

Status and demand of technology for selected beef cattle producers in Peninsular Malaysia

(Status dan permintaan teknologi pengusaha lembu pedaging terpilih di Semenanjung Malaysia)

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Abstract

A study was conducted to identify the status and demand of beef cattle technology among selected producers. Descriptive analysis and probit regression were used to analyse the data of 60 selected farmers. An overview and the status of beef production technology at farm level were generally discussed. Response from farmers has shown that animal feed and nutrition technology was the most demanded technology followed by livestock management and housing system and value-added processing technology. Farm's cattle population, rearing system, extension services, number of labour and experience were the significant factors that were affecting beef technology demand. Efforts should be taken to widely distribute improved breed such as Brakmas so as to increase stock population. Enhancing research in those demanded technologies will help to improve the competitiveness of local beef cattle industry.

Introduction

The livestock industry is an important and integral component of the agriculture sector in Malaysia. It contributed 22% to the total agriculture sector value added with ex-farm value of RM9.9 billion in 2008. Although the non-ruminant accounted for the bulk of production, production of beef cattle is gaining momentum. There are four categories of producers involved in the production of local beef cattle. They are the plantation integrators, large farms practising semi-intensive system, small and medium scale traditional farmers and commercial feedlot operators. Most of them are small and medium traditional farmers which made up 60% of the local beef production.

Currently, local beef production is inadequate to meet the domestic demand (*Figure 1*). This is due to the increase

in consumption and a relatively slow growth of the domestic industry (Tapsir et al. 2008). The per capita consumption of beef increased from 4.08 kg in 1999 to 5.43 kg in 2008. To meet the domestic consumption, Malaysia imported 75% of its beef requirement mainly from India and Australia. With higher incomes and living standards, beef, which was once considered a luxury and traditionally consumed only during festive seasons, is now part of the regular diet of Malaysians, although quality beef especially special cut still remains a niche market (Tey 2008).

Imports are expected to increase with increasing income growth of Malaysian consumers unless the domestic production could quickly expand to keep up with the rising demand. Apart from stock population, technology plays a crucial role in enhancing

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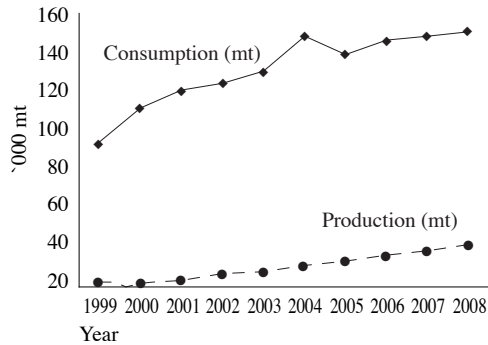


Figure 1. Beef production and consumption in Malaysia (1999–2008)
Source: DVS (2009)

the efficiency, competitiveness and returns from beef farming. Supply response could be better if profits from beef farming are higher. However, the adoption of beef farming technologies by small and medium scale farmers in the tropics and subtropics had generally been low (Reiber et al. 2006). The reasons include the high investments that are required, lack of knowledge of technological know-how and appropriate low-cost alternatives.

The use of appropriate technology can reduce the cost of production. For example, a good livestock handling system and adequate feed supply will increase farm performance, reduce labour expenses, and improve safety and animal welfare, which will lead to better production efficiency (USDA 2009).

In Malaysia, a study on the productivity of beef production in both the feedlot and plantation integration systems showed that the technical efficiency of beef production in both systems were low (MARDI 2009). There were many reasons that were associated with the low efficiency performance of local beef production. One of the factors was the variation of animal husbandry and farming practices due to low adoption and application of technology in beef production. Another reason was the difficulty in obtaining consistent feed of sufficient quantity and quality within reasonable costs. This was especially so for

small and medium scale farmers which form the majority of beef cattle producers in the country.

The purpose of this study was to identify the technological practices and the extent of technology adoption and application in local beef production, as well as to determine factors that affect technology demand among beef producers. Based on the findings, the study suggested some recommendations to improve technology application in beef cattle production.

