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Egg and Broiler Supply in Malaysia: Issues, Challenges and Recommendations

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Abstract

The Malaysian poultry industry, particularly the broiler and egg supply, was greatly affected due to recent global challenges such as COVID-19, the Russia-Ukraine conflict, global logistic strains, and the overall deceleration of economies. Being self-sustainable for poultry, the crisis throughout 2022 has shown how fragile the industry is in Malaysia. Based on the above perspectives, the dependency of the poultry industry on imported feed materials and its stability from external factors that support the industry needs to be considered to sustain food security. Therefore the concept of food security in a country might need to be further evaluated as a sustainable value chain rather than individual components. Understanding the value chain involved in the poultry industry is important to conclude the decisions to attain supply stability in Malaysia.

1. Introduction

In order to contribute to the existing body of literature on this topic, we must first ask ourselves: what is food security? At its most basic level, it refers to having enough food to eat on a regular basis. This means having enough food for today or tomorrow, next month and next year. Though this may seem like a straightforward concept, there is still a great deal of confusion surrounding it. To help answer this question, we must consider the various factors contributing to food security. The Food and Agriculture Organization of the United Nations suggests that food security is the result of food availability, food access, stability of supplies, and biological utilisation (Clapp *et al.*, 2021).

1.1 Availability

The availability of food is determined by a combination of factors, including domestic production and imports, such as well-functioning market infrastructure, adequate transportation, and storage and processing technologies (Riely *et al.*, 1999)

1.2 Access

Food access refers to the ability of individuals to obtain and maintain adequate supplies of food for a nutritious diet. This may involve direct access to food, such as growing, purchasing, and bartering, and indirect access through social arrangements such as family, welfare systems, and emergency food aid (O'Hara and Toussaint, 2021).

1.3 Stability

The idea that food security can be lost and gained is of increasing concern within the food security debate. As a result, risk management is gaining much credibility as a tool in the fight against hunger. Such consideration involves issues of stability and vulnerability; this can be of the wider economy in general, of livelihoods in particular, incomes, or even of food supplies themselves, concentrating on shocks, sudden or otherwise, such as floods, droughts or pests (Béné, 2020).

1.4 Utilisation

The concept of biological utilisation refers to a person's ability to absorb the nutrients in the food they eat. Research has shown that this ability is closely related to a person's overall health. Optimum biological utilisation requires access to

proper health care, clean water and sanitation, and adequate knowledge of nutrition and physiology.

Although the above provides a more detailed overview of food security, it only scratches the surface of this complex concept. There are many definitions of food security, each with nuances. For example, the United Nations have different definitions of food security. This can make it difficult to clearly understand what food security means.

The Food and Agriculture Organization (FAO) of the United Nations' definition of food security has had many incarnations over the years and is still being widely debated. In October 2012, the Committee on World Food Security attempted to revise the terminology of their current definition to reflect popular progressive thinking, but most have used the following definitions.

> *"Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life."*
>
> (FAO, 2001)

It is not necessarily the case that a country with a lot of food is also a food secure country. Following the definition of food security by the FAO strictly, food security does not readily exist in Malaysia since it would require all people to have access to sufficient, safe, and nutritious food at all times. Malaysia was previously reported as having quite an obese population (Verma *et al.*, 2013). Various efforts by the government to ensure malnutrition is not undermined and the ability to have access to subsidies and support systems for the underprivileged for access to food is commendable (Muda, 2020). Furthermore, anecdotal evidence suggests that food wastage is still prevalent in Malaysia (Papargyropoulou *et al.*, 2019; Zainal *et al.*, 2019). Thus the current status of compromised food security may be wrongly defined, but rather can be arguably applied to having an issue of stability towards food security in the event of a crisis (Béné, 2020; Jamaludin *et al.*, 2022;). To fulfil the aspects of food availability, food access, food utilisation and food stability, which are essential for food security, remains elusive and maybe unlikely achievable in practice by a singular country if the definition was to be extended to the ability to reach all individuals within that particular country.

