

Economic analysis of broiler production in Peninsular Malaysia

*Abdurofi, I., Ismail, M.M., Kamal, H. A. W. and Gabdo, B. H.

Institute of Agricultural and Food Policy Studies, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

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Abstract

The domestic demand for broiler meat is one of the highest in the Malaysian markets. The industry requires continuous evaluation to identify the existing problems and improves its competitive advantage. Thus, economic analysis of this sort will continue to update current statistics on production cost, output and profitability. Following this, the study, therefore, aims to assess the existing financial condition of farmers, marginal cost of production, total net income and input-output ratio of broiler production in different regions in Peninsular Malaysia. The study used multi-stage sampling in selecting 310 operators from Southern, Northern, East Coast and Central regions. The analytical tools include descriptive statistics and farm budget. The findings disclosed that the broiler farm incurs major cost from acquiring operating inputs especially feed. The operations in the East Coast region was almost unprofitable for the reason that feed conversion rate is more than 2 resulting in higher production cost. But the other three regions indicate positive returns based on the estimated input-output ratios of 1:1.09, 1:1.17 and 1: 1.23 for Northern, Southern and Central regions, respectively. The study advocates for both managerial and policy measures that will help cut the cost of production to attract more investors and increase export.

Keywords

Economic analysis

Production cost

Broiler production

Peninsular Malaysia

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Introduction

The poultry industry plays a significant role to the Malaysian economy in the provision of cheap source of protein to its multi-ethnic population. The poultry industry accounts for 57.5% of the total value added in the livestock sector in 2012; higher than other livestock individually and collectively. The poultry meat has recorded more than 120% self-sufficiency in 2007-2012 (DVS, 2012). The percentage share of poultry to the total livestock is highly likely to increase in the future (Jamaludin, 2013). This is because the broiler meat has a peculiar status among the multiethnic population of Malaysia; no religious prohibition exist relative to other meats like beef and pork which are still unacceptable for consumption by specific race or religion of the population. Additionally, the percentage of broiler consumption in Peninsular Malaysia accounted for 96% of the total poultry consumed in 2012; while ducks and other poultry meat relatively accounted for about 3% and 1% respectively (Agrofood Statistic, 2013). Therefore, in meeting the expected higher demand for chicken meat, the broiler industry must operate sustainable production and maintain private profitability in order to make the meat available at reasonable price in Malaysia.

However, even though the broiler meat in Malaysia are self sufficient, relevant issues like production accessibility, sustainability and non optimal resource utilisation still exist (Shamsudin, 2013). For instance, the margin between cost of production and sales is quite small forcing farmers to accept less profit on a single bird or a kilogram of chicken. Net of returns in broiler production are not promising and thus, limit the inflows of new investment (Rahman *et al.*, 2003). The higher cost of feed is one of the main reasons cited by many researchers on why the industry cannot perform better and highly rely on the price trend of the main feed ingredients (Elsedig *et al.*, 2015; Chanjula and Pattamarakha, 2002). They exert that high cost of feed is considered as a major problem of broiler production along with a lack of knowledge for disease prevention, outbreak of diseases, selection and mating process. The feed cost in broiler production as a major cost that contributes about 70% to the total variable cost while, day old chicks (DOC) contributes about 22% and the rest like labor, vitamin, and equipment jointly contributes less than 9% (Ravindran, 2013). In order to ensure sustainable and continuous supply of broiler meat in Malaysia, the factors that enhance profitability of the broiler industry must be scrutinized. The broiler performance is correlated with maximum profit where the

*Corresponding author.

Email: ofee_2907@yahoo.com

necessity of huge investment compounded with high feed cost is required to meet maximum performance and achieve breeder's objective (Tangendjaja, 2013). In view of the anticipated unstable profit in the broiler industry necessitated largely by high cost of production, an economic analysis aimed at revealing the current status of broiler production in terms of costs and benefits through various performance indicators is indeed important for newcomers and policy formulation in Malaysia.

