Abstract T249

Cow-Calf Production Performance under Different Management Systems in Thailand

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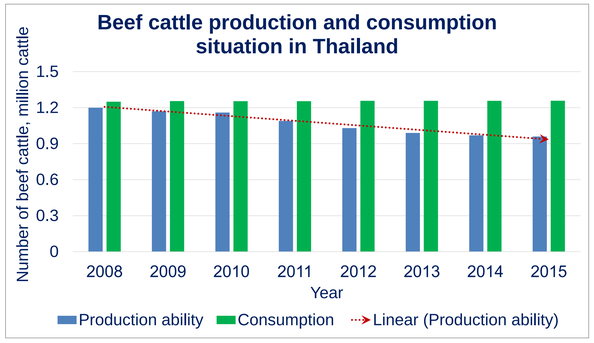
SUMMARY

The numbers of beef cattle and cow-calf producers in Thailand are decreasing every year due to a sharp increase in demand and high prices offered for all types of cattle by neighboring countries. To help evaluate the extent of this problem, an assessment of the current status of cow-calf production in Thailand is needed. Thus, the objective of this study was to compare the cow-calf production performance and profitability in three regions of Thailand (**UN** = upper Northeast region; **LN** = lower Northeast region, **CT** = Central region). The factors considered were number of cows per farm, paddock size, number of laborers, birth weight, weaning weight, sale age, calving interval, costs and profits. The factors considered were number of cows per farm, paddock size, number of laborers, birth weight, weaning weight, sale age, calving interval, costs and profits. Data for these factors were gathered from 501 cow-calf producers (130 producers in **UN**, 341 producers in **LN**, and 30 producers in **CT**) using questionnaires, interviews, visits, and seminars. Means and SD were used to describe factors. Least squares means (LSM) for all factors in each region were computed using a linear model that included region (**UN**, **LN**, **CT**) and farm size (small: less than 10 cows; medium: 11 to 20 cows; large: more than 20 cows) as fixed effects and residual as a random effect. Cow-calf producers had from 7.7 (**UN**) to 12.9 (**CT**) cows per farm, paddock size ranged from 1.3 (**UN**) to 2.1 (**CN**) ha, and hired 1.9 (**LN**) to 2.2 (**UN**) laborers for their operations. Calf birth weights ranged from 24.3 (UN) to 29.9 (**CT**) kg, weaning weights ranged from 151.9 (**LN**) to 193.4 (**CT**) kg, weaning ages from 7.8 (**CT**) to 8.6 (**UN**) mo, and sale ages ranged from 11.7 (**CT**) to 13.5 (**LN**) mo. Calving intervals were from 12.6 (**LN**) to 13.7 (**UN**) mo. Factor LSM differed among regions (P < 0.05), except for weaning age, sale age and calving interval. Cow-calf producers in **CT** had higher profits and lower costs than **UN** and **LN** (P < 0.05). *These results suggested the need for different cow-calf production strategies would need to be implemented in each Thai region improve productivity and profitability in a sustainable manner.*



INTRODUCTION

Beef cattle production in Thailand relies mainly on small holders, who have less than 10 beef cows as a secondary source of income to agricultural production (e.g., rice, cassava, or sugarcane). Differences in agricultural production, consumer culture, and market demands in each region (**UN** = upper Northeast region; **LN** = lower Northeast region, **CT** = Central region) could influence the characteristics of beef cattle production in each region. The Office of Agricultural Economics (2015) reported that currently beef cattle production in Thailand was 980,000 cattle per year, which was smaller than the domestic beef consumption that required approximately 1,260,000 cattle per year. Consequently, live cattle and frozen meat from other countries (Myanmar, India, and Australia) were imported legally and illegally into Thailand. Unfortunately, changes in economic and social lifestyle have caused a decline in numbers of beef cattle and producers in Thailand in recent years, especially those in cow-calf production that supplied cattle for fattening. Cost, profit and return periods of cow-calf production might affect the decision of beef producers to either continue or quit their cow-calf production business, and these decisions may differ among regions. To help visualize and evaluate the extent of problems in the cow-calf business, an assessment of its current status in Thailand is needed. *Thus, the objective of this study was to compare cow-calf production performance and profitability in three regions of Thailand.*

MATERIALS AND METHODS

Data and traits: Data consisted of number of cows per farm, paddock size, hired laborers for the operation, calf birth weights, weaning weights, weaning ages, calving intervals, sale ages, treatment costs and mating costs. These data were gathered from 501 cow-calf producers in **UN** (130 producers), **LN** (341 producers), and **CT** (30 producers) using questionnaires, interviews, visits, and seminars from September 2013 to December 2014.