2. Malaysia self sustainability for food status

According to The Department of Statistics Malaysia (2022), from 50 identified commodities, Malaysia was considered self sustainable for 26 items. While most fish supplies are within very favourable self-sustainable levels, protein sources from cattle, goats and sheep are still struggling to reach a reasonable level (Jamaludin *et al.*, 2014; Zayadi, 2021). Meanwhile, Malaysian broilers and eggs are abundant in Malaysia (Firdaus *et al.*, 2020; Sulaiman *et al.*, 2021). The ability of Malaysia to import to cover for the insufficiency shows very little issues of food security, although shortages of food materials during certain periods of the year or during major events do happen, but are not catastrophic. The implication of dependence on imports can be vulnerable on an economic aspect in fluctuations of costs (Mohamed and Hameed, 2010; Luo and Tanaka, 2021). Yet major events such as the COVID-19 pandemic, which resulted in supply instability, can be detrimental to a country that is reliant on imports, such as what was faced by Malaysia shows how fragile a country's food supply chain can be (Chin, 2020).

2.1 Poultry in Malaysia

The poultry and egg industry can be a typical case study of how a country relates the basis of food security. Eggs and poultry are considered cheap protein sources and are widely consumed by Malaysian consumers. The growth of the Malaysian economy saw the diet shifting to more meat, particularly poultry products such as chicken (Drewnowski *et al.*, 2020). The consumption of chicken in Malaysia stands at 49.7kg per person is considered one of the highest in the world (Zayadi, 2021) and is expected to increase further in the future. Malaysia's poultry and eggs industry is privately driven (Jamaludin, 2013; Jamaludin *et al.*, 2022) but imposed ceiling prices as part of government initiatives to ensure a relatively affordable protein supply to the general public. Profit margins for poultry and egg producers are considered small; thus, mass production via intensive farming practices is the typical approach to ensure that revenue is sufficient to support future production cycles. The production of poultry for broilers and eggs can be considered stable for the last 5 years, as shown in Table 1 and is expected to maintain steady growth for years to come.

Although broilers and eggs in Malaysia are considered commodities with a favourable self-sustainable ratio, feed inputs are still dependent on imports (Rae *et al.*, 2019; Abdullah *et al.*, 2020), mainly maise and grains. For example, the value of grain corn used in animal feed has increased by over 2 times in the last 5 years (Figure 1), which can be related to the event of the COVID-19 pandemic (Elleby *et al.*, 2020).

Table 1: Number of poultry output (broiler and eggs) from 2016 until 2021 (Federation of Livestock Farmers' Association of Malaysia, n.d.)

Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Number of broiler (millions)	818	767	717	787	799	756*
Number of eggs (millions)	12,113	12,502	11,943	9,624	11,743	12,372*