In poultry production, total expenses greatly influenced by feed price that can reach up to 70% of total cost. Feed component of total costs for broiler production increased from 51.8% in 2001 to 68.7% in 2008 at the peak of food crisis (Donohue and Cunningham, 2009). Production input (physical amount and cost) and farm size affect inefficiency in broiler production (Padilla-Fernandez and Nuthall, 2012). However, this circumstance can be seen as a threat, particularly to small scale farmers because they have limited capital. Another findings supported that there are some problems that often plague poultry production and heighten competitive pressure on existing farms (Adepoju, 2008). The general problems may include high feed cost, other production cost like diseases and marketing problems. Therefore, the contract farming could minimize the risk and provide higher expected profit for small operators (Nguyen *et al.*, 2011). The poultry industry in Mirpur using economic analysis also was investigated that the production costs and benefits were used to analyze the relationship between resources and outputs. The result revealed that high production cost and lower profit forced several commercial farms in Mirpur area to close down (Ahmad *et al.*, 2008). Similar study concluded that broiler farming is considered as a profitable business and has accomplished good prospect in Punjab. However, more attention should be given to small operators where they received marginal income (Singh, 2010).

Methods and Methods

Study area and source of data

This research focused only on the broiler farms in Peninsular Malaysia. This is because large number of broiler farms are in those areas and the availability of production data on different sizes of broiler operations confirmed the choice of Peninsular Malaysia as the study area. The study area is made up of the Northern region (Kedah, Penang, and Perak), Central region (Selangor), Southern region (Negeri Sembilan, Malacca, and Johore) and the East Coast region (Kelantan and Pahang). Primary data

was the major source of data while in some instances secondary information was also used. The primary data was obtained via questionnaire that had been pretested and improved before actual interviews.

Sampling method

In order to closely represent the population, the multi-stage sampling technique was used to select a sample of broiler farmers from 2403 registered farms in Peninsular Malaysia (DVS, 2012). The first action of multiple-stage sampling in this study was to stratify the states in Peninsular Malaysia according to Northern, Southern, East Coast and Central regions. The second stage was the selection of the broiler farmers that are engaged in small, medium, and large scale across the regions. Finally, a simple random sampling was conducted to obtain 310 broiler farmers who were administered with the survey questionnaires and this sample has fulfilled more than 10% of total population of broiler farms in Peninsular Malaysia.

Analytical techniques

In this study, the analytical tools applied were descriptive statistics and simple economic analysis. Descriptive statistics provide a summary data that is normally presented as graphical and numerical figures in order to have a clear overview of the data (Jaggi, 2012). The data include the age of farmers, education level, working experience, scale of broiler business and source of capital. On the other hand, economic analysis can be simple or complicated, which depends on farm commodity and technology (Heady and Dhillon, 1988). The research used farm budgetary technique to compute economic indicators such as fixed cost, variable cost, net return and input-output ratio.

Production function equation :

$$Q = f(C_v, C_f) \quad (1)$$

Where,

Q = the quantity of output

C_v = the quantity of variable inputs used

C_f = the quantity of fixed inputs employed

The cost of production will be measured based on the variable inputs and fixed inputs identified through face to face interview. One of the most important ratios in animal production is feed conversion ratio. Farmers always manage the farms as efficient as possible in order to lower this ratio.

Feed Conversion Rate equation :

$$\frac{\text{Total Feed (kg)}}{\text{Total Weight (kg)}} = FCR \quad (2)$$

If the ratio is 2, the management and technology converts 2 kg of feed into 1 kg of meat which is not efficient in broiler production.

Results and Discussion

Descriptive analysis

Socioeconomic and demographic characteristics are essential information to describe socially the current status of broiler farms ownership and management in Peninsular Malaysia. The categories include age of farmers, education background, working experience, business scale and its capital sources. The data disclosed that in terms of age, 40% of farmers are in the age class of 51 years and above while the young farmers accounts for only 8%. Broiler production is a capital intensive operation and this deters new comers from entering the industry. This could be the reason for small number of young farmers in the industry. With respect to education, majority (56%) of the farmers completed secondary education, 27% of the respondents obtained primary school certificates, 9% with degrees while 8% with diplomas. In terms of farming experience, nearly 60% of the farmers engaged in broiler production for more than 10 years, about 20% of the farmers with 5-10 year production experience and another 20% of them with 0-5 year experience. The entrepreneurship training provide positive impact on management practices (Ezeibe *et al.*, 2014). In order to identify specifically their resource management, productivity and sustainability, the operators were classified into three categories; small scale (less than 30,000 birds), medium scale (between 30,001 and 125,000 birds) and large scale (above 125,000). The result showed about 90% of farmers were in the small and medium scale categories while the rest are large scale production. This will affect productivity since there are no economies of scale in small operations. The similar finding is reported elsewhere (Farooq *et al.*, 2001; Ahmad *et al.*, 2008) that majority of the farmers are focussed on small and medium scale operators. Credit is an important item that enables farmers to purchase adequate inputs and to have optimal working capital to achive an ideal yield. In this study, it can be seen that 52% of the broiler farmers source their credit independently, while 48% of the farmers rely on loans from institutional source to raise credit for broiler production. However, at present government provides loans at subsidized rate