Data analysis: Frequency and distribution of the collected cow-calf data were described using descriptive statistics. Region was classified into 3 groups by farm location in each region (**UN**, **LN**, and **CT**). Farm size was classified into 3 groups according to the number of cows in each farm (small: less than 10 cows; medium: 11 to 20 cows; large: more than 20 cows). Least squares means (LSM) for all traits were computed using a linear model included region and farm size as fixed effects and residual as a random effect. Then they were compared using t-tests.

Table 1 Descriptive statistics for cow-calf production performance and management costs

Cow-calf production performance traits	n	Min	Max	Mean	SD
Number of cows per farm (cows)	457	1.0	40.0	6.0	6.1
Paddock size (hectares)	376	0.2	4.8	1.1	1.1
Hired laborers (laborers)	405	1.0	5.0	1.8	0.8
Birth weight of calf (kilograms)	184	20.0	40.0	27.1	6.4
Weaning weight (kilograms)	172	95.0	250.0	156.1	43.1
Weaning age (months)	338	5.0	12.0	8.3	2.3
Calving interval (months)	215	10.0	24.0	13.1	2.6
Sale age (months)	176	6.0	18.0	13.5	3.2
Treatment costs (USD)	176	3.1	62.5	15.6	15.2
Mating costs (USD)	259	3.1	25.0	12.1	4.4

RESULTS AND DISCUSSION

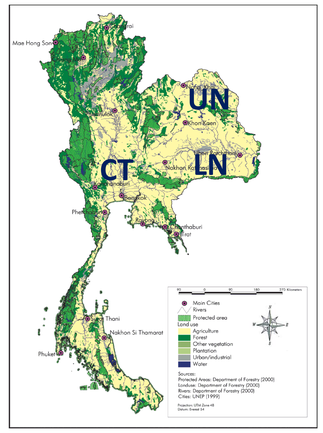
Descriptive statistics for cow-calf production performance and management costs are shown in **Table 1.** In general, cow-calf producers in **UN** were smallholders that raised cows and produced and sold calves under the supervision of the beef cooperative they belonged to. Calf price was based on weight. In **LN,** cow-calf producers were independent smallholders. There was no beef cooperative. Producers managed their cows using their own system and sold their calves to other cattlemen or to middlemen either within or outside the region. Price was based on general appearance of the cattle and negotiation between producers, or between producers and middlemen. Lastly, management systems of cow-calf producers in **CT** were integrated into a unified cow-calf-fattening system formed by cow-calf and fattening beef cattle producers (unified commercial cattle production systems).

Least squares means of cow-calf production performance, management costs, and profits in each region are shown in **Table 2.** The range of LSM was from 7.69 ± 0.50 (**UN**) to 12.9 ± 0.67 (**CT**) cows for number of cows per farm, 1.29 ± 0.15 (**UN**) to 2.12 ± 0.24 (**CT**) hectares for paddock size, 1.92 ± 0.09 (**LN**) to 2.21 ± 0.10 (**UN**) people for hired laborers, 24.27 ± 1.31 (**UN**) to 29.94 ± 1.77 (**CT**) kg for birth weight of calf, 151.88 ± 6.71 (**LN**) to 193.35 ± 12.62 (**CT**) kg for weaning weight of calf, 7.80 ± 0.49 (**CT**) to 8.61 ± 0.35 mo (**UN**) for weaning age of calf, 12.64 ± 0.34 (**LN**) to 13.66 ± 0.47 (**UN**) mo for calving interval, 11.72 ± 0.81 (**CT**) to 13.50 ± 0.55 (**LN**) mo for sale age, 11.86 ± 3.92 (**UN**) to 21.36 ± 3.97 (**CT**) USD for treatment cost, and 8.78 ± 1.32 (**CT**) to 12.32 ± 0.65 (**LN**) USD for mating cost.

