Chapter 5

PROFITABILITY OF CATTLE PRODUCTION

This chapter aims to assess the profitability of local and crossbred cattle production. So, it discusses the farmers' input use and cost, followed by profitability analysis for each data set and a summary of the empirical results.

5.1 Input use and cost analysis

5.1.1 Input use

There are different production practices in local and crossbred cattle production. Table 5.1 shows production costs of cattle as regard to feed, salt and minerals, veterinary services and health expenses, breeding fees, fertilizer for grass, labor, cattle-shed depreciation, breeding cows depreciation, and opportunity cost of land being significantly at 1 per cent between two cattle production systems. However, there are no significant differences of costs of cattle-shed repairing and equipment depreciation between two cattle production systems.

Feed and labor are the main cost used in cattle production. Labor is the highest cost of input use in cattle production system. Labor cost* referred here was the opportunity cost of family labor that were labor for cleaning animal place, grazing, feeding concentrates and mixing water, maintaining the pasture and cutting the grass. There was no hired labor for cattle raising in the study area. On the average, 36 labors per MSU per year were used to take care of the local bred cattle, while crossbred cattle needed 55 labors per MSU. Therefore, cost of labor of crossbred cattle was

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* Calculation labor unit considered also the difference of age: 3 children (7-14 years olds) work 8 hours a day equal to one man-day (a man-day work 8 hours); 2 elders (>60 years old) work 8 hours a day equal to one man-day.

853,733 VND/MSU, which was significantly higher than that of local cattle (558,284VND/MSU) at 99 per cent significance level. For local cattle raising, grazing labor was the highest use of labor (16.9 man days/MSU), followed by labor used for maintaining pasture and cutting grass (12.4 man days/MSU), feeding concentrates and mixing water (6.2 man days/MSU) and cleaning cattle-shed (1.7 man days/MSU) whereas for crossbred cattle raising, labor mostly was used for cattle grazing (27.6 man days/MSU), followed by maintaining pasture and cutting grass (18.2 man days/MSU), feeding concentrates and mixing water (7.9 man days/MSU) and cleaning cattle-shed (3.3 man days/MSU) (Table 5.2). In general, grazing cattle was based on free grazing along the edge of rice-field, in rubber farm and uncultivated areas. This word was done by children who were in 7-14 years old group. When they went to school normally one went in the morning and one went in the afternoon. Maintaining pasture and cutting grass was mainly done by adult. Cleaning cattle-shed was also done by adult because it was a heavy work. In the winter season, the climate is cold and heavy rain that were limited the grass growing. So, the cattle raisers went to communal grassland on roadsides, hills and forest-sides to cut and carry grasses. The households who raised crossbred cattle needed more time to take care and mix concentrates feed.

Feed is the second highest cost of input used of cattle production systems. Feeding cost of crossbred cattle production (492,372 VND/MSU) was higher than that of local cattle production (341,867 VND/MSU). The most popular concentrates feed used for raising cattle were cassava chip and rice bran that were provided from own production. However, some households had to buy concentrates feed from local market and were generally done by female farmers because it was considered light work. The concentrates feed was combined with some salt and water for cattle in the winter season. This feeding practice, once again, explains why the households raising crossbred cattle had significantly higher amount of salt and minerals than the households raising local cattle.

The costs paying for veterinary service included medical treatment, and vaccination. The average costs of veterinary service for local cattle was 18,058

VND/MSU, it was lower than crossbred cattle (28,878 VND/MSU) in 1% level of significant. Vaccination for cattle was generally done two times for local and crossbred cattle: One time in winter- spring season and another time in summer-autumn season. The crossbred cattle were easy to infect by diseases with poor feeding condition and changing the climate. So, medical treatment was mainly applied for crossbred cattle. Local cattle breed adapt well to the local climate and to poor feeding. That is why veterinary service cost of crossbred cattle was higher than that in the same condition.