*estimated

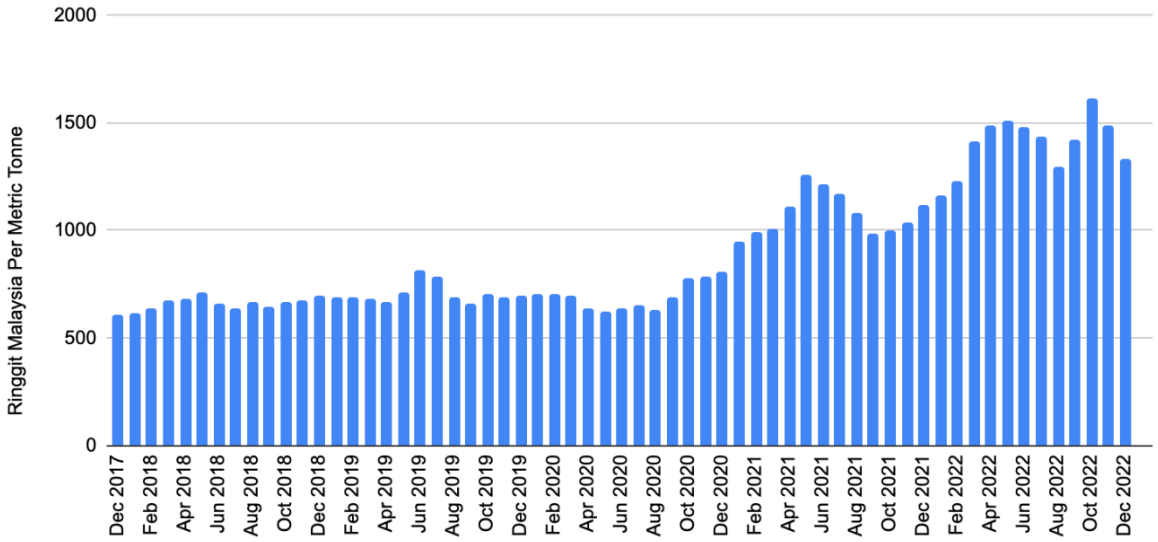

Figure 1: Corn grain prices in Ringgit Malaysia (Indexmundi, 2023).

Further global instability, such as the Russia-Ukraine conflict, further adds to the instability in the global farming system supply chain (Behnassi & Haiba, 2022; Ben Hassen & El Bilali, 2022). Ukraine is a major exporter of wheat, soybean and maise, which are heavily used as material for animal feed and were greatly affected by the conflict (Nasir *et al.*, 2022). On the one hand, the implication of Russia, a major producer of fertiliser, did, to some extent, destabilise accessibility by countries that focus on intensive arable farming practices (Lin *et al.*, 2023).

Due to the various global events, the domino effect has led to increased broiler and egg prices, which end users bear. The rise in poultry production costs was inevitable, but the industry has maintained its production to meet demand. Despite the price hike, poultry was still one of the cheapest protein sources, at an average of RM9.35 per kg, compared to beef (RM38.47 per kg) or fish (Cencaru or *Megalaspis cordyla* at RM10.35 kg) (Department of Statistic Malaysia, 2022).

2.2 Management of poultry crisis

Poultry production in Malaysia was considered one of the cheapest due to its industrial approach (Bahri, 2019; Zayadi, 2021). The policy by the Malaysian government to ban export on 1st June 2022 (Kementerian Pertanian dan Industri Makanan, 2022) was to ensure poultry was sufficient within the country, and the decision to import poultry was initially expected to cushion local supply stability. This policy did not go down well with some local farmers and poultry integrators, suggesting the effect it will bring on the export market to Singapore (Nordin, 2022). The 3.6 million birds produced monthly for the export market were banned from leaving the country, accounting for just 2% of monthly broiler production in Malaysia. Meanwhile, the suggested import of frozen chicken created uncertainty leading to reduced production in the advent of a potential stockpile of chicken in the market, which can potentially push down the selling price, affecting revenue on the already high cost of production. Concerns by integrators and also farmers on the possible influx of imported chicken led to the decision to reduce output into the market by extending harvesting time and reduced poultry stocking numbers. In this effect, the insufficient market supply of chicken was evident for 2 to 3 months, followed by oversupply from August 2022. The supply crises did not last long, as supply and prices stabilised (Ong, 2022), although at a slightly higher retail value.

A recent egg crisis in late 2022 saw Malaysia importing 2 million to 10 million units per day from India in December 2022 (Yunus *et al.*, 2022). The production of eggs is expected to take slightly longer to stabilise than broilers. This reason is expected because layer hens will take 6 months to consistently produce eggs (Hamilton and Bryden, 2021), compared to broilers which can be harvested after an average of 35 days (Indi *et al.*, 2022). The outcome to import is an indication that policymakers need to understand the economic consequences on the stability of the production ecosystem and its domino effect.

The issuance of cartels in the poultry industry shows the country's lack of preparedness to manage the crisis. The industrialisation of poultry production takes on many risks, from the potential wipeout of flocks from diseases to absorbing potential price hikes from the external market. Creating anti-monopoly regulation tools (Anisimova *et al.*, 2021) and supporting the growth of smaller farmers requires developing a long-term support system to democratise the poultry industry. With subsidies for broiler breeders and egg, producers extended until the end of 2022 (Bernama, 2022), a negative impact on commercial farmers is not expected, and production is presumed to maintain a subtle growth.

2.3 *Halalan Toyyiban* and poultry

Being a Muslim majority country, poultry is an important source of food products that can be consumed. The *Halalan Toyyiban* concept in poultry consumption is important to create upright and righteous individuals and has been stressed by the prophetic tradition.

