# Utilization of Male Dairy Calves in Thailand

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**Abstract**

There are no reports of the utilization of male calves of dairy cattle for beef production in Thailand. This study was conducted to determine how dairy farmers in two regions of Thailand dispose of male calves. A total of 137 dairy farmers in northern Thailand and a further and 200 dairy farmers from central Thailand were interviewed. Most of the farmers revealed that they sell male calves as soon as possible after birth. In northern Thailand all male calves were fed and maintained in a similar manner to the female calves prior to sale, whereas in central Thailand only 78.50 percent ($P<0.01$) of male dairy calves were fed milk before they were sold. Most of the dairy farmers (94.89%) in northern Thailand sold their male calves to "retailers" whereas in central Thailand most farmers (96.00%) sold male calves to "male dairy calf stockers". It was found that the farmers in central Thailand received less money per calf ($P<0.05$) than those in northern Thailand. The farmers in the north expressed more interest in rearing the male calves to supply a future male dairy beef production program than those in the central region. This was reflected in the more organized and embedded male calf business in central compared to northern Thailand. As a consequence it would be more difficult to promote large scale dairy beef production in central compared to northern Thailand. Based on the results of this study it will be necessary to implement an appropriate strategy and educational program to encourage and convince dairy farmers of the benefits of a dairy beef production program, especially in the main dairy production area in central Thailand.

***Keywords:***male dairy calves, dairy beef production, Thailand

## Introduction

The amount of beef imported into Thailand is increasing markedly. Since 2008 there has been an annual increase of 64.33% and in the year of 2012 some 11,470 tonnes of beef and beef products valued at 1,705million baht (THB) were imported (Anonymous, 2013). In other countries, beef derived from dairy cattle (dairy beef) comprises a high proportion of the total beef consumed. For example, at this time in Japan, the rate of increase in production of beef from dairy breed steers is twice that produced from beef breed steers (Longworth, 1983). Moreover, in North America approximately 20% of people consume beef from dairy cattle and in Europe 80-90% of total beef production is derived from dairy/beef crossbred animals (Zarnecki and Stolzman, 1986).

Hitherto, all stakeholders in the beef industry in Thailand have overlooked the potential for using dairy breed animals to produce beef. Adoption of a system for the efficient use of male dairy cattle for the production of beef would enhance the production of beef, improve the income of dairy farmers and create opportunities for the development of a dairy beef industry. The present study was conducted, between October 2013 and May 2014, to investigate the utilization of male dairy calves and to assess the potential for the development of a dairy beef industry in Thailand.

## Materials and Methods

### Surveys

Dairy farmers from northern (Chiang Mai and Lumphun Provinces) and central (Saraburi and Lopburi Provinces) of Thailand were surveyed by interactive interviews.

### Sample Size for Interview

The selection of a representative sample of the dairy farmers in both regions was based on the method of Yamane (Yamane, 1973). Briefly, the minimum number of participants (n) from the total number of potential participants (N) was determined, assuming a variance value for each sample group of 0.1 (e) using the following relationship:

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

It has been reported that there are 1,777 dairy farmers in the northern region and a further 5,384 dairy farmers in the central region of Thailand in which surveys were to be conducted (Anonymous, 2012). Thus a minimum sample size of approximately 100 for each of the regions to be surveyed would provide a representative number of farmers. The actual number of farmers surveyed were 137 from northern and 200 from central Thailand.

### Data Analyses

The data obtained were analyzed using t-tests and chi-square tests. The level of satisfaction was assessed using a Likert's Scale(Najib et al., 2011), where there were 5 levels of satisfaction. These were score 5 = highest level of satisfaction (4.50-5.00 point); score 4 = high level of satisfaction (3.50-4.49 point); score 3 = moderate level of satisfaction (2.50-3.49 point); score 2 = low level of satisfaction (1.50-2.49 point); score 1= lowest level of satisfaction (1.00-1.49 point).

## Results and Discussion

### Management of Male Dairy Calves on Farms

The management practices for male dairy calves in the two regions were similar but there were some differences. In both regions all farmers sold the male calves soon after birth but the male calves from farms in northern Thailand were retained on farms for longer than those on farms in central Thailand. On the former farms male calves were fed colostrum/milk for 4.17±2.18 days (mean±SD) with a range of 0 to 15 days and on the latter for 2.30±6.5 days with a range of 0 to 90 days; this difference was significant ($P<0.05$). Possible reasons for the longer delay in selling male calves in northern by comparison with the central region are the lower demand from retailers and the lack of an organized calf buying businesses in the north.