Table 5.1 Cost of local and crossbred cattle production

Items	Local cattle (N=40) (1)		Crossbred cattle (N=40) (2)		Difference Between (1) and (2)	Prob.
	VND/MSU	%	VND/MSU	%	VND/ MSU	
Operating cost	1,012,729	100.00	1,476,926	100.00	464,197	
Feed	341,867	33.76	492,372	33.34	150,505	.000***
Salt, minerals	18,136	1.79	26,782	1.81	8,646	.000***
Veterinary service and health expenses	18,058	1.78	28,878	1.96	10,820	.001***
Breeding fees	23,325	2.30	42,750	2.89	19,425	.000***
Fertilizer for grass	34,293	3.39	15,522	1.05	-18,771	.001***
Repair cattle-shed	18,764	1.85	16,886	1.14	-1,878	.745^{NS}
Labor	558,284	55.13	853,733	57.80	295,449	.000***
Ownership cost	260,748	100.00	347,452	100.00	86,704	
Cattle-shed depreciation	59,767	22.92	103,590	29.81	43,823	.000***
Breeding cows depreciation	146,157	56.05	217,165	62.50	71,008	.000***
Opportunity of land	48,006	18.41	18,520	5.33	-29,486	.000***
Equipment depreciation	6,816	2.61	8,176	2.35	1,360	.119^{NS}
Total cost	1,273,473		1,824,374		550,901	.000***

Note: (^{NS}) Not significant level (***) Significant at 1% level

The breeding fee applied according to raising techniques and breeding of cattle. Local cattle were applied local breeding males for crossing to reproduce a calf. Crossbred cattle was applied the Artificial Insemination (AI) technique for crossbreeding. Frozen cattle semen was imported from Mexico, Spain and New Zealand for crossing to create crossbred cattle. So, the average of breeding fee was 23,325 VND/MSU for local cattle, which was almost a half less than 42,750 VND/MSU for crossbred cattle.

There was significant difference between fertilizer used for grass land of local and crossbred cattle. The local cattle raisers used 9 kg of fertilizer/MSU for putting in the grass land which was more than double amount of fertilizer used by crossbred cattle raisers (4 kg). This is due to the bigger grass land of local cattle raisers (0.037ha) in compare to the crossbred cattle raisers (0.017ha). The most popular fertilizer used for grass land were Urea and NPK (10:10:5) fertilizer. Cleaning the grass land and applying fertilizer was done two times per month and was generally done by adult labour because it was considered as hard work.

Breeding cows' depreciation was the highest cost in total ownership cost (56.05% in local cattle and 62.50% in crossbred cattle of total ownership cost). Breeding cow depreciation of crossbred cattle was 202,959 VND/MSU which was higher than local cattle (136,595 VND/MSU) in 1 % level of significant. Although cattle had the same body weight, the breeding price of crossbred cattle was double the price of local cattle. Besides, average useful life time of local cattle was 9 years old which was 2 years longer than crossbred cattle (7 years old).

Cattle-shed depreciation for local cattle was 59,767 VND / MSU; it was lower than cross- bred cattle (103,590 VND /MSU) (Table 5.1) in 1% level of significant. According to surveyed result in 2006, the average cattle-shed area of local and crossbred cattle was 11 square meters and 13 square meters, respectively.

Table 5.2 labor used for cattle raising

Activities	Local cattle (N=40) Man day/MSU	Crossbred cattle (N=40) Man day/MSU	Prob.
Cleaning animal place	1.7	3.3	.002***
Grazing cattle	16.9	27.6	.000***
Feeding concentrates	6.2	7.9	.001***
Maintaining pasture	1.5	1.0	.191 NS
Cutting grass	10.7	17.2	.000***

Note: (NS) Not significant level (***) Significant at 1% level

5.1.2 Cost analysis of local and crossbred cattle production in study area

Total production cost of crossbred cattle (1,824,374VND/MSU) was significantly higher than that of local breed cattle (1,273,473 VND/MSU). The difference was about 1.43 times. The difference of total cost came from both operating cost and ownership cost but mainly from the operating cost. The total operating cost (TOC) of crossbred cattle production was 1,476,926VND/MSU which was 1.46 times over the local breed cattle production. For the ownership cost (TOWC), the crossbred cattle had a higher cost about 1.33 times over the local breed cattle.