أَيُّهَا النَّاسُ إِنَّ اللَّهَ طَيِّبٌ لاَ يَقْبَلُ إِلاَّ طَيِّبًا

"*O people ! Allah is toyyib (pure) and, therefore, accepts only that which is pure."* (*Sahih Muslim*, *Hadith* no.1015)

The Islamic prophetic tradition in food consumption was also highly regarded and mentioned in the Islamic scriptures of the *Qur'an*,

يَٰٓأَيُّهَا ٱلرُّسُلُ كُلُواْ مِنَ ٱلطَّيِّبَٰتِ وَٱعۡمَلُواْ صَٰلِحًاۖ إِنِّي بِمَا تَعۡمَلُونَ عَلِيمٞ ٥١

"O Messenger! Partake of the things that are toyyib (pure, clean, wholesome) and act righteously. I know well all that you do" (*Qur'an*, 23:51)

يَٰٓأَيُّهَا ٱلنَّاسُ كُلُواْ مِمَّا فِي ٱلۡأَرۡضِ حَلَٰلٗا طَيِّبٗا وَلَا تَتَّبِعُواْ خُطُوَٰتِ ٱلشَّيۡطَٰنِۚ إِنَّهُۥ لَكُمۡ عَدُوّٞ مُّبِينٌ ١٦٨

"*O you who believe, eat from the good things which have provided for you"* (*Qur'an*, 2:172)

In the poultry industry for food consumption, it is clear that avoiding suspicious things safeguards one's religion, honour and company dignity. It is related to what has been mentioned in *Hadith*

الْحَلاَلُ بَيِّنٌ وَالْحَرَامُ بَيِّنٌ، وَبَيْنَهُمَا مُشَبَّهَاتٌ لاَ يَعْلَمُهَا كَثِيرٌ مِنَ النَّاسِ، فَمَنِ اتَّقَى الْمُشَبَّهَاتِ اسْتَبْرَأَ لِدِينِهِ وَعِرْضِهِ

"*Both legal and illegal things are evident, but in between them, there are doubtful (suspicious) things, and most people have no knowledge about them. So whoever saves himself from these suspicious things saves his religion and honour."*(*Sahih Bukhari*, *Hadith* no.5)

The responsibility of the authority is to ensure a stable poultry supply, making sure consumers, particularly the Muslim community, have access to *Halalan Toyyiban*.

2.4 Misconception of food security?

Poultry is a cost effective and reliable protein material important for food security. In light of the situation faced in Malaysia, the question arises whether it is food security or food instability. The management and coordination of producers and storage capability will be important in ensuring stable supply demand equilibrium. The instability being mostly due to external factors; Malaysia may need to identify long term measures to manage a similar crisis before it occurs.

The rise in the cost of production cannot run from the fact that the feed materials required are dependent on imports. With feed cost accounting for almost 70% of the production of most livestock, controlling its availability and costs is important to ensure a much more stable price for end products. One of the main important factors in the price hike can be attributed to rising feed costs. Food security should not negate the decision to import a commodity for short term measures. Two main aspects of food security that should be focused on are the ability to ensure localised end-to-end supply and the ability to have access to supply during times of crisis. Taking the issue surrounding poultry in Malaysia, using the context of food security may need to be redefined, and measurement used to justify its use should also be scrutinised (Jamaludin *et al.*, 2022).

3. Tackling the poultry crisis

The poultry crisis shows the vulnerability of an industrial production that was proclaimed as being self sufficient. If evaluating a stable ability to be self sufficient, many factors may need to be looked into to understand the capacity to withstand a crisis if it does occur. For the poultry industry in Malaysia, a strong scientific understanding of animal science is impeccable and must be developed and sustained, particularly on feed and nutrition, breeding and genetics, and innovative housing systems. The infrastructure and support system that ensures supply can be made available during a crisis should also not be overlooked, covering management of the product, its storage and stocking, logistics, and fluctuating Malaysian Ringgit. Consumers are also important to ensure the stability of the food production system, and encouraging diversification in diets can ease dependency on a singular item. As Malaysians become more conscious of the food they take, the industry must also be prepared to face consumer perception of animal welfare and its possible effect on poultry operations. The following list some of the above challenges that can be further evaluated to successfully manage towards achieving much more sustainable poultry stability for Malaysia.