Methodology

A total of 60 farmers in Peninsular Malaysia were selected representing the traditional, feedlot, integration and semi-intensive beef cattle rearing systems. Information collected included farms' profiles, types of cattle breeds, animal husbandry practices and technical performances, farms' input and output, governmental involvement, as well as the farms' accreditation. Open-ended questions were also asked to obtain information on technologies demanded by producers. The survey was done using a structured questionnaire and conducted by enumerators from the Faculty of Veterinary Medicine and the Faculty of Agriculture and Food Sciences, Universiti Putra Malaysia, who were knowledgeable in animal husbandry.

Descriptive statistics were used to analyse and provide an overview and the status of beef production technology of the sample farms. A probit regression was used to identify the factors influencing the beef technology demand. Ten factors were identified as independent variables, namely the production system, farmers' experience in beef cattle farming (years), farmers' education level, farm initial capital, number of labour force, cattle population, existence of animal identification (as a proxy for animal husbandry practices), existence of farm record (as a proxy for livestock management), farm's accreditation, and the extension services of government agencies.

Results and discussion

There were 23,552 heads of beef cattle in the farms surveyed. The majority of farms (51 farms) had the Kedah Kelantan breed, with an average of 150 cattle and a maximum of 2,200 cattle per farm. Meanwhile, only 28 farms had the Brahman breed with an average of 450 cattle and a maximum of 5,000 cattle per farm. Other breeds did not contribute significantly to the total beef cattle population. For instance, good quality breed of beef cattle developed by MARDI (Brakmas) made up only 0.02% of the total population.

The majority of farms (63%) practised natural mating for animal husbandry, while 10% used artificial insemination, with the remaining farms using both methods. Among the farms, 65% practised manual feeding and pasture grazing, while only 21 farms had a mechanized feeding system. As for animal feed, 32% used palm kernel cake/palm kernel expeller (PKC/PKE), 18% used raw oil palm frond and urea molasses block, while only 11% used nutriblock and oil palm frond (pallet). However, a majority of farms (80%) used those formulated feeds in controlled quantity together with fodder/pasture.

About 45% of the farms used wells or pools as water sources for the drinking system, 32% used water containers/barrels and 13% had a proper piping system. However, 10% of farms had no specific water sources, which could expose the cattle to higher risk of infection and diseases.

A majority of the farms did not have temperature control (92%) and a specific

waste disposal system (53%). These facilities existed only in the intensive feedlot rearing system.

About 63% of farmers practised manual cleaning of the cattle housing and only 7% had a mechanical system for cleaning management. In health management, 73% of the farms conducted vaccination programme, 87% conducted deworming, and 65% conducted blood screening. About 35% of farms surveyed achieved the Veterinary Health Mark (VHM) accreditation, while only 17% received the Farm Practices Scheme (SALT) accreditation.

Responses from beef cattle farmers showed that feed technology was the most highly demanded technology (*Table 1*). These included the feed formulation technology using local agricultural byproducts, fodder production and preservation as well as pasture management. This was indicated by 62% of farmers surveyed. Other technologies that were in demand were livestock management and housing technology (31.08%), as well as value-added processing technology (14.86%). Information management technology was of less demand although record keeping was crucial for farm's decision making process.

Three probit regression analyses were separately conducted to identify influencing factors for feed, livestock management and processing technologies demand. Results showed that only two of the 10 independent variables had significant influence on the demand of feed technology (*Table 2*). As

Table 1. Demand of beef cattle farming technology, ranked by responses

Category of demanded technology	Freq.	%	Cumulative (%)
Feed and nutrition technology	37	50.00	50.00
Livestock management/housing technology	23	31.08	81.08
Value-added processing technology	11	14.86	95.95
Breeding technology	2	2.70	98.65
Information management technology	1	1.35	100.00
Total response	74	100	

Table 2. Probit regression: Parameter estimates of the factors that determined feed technology demand

Parameters	Coefficients	Std. Error	z-Statistic	Sig.
Constant	0.695	0.856	0.812	0.417
Cattle population	-2.48E-04	1.70E-04	-1.687	0.090*
Obtained farm accreditation	-1.646	0.524	-3.141	0.002**
McFadden R-squared	0.189			
S.E. of regression	0.486			
Log likelihood	-33.172			
LR statistic	15.430			
Prob (LR statistic)	0.071			
% of correct prediction	61.80%			

