

# “Egg Sell Points” A Chicken Eggs Marketing Strategy Based On Smart Farming System

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**Abstract.** Post-COVID-19 in 2022, reported an increase in chicken egg consumption by 2.7 percent in Indonesia consumer’s. In 2021, the amount of eggs consumption was 18.92 Kg/Capita/year up to 20.02 Kg/capita/year in 2022. Estimated output consumption in 2023-2026 is estimated to grow by 1.16% per year. This condition is an excellent opportunity for laying hen farmers to maximize productivity and profits. However, generally the farmers still carry out the open house traditional farming system, its need to implement smart farming systems in the production process, and rely on one marketing channel. This paper is a review article and is collaborated with existing conditions in current laying hen farms. The first objective of this study is to overview the potential of laying hen farms using a smart farming system approach with the aim of farmers being able to diversify products with segmented distribution channels. The second is to build a segmented marketing network according to the product needs of each consumer. The expected result of this study is that farmers can maximize productivity and increase profits through segmented distribution channels. The innovation of this marketing system will be called “Eggs sell points” an integrated chicken egg marketing system through a sales point connected to the Internet of Things.

## 1 Introduction

Orange has been known as the third most consumed fruit in Indonesia after banana and Three critical factors will influence future food demand, specifically by population size, demographic factors include growth and distribution of income, and food prices [1]. Urbanization and the increasing number of women participating in working fields activities also encourage socio-cultural factors and lifestyle changes in consumption patterns and lead to the increase of awareness of the importance of health through adequate and balanced consumption of food nutritional needs. Therefore, livestock products will play a significant role in supporting food consumption needs such as consumption of meat, milk, eggs and other

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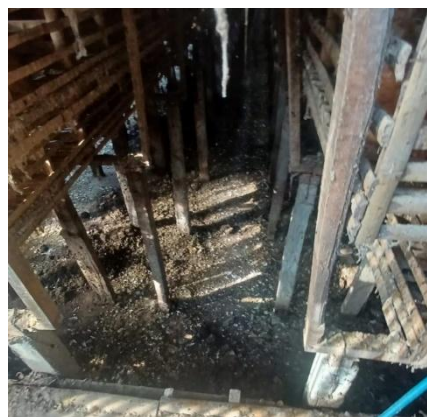
livestock products. Among middle-income countries, the availability of animal protein is around 25-26 g/person/day, increased by +1.4 g/person/day in Southeast Asia and dominated by poultry consumption. However, overall protein availability in this region is relatively low compared to the sub-Saharan Africa region, which will only reach 12% in 2030 [1].

During the COVID-19 pandemic in Indonesia, many sectors were negatively affected. However, three sectors still grew positively, namely the information and communication sector, the financial sector, and the agricultural sector, which grew 2.2 percent. The agricultural sector contributed 13.28% to the national gross domestic product in 2021. Furthermore, eggs, as a livestock product, had an increase in production to 5.57 million tons in 2021, with the largest population of laying hens in East Java province at 53 million. The national egg consumption in 2021 recorded 18.92 kg/capita per year and increased to 20.02 kg/capita per year in 2022 [2].

Based on the data above, eggs are a strategic commodity in providing food at affordable prices. In 2021, the average egg price at the producer level was IDR 19,000 - 24,000, and the consumer level was around IDR 27,000. However, the farmer still needs help in terms of specific production and marketing. Generally, Farmers still use traditional farming system through a cage system of laying hens with minimum conditions. On the other hand, post-harvest treatment of eggs still lacks treatment, where the eggs are sold without any market segmentation purpose. In this article, the author will review how to increase the farmers' income by improving products sold with segmented markets with more selling value.

## 2 The Existing Layer Farm

Laying hens in an open house traditional farmer system has many weaknesses, especially in uncontrolled temperature and humidity conditions open house system makes the chickens susceptible to disease due to drastic changes in air temperature at night and during the day. Feeding and drinking places feed manually make it easily contaminated by viruses and bacteria from disease vectors such as flies, mosquitoes, or other insects. The chicken waste that accumulates under the cages also be problematic if not appropriately handled. The conventional cage system shows in Figure 1.