Table 1. Socio-economics characteristics of broiler farmers in Peninsular Malaysia

Category	Number	Percentage
Age of farmers		
20-30	24	8%
31-40	71	23%
41-50	91	29%
51 above	124	40%
Total	310	100%
Education level		
Primary School	85	27%
Secondary School	173	56%
Diploma	25	8%
Degree	27	9%
Total	310	100%
Working Experience		
Less than 5 years	62	20%
5-10 years	65	21%
More than 10 years	182	59%
Total	309	100%
Scale of broiler business		
Small scale (less than or equal to 30,000 birds)	139	45%
Medium scale (30,001-125,000 birds)	137	45%
Large scale (above 125,000 birds)	30	10%
Total	306	100%
Source of credit		
Owner / shareholder capital	146	52%
Loan from other institutional credit	137	48%
Total	283	100%

Source : Survey Data 2013

of 3.75% as an incentive to the industry.

Economic analysis of broiler farming

Broiler production and price

The result indicates that the number of broiler production among each region differs slightly (Table 2). The Southern part of the Peninsular Malaysia produced the highest number of day old chick (DOC) while the Central part (Selangor) produced fewer number of DOC. This is not surprising because Johor is the largest producer. On the other hand, the price of DOC among regions is similar, that is, at RM 1.60 per bird. The average weight of broiler production among regions ranges between 2.1 Kg and 2.3Kg at farm gate with a mortality rate of 3.6% - 5.1%. The result of average weight of broiler and the mortality rate identified in this study are within the DVS statistics. The precise information on FCR that varied among regions is important to calculate feed consumption each bird (Sahzadi *et al.*, 2006). The East Coast maintains the highest FCR of 2.1; implying the consumption of 2.1Kg of corn based feed will increase the bird's weight by a kilogram.

Cost of production

The components of variable cost are cost of DOC, feeds, manpower, vitamins and vaccines, utility,

Table 2. Production background and average price

Variables	North	South	Coast	
			East	Center
Number of day old Chick (DOC)	46,657	66,128	28,685	25,009
Price of DOC	1.6	1.6	1.6	1.6
Mortality Rate (%)	4.3	4.3	5.1	3.6
Average Weight of Broiler (kg)	2.1	2.3	2.2	2.2
Feed Conversion Rate (kg of bird/kg of feed)	1.6	1.6	2.1	1.7

Source : Survey Data 2013

maintenance, catcher cost, and transportation. As expected, feed cost account for 70% of total variable cost (Table 3). The second highest cost component is the DOC constituting 18% of the total variable cost and the least is maintenance cost that accounts for a negligible proportion of the variable cost. The difference of variable cost across regions may be due to the transportation cost. Thus, producers could reduce the cost if they collude and buy in bulk. The level of output has a direct relationship with the total variable cost that is particular to a business, and vary with scales (Ahmad *et al.*, 2008). These variable costs are mostly present as working capital that applies to the production cycle (Nix, 1979). On the whole, the total variable cost among regions in Peninsular Malaysia differs; the Southern part spends heavily owing to highest annual broiler production compared to other regions. The East Coast represents the least as a result of less annual production. In summary, the results reflect that the geographical and socio-economic factors play predominant roles in cost variations among different regions of broiler production.

Net returns to broiler producers

The net returns for the East Coast region is the lowest compared to the Southern region which is the highest (Table 4). This is because farms in the Southern region produce with the least cost of production while farms in the Eastern Coast produce with the highest which could be due to the differences in transportation cost. Similarly, in terms of quantity of broilers sold, the Eastern region was the least while the Southern region the highest. This could be because of Singapore factor which consumed about 40,000 live birds daily. In terms of cost per kg, the Eastern region is the only region where the production cost (RM5.1/Kg) is higher than the farm gate price (RM4.7/Kg). The different maybe due to the many substitutes for chicken found in the east