Whereas in northern Thailand all male calves were fed colostrum, in central Thailand 21.5% of male calves were not fed colostrum. A similar difference was found for the feeding management of male and female calves. On northern farms all calves were fed colostrum but on the farms in central Thailand significantly fewer (75.5%, $P<0.01$) male calves were fed the same as female calves. No farmers in northern Thailand reported problems with diseases in male calves but 65% ($P<0.01$) of farmers in central regions reported problems with diarrhea and navel infections.

On most farms in both northern and central Thailand calves were kept in barns (either in pens or tethered) until sold; there was no significant difference ($P>0.05$) between farms from northern and central Thailand, 70.10 and 77.50% respectively. The remaining farmers kept calves outdoors either tethered to trees or posts (29.90% v 22.00% respectively for northern *v* central farms) and on one farm in central Thailand (0.10%) calves were kept untethered. Given that there was no difference between the regions in the way in which calves were housed it appears that the increased incidence of disease in the calves in central Thailand was due to the failure to feed colostrum.

### Reasons for Selling Male Calves

In northern Thailand the majority of farmers (54.00%) disposed of the male calves because they believed they could not afford to keep them whereas only 12.50% of farmers in central Thailand gave this as the reason for disposal; this difference was significant ($P<0.01$). In both regions very few farmers sold male calves because they sought extra income from the sale of the calves (0.70 and 1.50% for northern and central Thailand respectively).

The earlier disposal of male calves in central compared with northern Thailand may have been due to the capacity of farmers in central Thailand to sell their milk to co-operatives from the fifth day of lactation as opposed to their northern counterparts who were not able to sell their milk to co-operatives until 10 days after cows calved. Another reason for the delay in sale of male calves in northern Thailand may have been the due to the demand for calves from purchasers.

**Weights and Prices of Calves Sold**

In central Thailand the male calves sold were significantly heavier ($P<0.01$) than those from northern Thailand even though the former were, on average, sold sooner than the latter. The calves from central Thailand weighed 30.42±6.05 kg (mean±SD) whereas those from northern areas weighed 26.86±5.76 kg. In both regions the range of weights was 15.00-50.00 kg. The likely reason for the difference in weights of calves was the nutrition of the cows prior to calving. There were no differences in the breeds of cows (in both regions the cows were predominantly Holstein/Friesian or crossbred Holstein/Friesian) but the cows from central Thailand were in better body condition than those from northern Thailand.

Farmers from northern Thailand received an average price for their male dairy calves which was significantly higher ($P<0.05$) than the price received by their counterparts from central Thailand 1,218.24±176.45 (mean±SD) *v* 1,173.75±197.84 THB head$^{-1}$, with a range in both regions of 750-1,500 THB head$^{-1}$. Prices paid for large calves (>41 kg) in northern Thailand (1,518.24 ± 268.77 THB head$^{-1}$ with a range of 1,000 - 2,000 THB head$^{-1}$) were also significantly higher ($P<0.05$) than prices for similar calves in central Thailand (1,460.08±262.38, range of 1,000-2,100 THB head$^{-1}$). There was no significant difference ($P>0.10$) in the price paid for smaller calves (<30 kg) in both regions (918.24±180.64 *v* 887.50±191.25 THB) in northern and central regions respectively with a range of 500-1,500 THB in both regions.

Most of the farmers in northern Thailand (94.89%) sold their male calves to retailers, with the remainder selling calves to "casual buyers" or giving calves to relatives at the times of celebrations. In contrast, the majority of farmers from central Thailand (96.00%) sold their male calves to "male dairy calf stockers" with the remainder selling to casual buyers.

Prices for the male calves in northern Thailand generally were negotiated in a congenial manner, with price being set by estimation of size rather than actual weight. In contrast, in the central region the prices were set by buyers and stockers and based on actual weight. As indicated above, prices paid for calves were dependent on the size of the calf but prices also were affected by increased demand at the times of festivals such as New Year and Songkran (Water Festival). Although Duanyai (2012) has reported that prices paid for dairy cattle in local cattle and buffalo markets are based on bargaining and negotiation, dairy farmers are disadvantaged by the fact that buyers of bull dairy calves are aware that farmers do not wish to rear bull calves thereby lessening their bargaining ability.