Table 2 Least squares means and standard errors for cow-calf production performance, management costs and profits in **UN**, **LN** and **CT**

Cow-calf production \ Regions	UN	LN	CT	P-value
Number of cows per farm (cows)	7.69^{c} ± 0.50	8.43^{b} ± 0.40	12.90^{a} ± 0.67	0.0001
Paddock size (hectares)	1.29^{b} ± 0.15	1.43^{b} ± 0.14	2.12^{a} ± 0.24	0.0156
Hired laborers (laborers)	2.21^{b} ± 0.10	1.92^{a} ± 0.09	2.20^{ab} ± 0.16	0.0036
Birth weight of calf (kilograms)	24.27^{b} ± 1.31	26.87^{a} ± 0.94	29.94^{a} ± 1.77	0.0223
Weaning weight of calf (kilograms)	170.06^{a} ± 8.65	151.88^{b} ± 6.71	193.35^{a} ± 12.62	0.0040
Weaning age (months)	8.61 ± 0.35	7.89 ± 0.26	7.80 ± 0.49	0.0523
Calving interval (months)	13.66 ± 0.47	12.64 ± 0.34	12.85 ± 0.86	0.0678
Sale age (months)	13.15 ± 0.70	13.50 ± 0.55	11.72 ± 0.81	0.2370
Treatment costs (USD)	11.86^{a} ± 3.92	19.50^{b} ± 2.65	21.36^{b} ± 3.97	0.0380
Mating costs (USD)	9.87^{a} ± 0.74	12.32^{b} ± 0.65	8.78^{a} ± 1.32	0.0001

$^{a, b, c}$ Least squares means within the same row with different superscripts differ (P < 0.05)



The LSM of number of cows per farm, paddock size, hired laborers, birth weight of calf, weaning weight of calf, treatment cost and mating cost were significantly different among regions (P < 0.05). The total costs that cow-calf producers expended per animal were 326 USD in **UN**, 332 USD in **LN**, and 126 USD in **CT**. Profits per animal in cash were 232 USD in **UN**, 157 USD in **LN**, and 517 USD in **CT** (**Figure 1**).

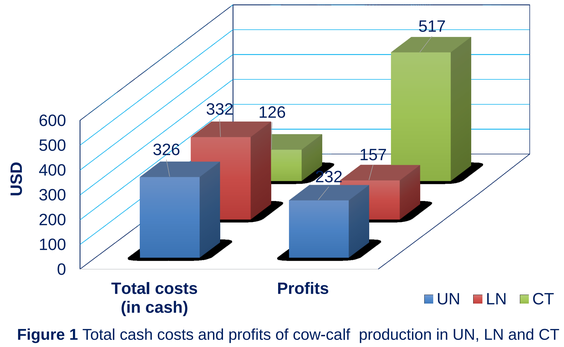


Figure 1 Total cash costs and profits of cow-calf production in UN, LN and CT

Compared to **UN** and **LN,** cow-calf production in **CT** had larger number of cows per farm, larger paddock size, heavier calf birth weights, heavier calf weaning weights, lower mating costs, higher treatment costs, but lower total costs and higher profits (in cash). In contrast, cow-calf production in **UN** had the smallest number of cows per farm, smallest paddock size, highest number of hired laborers, lightest birth weight, and the smallest treatment costs. Cow-calf production in **LN** had the smallest number of hired laborers, smallest calf weaning weights, and the highest mating costs, highest total costs, and lowest profits (in cash). Differences in number of cows per farm, paddock size, and number of hired laborers may have affected costs and profitability of cow-calf production (Kankaew *et al.,* 2012; Ramsey *et al.*; 2005).

Differences among regions could be used to classify cow-calf production systems into **a cooperative production system (UN), a smallholders production system (LN)**, and **a commercial beef cattle production system (CT).** The commercial beef cattle production system (**CT**) and the cooperative production system (**UN**) had lower costs and higher profits than the smallholder production system (**LN**). Thus, the smallholder production system (**LN**) needs to decrease costs and increase profits to become competitive. Cooperation among cow-calf producers should be encouraged as well as integration with related business in the production chain. Temporary support the government could also help. Differences among cow-calf production systems across regions evidenced the need for alternative strategies to improve productivity and profitability of cow-calf production systems in a sustainable manner.

FINAL REMARKS

- *Cow-calf production systems in Thailand differed among regions (**UN**, **LN**, **CT**) and they affected cow-calf production performance, costs, and profitability*
- *Differences among regions indicated the existence of 3 systems: a cooperative production system (**UN**), a smallholders production system (**LN**), and a commercial beef cattle production system (**CT**)*
- *Cooperative and commercial cow-calf production systems should be promoted to improve performance and profitability*
- *Strategies suitable to each region could be implemented to improve productivity and profitability in a sustainable manner*

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