* $p < 0.10$; ** $p < 0.05$

Table 3. Probit regression: Parameter estimates of the factors that determined livestock management technology demand

Parameters	Coefficients	Std. Error	z-Statistic	Sig.
Constant	1.018	1.083	0.939	0.348
Extensive system of cattle rearing	-1.712	0.573	-2.990	0.003**
Received extension services	1.142	0.678	1.685	0.092*
Numbers of labour	-0.392	0.171	-2.295	0.022**
McFadden R-squared	0.294			
S.E. of regression	0.414			
Log likelihood	-26.163			
LR statistic	21.825			
Prob (LR statistic)	0.016			
% of correct prediction	71.20%			

* $p < 0.10$; ** $p < 0.05$

farms got bigger and obtained accreditation, there was a lesser probability for them to demand for feed technology. This was more likely due to the fact that bigger farms had better knowledge of feed technology compared to small farms.

The demand for livestock management technology showed that three variables had significant impact (Table 3). Farmers with traditional extensive system and with more labour were less concerned about livestock management technology. However, there was a tendency among farmers who received advisory and extension services to demand for a better livestock management technology. More exposure and information about livestock management technology

from the extension agents might be the underlying reasons for this situation.

There were two factors that influenced the processing technology demand by beef cattle producers (Table 4). 'Years of experience' in beef cattle farming correlated positively to the probability of processing technology demand. Higher population of cattle also correlated positively with processing technology demand by farmers for the purpose of value-added activities. However, the majority of farmers demanded only simple primary processing such as meat cutting and packaging for the fresh market.

The models for feed, management and processing technology demand were moderately good to represent the situation with the correct prediction of 61.80, 71.20

Table 4. Probit regression: Parameter estimates of the factors that determined processing technology demand

Parameters	Coefficients	Std. Error	z-Statistic	Sig.
Constant	-2.845	1.127	-2.526	0.012**
Experiences in breeding cattle (year)	6.73E-02	0.030	2.231	0.026**
Cattle population	3.69E-04	1.99E-04	1.851	0.064*
McFadden R-squared	0.269			
S.E. of regression	0.332			
Log likelihood	-17.107			
LR statistic	12.618			
Prob (LR statistic)	0.096			
% of correct prediction	58.07%			

* $p < 0.10$; ** $p < 0.05$

and 82.07% respectively. The models also showed that there might be many other internal and external factors which had influenced the demand of technology, that were beyond the scope of this study. This could be seen in the McFadden R-squared for each of the models which were between 0.19 and 0.29. This meant that only about 19–29% of the variations in the probability of technology demand were caused by the factors that were included in the models.

Conclusion and recommendations

In general, the Kedah Kelantan breed still dominates the local beef cattle population. Efforts should be taken to widely distribute and increase the stock population of improved breed such as Brakmas. The three most demanded technologies were animal feed and nutrition, livestock management and housing system, as well as value-added processing. Enhancing research and development in those fields would contribute to improve the viability and feasibility of beef cattle farming. However, factors such as farm size (farm's cattle population), production system and farmer's skills and experiences were the major influencing factors in the level of technology demand. Strengthening the technology information dissemination in extension services could be an effective way in the technology adoption processes.

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Abstrak

Kajian telah dijalankan untuk mengenal pasti status dan permintaan teknologi di kalangan penternak lembu daging terpilih. Analisis deskriptif dan regresi probit digunakan untuk menganalisis data daripada 60 orang penternak terpilih. Status dan tahap amalan teknologi di peringkat ladang dibincangkan secara umum. Maklum balas daripada penternak mendapati teknologi makanan dan pemakanan ternakan paling dikehendaki, diikuti dengan teknologi pengurusan ternakan dan perumahan serta teknologi pemprosesan produk ternakan. Populasi ternakan di ladang, sistem pemeliharaan, khidmat pengembangan, bilangan pekerja dan pengalaman dalam penternakan merupakan faktor signifikan yang mempengaruhi permintaan teknologi. Usaha pengagihan baka lembu yang bermutu seperti Brakmas perlu diberikan penekanan supaya populasinya dapat dipertingkatkan. Penyelidikan terhadap teknologi yang mendapat permintaan tinggi wajar diteruskan supaya dapat membantu mempertingkatkan daya saing industri lembu pedaging di negara ini.