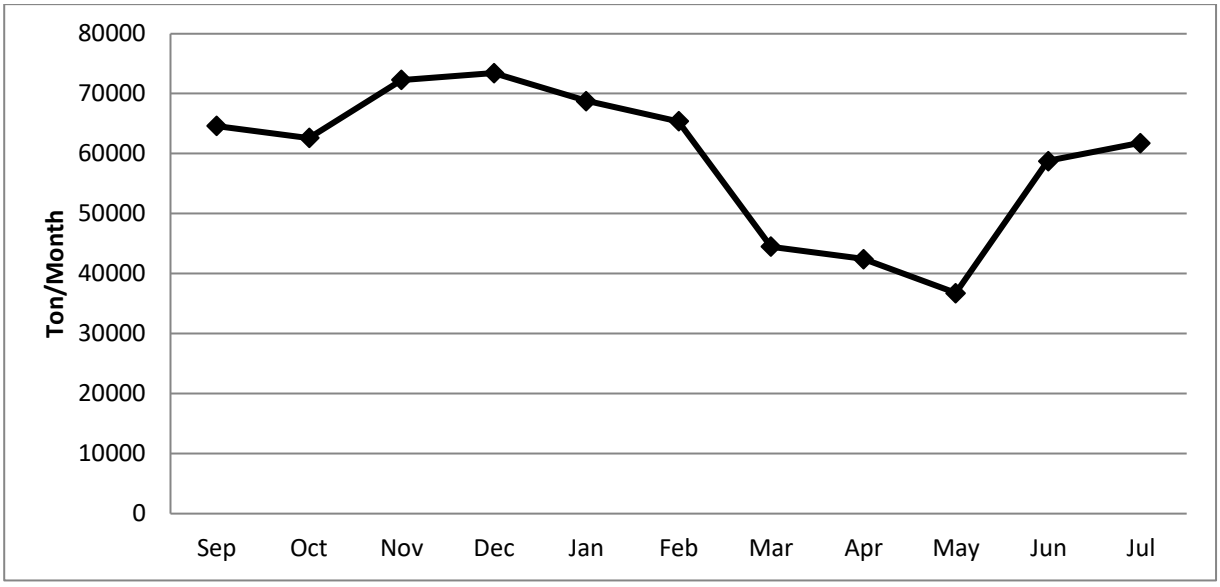

Figure 3. Egg consumption in Kendal, September 2019 – July 2020

The egg price influenced the revenue and finally would influence the income. There was a positive correlation between egg price and laying hens farmers' income. Increasing the egg price leads to an increase in the laying hen farmers' income. According to Setiadi (2020), the laying hen characteristics was shown in Table 1. The average layer of laying hens in Kendal Regency is 46 years old. At that age, the layer hen farmers are at their productive age. It is straightforward to do this productive age when getting training to improve skills. The results of this study are in line with Sofyan et al. (2019). Productive age guarantees business success. Most of the layer chicken farmers are graduates of senior high school 78%. The experience of raising laying hens has been 11 years on average, and this indicates that layer hen farmers have mastered the knowledge of raising laying hens. Sofyan et al. (2019) stated that farming experience is a key factor in the laying hen business; the higher the experience, the greater the skills in solving problems that arise. Experience also reflects the maturity level of the farmer in managing layer hens.

The scale of ownership is an important factor that affects income. Setiadi et al. (2020) stated that the scale of livestock ownership significantly affects farmers' income. Furthermore, they (2020) stated that the scale of ownership of 1000 kampong chickens provided relatively high profits. The ownership scale of laying hens in this study was 4233 chickens with a daily egg production of 268 kg. During the Covid-19 pandemic from March to July 2020, it was shown that the income of layer chicken farmers decreased by 37.5%. The decline was due to the distribution of eggs from Kendal to Jakarta and Semarang, where consumers were disrupted. Transportation restrictions during the implementation of HSSD in Indonesia from March-May 2020 caused distribution to be disrupted, it also caused egg prices to decline because layer hen farmers were unable to sell their products. The results of this study are in line with the research of Farias and Araujo (2021), Fang et al. (2020), and Workie (2020), who found that the Covid-19 Pandemic greatly impacted the agricultural sector in general at the beginning of the pandemic.