Table 3. Cost of broiler production (RM) in Peninsular Malaysia

Variable Cost	Malaysia			
	North	South	East Coast	Center
Cost of DOC	74,123	104,070	45,319	40,348
Manpower	10,452	15,756	10,189	8,989
Vitamin and vaccines	10,563	13,343	6,325	2,621
Utility	8,385	11,647	3,541	6,344
Maintenance	3,485	3,402	137	1,400
Feed cost	257,776	385,106	218,326	154,771
Catcher cost	2,682	1,733	919	2,078
Transport	4,912	3,167	240	2,260
Total Variable Cost	390,380	538,225	284,997	218,793
Cost Per unit				
Cost of DOC	0.78	0.72	0.77	0.75
Manpower	0.11	0.12	0.38	0.17
Vitamin and vaccines	0.11	0.09	0.09	0.05
Utility	0.08	0.08	0.07	0.12
Maintenance	0.03	0.02	0.01	0.03
Feed cost	2.84	2.68	3.79	2.87
Catcher cost	0.03	0.01	0.02	0.04
Transport	0.06	0.03	0.02	0.04
Cost per unit	4.03	3.76	5.14	4.05

Source : Survey Data 2013

coast or maybe there was a glut during the survey period. This means in the long run, the firm is not sustainable. On the other hand, net returns for other regions are competitive; market prices are higher than the unit cost. This implies that firms or farms in the Northern, Southern and Central regions are able to appropriately manage their cash flows during the five production cycles in a year. Even though, the selling price per unit of broiler is marginally higher than the cost of production in the Northern, Southern and the Central regions, the economy of scale of production played a significant role in generating high net return in those regions.

Value of input to value of output ratio

The input-output ratio is an indicator to assess the return on investment and evaluate efficiency of farm business. The ratio is mainly calculated by dividing the output cost as revenue with the input or total cost. The result showed that the ratio of broiler industry in Peninsular Malaysia is almost similar with slight dissimilarity occurring only in the East Coast region with a result of 1 : 1.01. This indicates each Ringgit of input invested in broiler

Table 4. Net return to broiler production in Peninsular Malaysia

Items	North	South	East	Center
	Coast			
Quantity sold (kg)	96,514	144,574	61,393	53,973
Production cost/kg (RM)	4.0	3.8	5.1	4.1
Price/Kg (RM)	4.4	4.4	4.7	5.0
Total revenue (RM)	428,729	630,076	287,588	268,816
Total Cost (RM)	390,380	538,225	284,997	218,793
Net returns (RM)	38,349	91,851	2,590	50,023

Source : Survey Data 2013

production will earn or attract 1.01 Ringgit. Table 5 shows in terms of ratio for return on investment, the East Coast region generated the least, while the Central region obtained the highest. It is worthy to note that in terms of net return, the Southern region obtained the highest value, but in terms of returns on investment, the Central region obtained the highest ratio. This is not surprising, studies such as (Khair, 2002; Ahmad *et al.*, 2008) found similar scenarios in Pakistan's broiler production that the most profitable farms may not necessarily be the most in terms of return on investment.

Conclusion

The study describe the current issue in broiler production through comparative economic analysis among regions in Peninsular Malaysia. Majority of the operators who are engaged in the broiler industry are in the matured age and focus on small and medium scale of production. Even though, most of them are not highly educated, they have gained substantial training skills over their many years of experience. The farmers mostly produce independently by sourcing independent credit without borrowing any additional credit from creditors. Furthermore, the three regions such as Southern, Northern, and Central parts have demonstrated profitable performance in terms of both net return and return on investment, but relative to other industries the return is rather minimal. The East Coast region, the only region confronted with poor performance arising from high unit cost of production, higher than the unit selling price and is the most worrisome finding of this research. Given the finding of marginal efficiency on the average, the study suggests that the Malaysian Government should introduce measures to reduce the high cost of production faced by farmers. For instance, by producing new inexpensive formula of feed ingredients locally. This will not only attract new investors into the broiler industry but also it enhances

Table 5. Value of input to output (returns) in broiler production in Peninsular Malaysia

Items	North	South	East	Center
	Coast			
Input cost (kg)	390,380	538,225	284,997	218,793
Output cost (RM)	428,729	630,076	287,588	268,816
Ratio	1 : 1.09	1 : 1.17	1 : 1.01	1 : 1.23

Source : Survey Data 2013

productivity and export which in turn, will increase foreign exchange in the Malaysian economy.

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