**Fig. 1.** Feeding and drinking system (left) and Chicken manure accumulates under the cage (right).

Based on Figure 1a, a traditional open house system in farms uses a pipe split into two pieces for feed and drink. This method makes drinking containers that are open and exposed to direct sunlight can easily develop moss quickly if cleaned infrequently. The position of the drinking water pipe parallel to the feed pipe will easily cause drinking water to spill into the

feed pipe and cause the feed to become moldy. The chickens consume feed contaminated with mold or wet feed, it makes them susceptible to disease. Figure 1b. Chicken waste dropped under the cage and accumulated every time, causing the potential for ammonia gas and becoming a nest for insects to lay their eggs. Apart from that, during the rainy season, if rainwater drainage is not good, there will be puddles of water mixed with chicken droppings. This condition quickly causes disease vectors to attack due to poor sanitation.

The egg collection process is carried out manually using people every day. Egg collection periodically in the morning or evening. The eggs are collected at the end of the cage and placed in a pile in a wooden box lined with waste paper. The condition of the eggs and their handling can be seen in Figure 2.



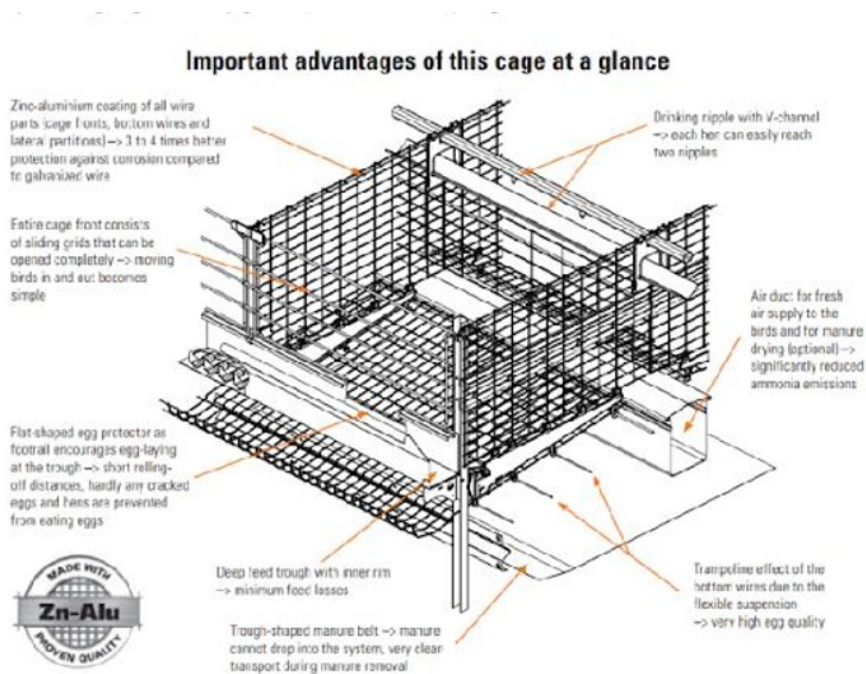
**Fig. 2.** Eggs drop into the front of a cage made of bamboo (left) and Wooden boxes for collecting the eggs (right).

In Figure 2a and 2b, the eggs are collected manually and placed in wooden boxes. The eggs are then placed in a storage room with minimal conditions. The farmer usually only separates cracked and whole eggs and sells them at different prices. Whole eggs are sold without distinguishing the egg quality.

### **3 Eggs Sell Points Marketing Concept**

#### **3.1 Transforming into modern laying hen farm**

Producing good quality of eggs is the key concept of “*Egg Sell Points*”. This concept requires good production equipment. One of the strategies was changed from the traditional farming system into the modern farming system. One of the characteristics of modern farming system was used of the closed-house system. Closed-house farming system was integrated system that can control temperature and humidity, feeding and drinking system automatically, which the purpose to produce the hygienic and efficient of eggs. Figure 3. shows the example layout of a modern laying hen cage by Big-Dutchman equipment company [3]. Eggs can be produced from two rearing alternatives; the first alternative is from a modern and integrated battery cage system. This system minimizes cage operators because the feeding and drinking system already uses an automation system, as well as the egg collection system, which is carried out automatically. The second alternative is eggs produced from a free-cage system, where this system is known to be more favourable to animal welfare [4].