Regression analysis was conducted to determine the factors that influenced the income of the laying hen farmers. As shown in Table 2, regression analysis was carried out to determine the supply, demand, and price of eggs on the income of layer hen farmers during the Covid-19 pandemic. The

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decreasing amount of supply caused by the limited number of workers caused the number of egg production during Covid-19 to decrease.

The supply number should be increased the income. However, due to the Covid-19 pandemic, the supply of eggs has decreased. This is in accordance with the results of research by Fang et al. (2020), which found that the income of broiler chicken farmers decreased by 45% during the Covid-19 pandemic. This decrease was since layer hen farmers were unable to cover operational costs during the Covid-19 pandemic. An increasing amount of egg supply will affect the amount of revenue. Revenue after deducting the costs incurred such as feed costs, labor costs, and other costs would become income. Akter (2020) states that increases in egg supply will increase food security during a pandemic. Alvi and Gupta (2020) stated that the lockdown period greatly affected the food supply. The demand for chicken eggs has decreased since implementing the HSSD policy in Indonesia but has increased again since June 2020. Egg prices greatly affected the income of laying hen farmers. During the Covid-19 pandemic, the government imposed HSSD to decrease the income of laying hens farmers.

The results of this study are different from those of Perrin and Martin (2020), who examined dairy farming in France. During the Covid-19 pandemic, due to increased demand for milk and transportation, it continued to run well, causing income from dairy farmers in France to be largely unaffected by the Covid-19 pandemic. Public awareness of the importance of maintaining health has made the demand for milk increase by 25-30% during the Covid-19 Pandemic. The public belief that milk can increase immunity causes the demand for milk to increase. Workie et al. (2020) stated that overall, the agriculture sector in Asia was greatly affected by the Covid-19 pandemic.

The level of risk in agriculture production is also very high. This is because in Asia, most of the production is still very dependent on human labor. The restrictions on mobility and transportation restrictions will undoubtedly disrupt the distribution percentage of agricultural products from producer regions to consumer regions in Asian countries. The price of eggs during the start of the pandemic decreased. This was because farmers were unable to sell their egg production. The results of this study are in line with the research of Mandal et al. (2021), who found that the level of fish consumption in households decreased at the beginning of the pandemic. This is due to restrictions on transportation, restrictions on mobility, and grants to stay at home.

This policy makes every family in Bangladesh reluctant to leave the house to buy fish in the wet market, which causes the level of fish consumption also to decline. At the beginning of the establishment of HSSD in Indonesia, many companies laid off their employees for only half of the normal pay and were promised to re-enter if the Covid-19 pandemic was over, this also caused the willingness to buy of the Indonesian population to decline, especially at the beginning of the pandemic. This will certainly cause the level of food consumption to also decrease, including the level of egg consumption.The decreasing purchasing power and decreasing the level of consumption have caused the demand for eggs in Indonesia to also decline nationally.

The egg price started to increase in June 2020, because there was a Muslim Festival, Eid al-Fitr. After the government lifted the HSSD on June 30, the egg price reached its normal price. The Covid-19 pandemic began to hit Indonesia initially, causing the Indonesian government to carry out HSSD to disrupt the egg distribution process (Table 3). This caused the price of eggs to fall at the beginning of the pandemic, this condition in line with Marusak et al. (2021). The Covid-19 pandemic affected the food supply, causing prices in production areas to fall

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Egg consumption has decreased due to the community's willingness to buy which has also decreased. This is because the government regulates that people work, go to school, and worship from home from March 22 through May 31 2020. The lockdown policy has caused markets, supermarkets to also close so that egg consumption has also decreased during the start of the pandemic in Indonesia.

CONCLUSION AND SUGGESTION

Based on the study, the supply number, demand number and egg price influence the income of the layer farmer. The supply number and demand number decrease during covid 19 pandemic. The egg price, income and egg consumption decrease during covid 19 pandemic. The Indonesian government during the Covid 19 pandemic implemented the lockdown concept which limited the movement of products, causing a decrease in the supply and demand for eggs in Central Java. After the covid 19 pandemic ended, the Indonesian government needed to make the right policies to regulate the supply and demand for eggs in Indonesia.

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