3.1 Feed and nutrition

Identifying alternative raw materials to reduce dependence on imports. The inability to produce sufficient corn and maise should also get local researchers to identify readily available raw materials. Oil palm is an example of readily available material that can be utilised and has shown to be potential for not just poultry but also other livestock such as cattle (Zahari & Alimon, 2005; Zahari *et al.*, 2012; Halim *et al.*, 2021; Alshelmani *et al.* 2021; Azizi *et al.* 2021; Boateng *et al.*, 2008). New approach to utilising waste material by fermentation can reduce or replace dependency on raw feed materials (Vandenberghe *et al.*, 2021; Kari *et al.*, 2022; Zhang *et al.*, 2022). The potential of plant-based material as a source of protein can support the need to maintain the Halal integrity status of poultry produced in Malaysia (Zainuddin *et al.*, 2020; Ashraf and Rahman, 2022).

3.2 Breeding and genetics

Poultry is bred for its meat (termed as broilers) or for the eggs produced (from layers). Breed improvement strategy is a long process of pedigree improvement and maintenance of quality traits for mass production (Kumar *et al.*, 2021; Portilo-salgado *et al.*, 2022). Quicker growth does not necessarily be the only option. Alternative breeds giving different qualities or types of chicken can allow different target traits such as better nutritive values, specific meat quality, better resistance to disease, and adaptability to specific housing conditions (Pius *et al.*, 2021). Poultry research on new breeds, both exotic and industry use, should be part of Malaysia's research initiative since the industry is mature and a major producer of a good protein diet

for local consumers. Currently, it is reported that only 4 Grand Parent stocks are managed in Malaysia (Ferlito, 2020), and very limited information can be found on Great GrandParent or pureline maintenance in the country. The maintenance of pure lines and pedigree selection, such as in figure 2, should also be considered part of good food security practices (Lisanty *et al.*, 2021). Apart from the common commercialised chicken such as Legohorn, Rhode Island Reds, Cobbs Chicken and White Recessive Rocks (Wang *et al.*, 2021), a good example is the development of the Haebara Breed of Chicken, which was developed to support the supply of halal non-Genetically Modified Organism (GMO) poultry breeds without antibiotics nor vaccination, currently in its prototype and implemented in Myanmar (Exclusive Interview With Mr Zuraimi Jumaat, 2022).

3.3 Housing system

Malaysia is considered a user of technology (Mustafa, 2021). Production and housing systems are still dependent on foreign technology. Such a system focuses on providing the most appropriate environment for optimal growth and biosecurity practices. Improvements that can be considered, such as cost effective building materials, improved biosecurity application, and automation (Li *et al.*, 2022), should take a localised approach to fit Malaysia. Local research institutions may play a crucial role in applying technological solutions to improve housing systems that are efficient and cost effective.

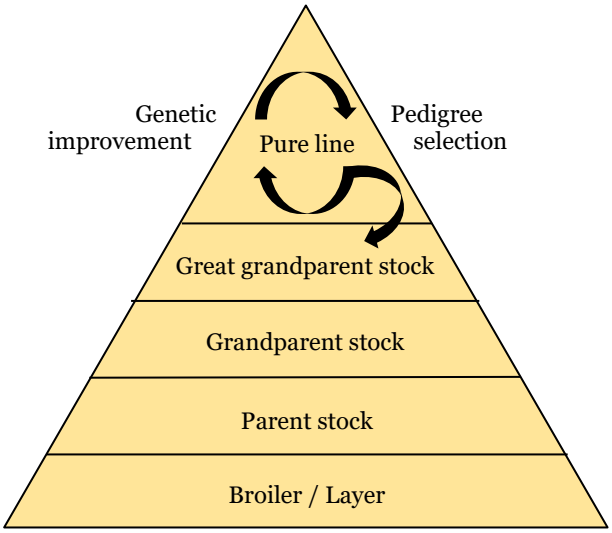

Figure 2: Management strategy for breed used in production of broilers and layers.