**Figure 3.** Modern laying hen integrated cage system [3].

Smart egg collection systems become the next part after placing the laying hen into a modern cages system. The modern egg collection has the following purpose: to reduce time and labour cost, excellent egg quality, and accurate recording of all eggs produced. The requirements of egg collection need to be gentle transport of the eggs, high reliability and easy handling [5]. Figure 4 shows the example of an eggs collection system integrated to the modern cage system in a closed house system.



**Fig. 4.** Eggs transfer from cage system into cross belt (left); eggs during rod conveyors (middle); and final eggs collection results (right) [5].

Based on Figure 4. Quality eggs will be produced that are free from salmonella and other disease contamination so that the quality of the eggs is well maintained. This automatic egg collection system will save time, and the egg collection process can be done all at once in a short time—an automatic egg collection system combined with a grading system. After grading the eggs, the eggs will be sold into different markets with specific segmentation.

### 3.2 Eggs Market Segmentation

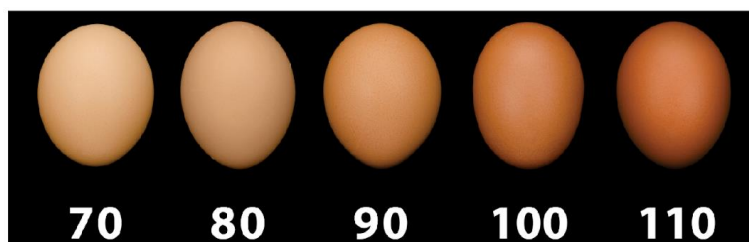
The good fresh egg quality is defined into several criteria. Table 1. Shows the good quality of eggs criteria.

**Table 1.** The good eggs quality.

No	Criteria	Measurements
1	Egg form	elliptical shape
2	Surface	clean, smooth and shiny
3	eggshell	Free of Cracks and another defects
4	Shell colour of white eggs varieties	Pure white
5	Shell colour of white eggs varieties	dark brown
6	the albumen	<ul style="list-style-type: none"> <li>● a clear or slightly opaque</li> <li>● jelly-like stacked-up appearance</li> <li>● should be free of inclusions (meat and blood spots)</li> </ul>
7	yolk	<ul style="list-style-type: none"> <li>● a uniform bright yellow to orange color</li> <li>● anchored in the center of the egg by the chalazae</li> </ul>
8	egg contents	free of odor and microorganism contamination

Source: [6].

The concepts of the egg sales point, sales are based on the marketing concept with an approach on market needs and wants, consumer satisfaction, focus on markets and customer needs and take along profit based on relationships and customer satisfaction. The target segment for egg sales is consumers with middle to upper income. Therefore, the egg sales system will not sell in bulk, as in Figure 2b. However, the eggs used a grading system based on color and size uniformity. The standard of egg shell colour shows in Figure 5.



**Figure 5.** eggs colour score; source: [7].

After grading, the next step is to package the eggs in packaging that is easy to carry, strong enough to prevent the eggs from breaking, and gives the product a brand name. The packaging also contains the farm's identity, expiry date, nutritional information, and an attractive product or packaging design. Also, eggs can be divided based on quality, such as eggs containing omega three or eggs from an open cage system. An example image of egg packaging shows in Figure 6.



**Figure 6.** Eggs packing in modern retail store

Eggs were distributed at "eggs sell points" stores as sales centres based on demographic segments in the store area. "Eggs sell points" are projected as centres for selling quality animals –sources of protein obtained directly from producers. Consumers in the shop area can directly order eggs via an application based on Android or iOS-based by selecting the type of egg products and purchase amount. Improving maintenance management and marketing treatment, farmers are expected to be able to increase selling value by offering quality eggs that are High quality and certified of food grade. The concept of an egg sales point is expected to improve the welfare of farmers and encourage the consumption of animal protein, especially eggs, in the future.

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