A possible reason for the higher prices paid for bull calves in northern, compared to central, Thailand is the preference of the people in the north to consume beef compared to other meats. Moreover, it is considered that demand would be stronger in the north than in the central region due to the larger population, some 2.07 *v* 1.39 million people as reported by the Department of Provincial Administration (2014) and the greater number of dairy farms in central as opposed to northern Thailand (5,384 *v* 1,777, see Anonymous (2012)).

**Marketing of Male Dairy Calves**

The price received for male dairy calves influenced 54.50% of farmers in central Thailand to dispose of their calves whereas a significantly lower ($P<0.01$) proportion of northern farmers, 22.63%, were influenced by the price offered. A significantly higher proportion of farmers in northern compared to central Thailand (76.64 *v* 45.50%, $P<0.01$) considered that the process of marketing their calves was reliable.

In both regions very few farmers (3.65 *v* 7.50%, $P>0.05$; north *v* central) took their calves to the homes of buyers and in both regions the great majority of farmers relied on buyers coming to their farms to purchase calves (96.35 *v* 92.50% for northern and central farmers respectively, $P>0.05$). Whereas in northern Thailand almost

all farmers (97.81%) knew what the buyers did with their calves, only 4.00% of farmers from central Thailand knew the fate of their calves. This difference was significant (P<0.01).

**Attitudes and Opinions of Farmers to the Development of a Dairy Beef Production Program**

Based on the Likert's scale, see above, dairy farmers from northern Thailand were considered to be "moderately positive" about the development of a dairy beef production program whereas the farmers from central Thailand were considered to have a "low attitude" to such a program (Likert scores of 2.57±1.25 *v* 2.30±1.48, mean±SD, P = 0.71).

The opinions of dairy farmers from both regions surveyed on the development of a dairy beef production program in Thailand are presented in Table 1, in which values presented are the percentage of farmers expressing a particular opinion. It was found that a higher proportion of dairy farmers in northern compared to central Thailand thought they would require more information and knowledge related to the rearing of male dairy. The farmers in northern Thailand also expressed more interest in the production of yearling bull calves than those in central Thailand.

The problems which were envisioned by the farmers if they were to raise bull calves to supply the future dairy steer fattening program are summarized in (Table 2). It was found that the dairy farmers in the two regions considered the rearing of male dairy calves would be wasteful. Relatively few farmers considered that they would receive more income as a result of implementing a yearling dairy beef program with a higher proportion of farmers in northern than central Thailand expressing this opinion (35.76% *v* 14.50%).

In both regions there was a clear understanding that such a program would increase workload and expenses with a higher proportion of farmers in central compared to northern Thailand recording this view (68.50% *v* 29.93%). It was found that there was lack of workforce in northern and central Thailand (13.14 and 8.00%, respectively). Few of the farmers in northern and central Thailand (1.46 and 1.50%) stated that they should form a group for power negotiation on pricing. Besides, some of the informants in northern and central Thailand (7.30 and 5.00%, respectively) believed that male dairy calf would be difficult to handle.

**Table 1** The opinions of dairy farmers from both regions expressing on the future development of a dairy beef production program in Thailand.

| Item | Northern Thailand (n = 137) | Central Thailand (n = 200) |
|---|---|---|
| Need more information about the program (%) | 55.47** | 25.50 |
| Interested in a yearling production program (%) | 51.83** | 21.50 |

**significant differences in response are indicated by an asterisk (P<0.01)

**Table 2** The percentage of farmers who expressed opinions about issues which would arise if they were to raise bull calves to supply a future dairy steer fattening program.

| Item | Northern Thailand (n = 137) | Central Thailand (n = 200) |
|---|---|---|
| Program would increase income with clear market | 35.76 | 14.50 |
| Need to form a negotiating group | 1.46 | 1.50 |
| Program would increase work and expenses | 29.93 | 68.50 |
| Current farm labour would be insufficient | 13.14 | 8.00 |
| Farm area would be insufficient | 12.41 | 2.50 |
| The calves/ yearlings would be difficult to handle | 7.30 | 5.00 |
| Total | 100% | 100% |

## Conclusions and Recommendations

It is clear from the results of this study that if a dairy beef production program is to be developed in Thailand it will be necessary to devise a strategy to educate farmers and encourage them to participate. Dairy farmers in northern Thailand appear to be more receptive than their peers from central Thailand to the possibility that a dairy beef production program might be beneficial. Given this it is suggested that a pilot program should be developed in northern Thailand to demonstrate the potential benefits from adoption of a dairy beef production program.

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