3.4 Production, storage and stocking

Production is driven by demand, and the industry has been quite stable and grew with little government support. With regards to ensuring supply availability, government intervention is required to focus on storage and stocking capability making sure readily available supply can be made available when needed (Gundersen *et al.*, 2021). Improve stocking approaches, such as energy efficient freezing strategy, strategic frozen storage facility, or stock in stock out a strategy to ensure food safety and quality.

3.5 Increased logistic cost

Logistics costs, both within the country and between countries, saw a sharp rise in the last decade, which was most prominent from the effect of the COVID-19 pandemic. Congestion and delays at ports, airports, and highways can lead to delays, increasing logistics costs by causing additional fuel consumption and driver overtime (Liu *et al.*, 2020; Barbosa *et al.*, 2022). Government regulations such as import or export restrictions further increase demand and supply instability (Aday and Aday 2020). Malaysia's logistic activities were not spared from the pandemic (Shin *et al.*, 2020) and numerous suggestions to improve these activities, such as automation and better management, as possible strategies to reduce costs (Sudan and Taggar, 2021).

3.6 Fluctuating Malaysian ringgit

The fluctuation of the Malaysian ringgit can lead to an increase in the cost of imported animal feed, leading to higher costs for farmers and potentially higher prices for consumers. This is because a weaker ringgit makes imported goods, such as animal feed, more expensive. Additionally, if domestic animal feed production is unable to keep up with demand, farmers may have to rely more heavily on imports, exacerbating the impact of a weaker currency on feed costs (Erokhin and Gao, 2020). With the main cost of production for poultry coming from feed, instability in the price of imported material will lead to the need to transfer these extra costs to consumers. The need to not be dependent on importing materials that go towards poultry production can ease sudden hikes in costs and ensure the stability of poultry prices.

3.7 Diversifying consumer diets

Malaysians are large consumers of chicken and eggs, and reducing intake of these protein materials can be an option to justify the relevance of a major crisis issue. While industrial needs can affect economic activities, consumers can always adapt to alternatives such as plant based protein resembling either chicken or eggs (Rubio, 2020; Will, 2022). In reality, eggs and chicken are protein products that Malaysians are custom too, and should not be negated to food security but rather production and supply stability. In this aspect, consumer adaptability to diversified protein sources should also be taken as an internal strategy for stabilising food security issues. Many countries have shifted to diversifying food production (Kerr *et al.*, 2021) towards preparing and understanding consumers to accept such diversity in diets (Aliabadi *et al.*, 2021). The use of motivation theory to understand consumer perception and practice (Soon *et al.*, 2020; Soon *et al.*, 2022) can further develop an approach to encourage understanding diets among communities. Diversifying diet can ease the burden to produce food materials, encouraging consumers to try new food materials, thus creating a much more resilient and adaptable individual if a crisis does occur.

3.8 The rise of consumerism

As poultry production becomes more industrialised, farmers aim to produce broilers and eggs at cost effective measures. Various production systems create different perceptions of the rearing and management of poultry animals. Animal welfare has been mainly expressed in industrialised countries (Bessei, 2018). However, can be anticipated to occur in Malaysia as consumer perception and awareness are made known. Currently, certification practices such as Halal have been the current perception of food quality awareness among Malaysians (Ramli *et al.*, 2020; Al-Shammari, 2021) rather than overall animal welfare.

4. Conclusion

Broiler and egg production stability in Malaysia is highly dependent on imports. Fluctuation of the Malaysian ringgit, rising logistics costs, and import of raw materials for feed is passed down to the initial cost of production. The poultry industry, in general, is also technologically dependent on foreign expertise and would need to reassess its capability to be highly well versed. Research and innovation in poultry production should be enhanced to reduce dependency on imported raw materials by focusing on alternative natural resources. Breed improvement and diversification of breed type to create market segments can be more beneficial than existing ones. The engineering aspect, for example, building materials, design and technological inputs and automation, will be required to reduce loss and increase productivity. Infrastructure capacity to create stock for emergencies of a real food security threat should also be efficiently developed. However, sustainable progress could be industrialised by utilising competent inhouse expertise along the value chain within the matured poultry industry in Malaysia.

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