Total Operating Cost (TOC): For local cattle production, TOC averaged was equal to 1,012,729 VND/MSU, which consists of feed cost 33.76 per cent, salt and minerals cost 1.79 per cent, veterinary service and health expenses 1.78 per cent, breeding fees 2.30 per cent, fertilizer cost for grass 3.39 per cent, repair cattle-shed cost 1.85 per cent and family labor cost 55.13 per cent. While crossbred cattle production, total operating cost averaged was equal 1,476,926 VND/MSU, which consists of feed cost 33.34 per cent, salt and minerals cost 1.81 per cent, veterinary service and health expenses 1.96 per cent, breeding fees 2.89 per cent, fertilizer cost for grass 1.05 per cent, repair cattle-shed cost 1.14 per cent and family labor cost 57.80 per cent. The difference of family labor cost between local and crossbred cattle

contributed to 64% of the difference of the operating cost of the two groups, followed by the different of feed cost which contributed to 32% of the difference of the operating cost.

Total Ownership Cost (TOWC): For local cattle production, TOWC average is equal to 260,748 VND/MSU, which consists of depreciation cattle-shed 22.92 per cent, depreciation breeding cows 56.05 per cent, opportunity cost of land 18.41 per cent and depreciation equipment 2.61 per cent. While crossbred cattle raisers, TOWC average is equal to 347.452VND/MSU, which consists of depreciation cattle-shed 29.81 per cent, depreciation breeding cows 62.50 per cent, opportunity cost of land 5.33 per cent and depreciation equipment 2.35 per cent. The differences of TOWC of local and crossbred cattle

5.2 Profitability analysis

The revenue from cattle production, gross margin, returns to management, returns to labor and management, and returns to family labor and management per day of local and crossbred cattle production are discussed in this section. The profitability was divided into two sections for this study: one is before including income from selling manure of cattle and the other one is after so doing.

Revenue:

In this study, revenue from cattle production was calculated based on cattle sold in the year and change in stock value during the year. Table 5.3 presented the average sold prices of the local breed and crossbred cattle of the sample households in Nam Dong district. Price of cattle usually depended on the body size and carcass percentage of cattle. As mentioned in Chapter 3, the body size and carcass percentage of crossbred cattle was higher than that of local breed cattle. So, the price of crossbred cattle was approximately 1.5 times higher than that of local breed cattle at the same age and sex (see Table 5.3). Offered prices for cows and heifers were usually higher than for bulls because they were sold as breeding cattle. The difference price of cow

between crossbred cattle and local cattle was 2,690,000VND/head or about 55%. The changes in stock value were estimated by the farmers, neighbor farmers as well as local traders and the average values were used for the analyses.

Table 5.3 The average of price of local breed and crossbred cattle in the study area

Items	Local breed cattle VND/head (1)	Crossbred cattle VND/head (2)	Difference between (1) and (2) (Times)
Calf under 6 months	1,281,818	1,881,250	1.47
Calf 6 to 12 months	2,300,000	3,463,636	1.51
Bull 1 to 1.5 years old	2,720,000	4,020,000	1.48
Bull > 1.5 years old	3,575,000	5,520,000	1.54
Heifer 1 to 1.5 years old	3,892,308	5,816,667	1.49
Heifer 1.5 to 2 years old	4,661,905	7,041,176	1.51
Cow > 2 years old	4,912,500	7,602,500	1.55

Source: Survey, 2006

Note: 1US$ = 15,500 VND (April, 2006)

In Figure 5.1 shows the revenue of local and crossbred cattle group in the study area. The vertical axis shows the revenue that calculated by VND per mature stock unit (MSU). The horizontal axis presented revenue of two groups of the local and crossbred cattle. As can be seen from Figure 5.1, the revenue of crossbred cattle was higher than with a difference of 1.6 times over local cattle before including income from selling manure. Before including income from selling manure, local cattle production earned revenue of 2,019,448 VND/MSU, which was significantly lower than 3,303,791 VND/MSU of the crossbred cattle production. Revenue from local cattle production increased up to 2,180,665 VND/MSU after including income from selling manure of cattle, but it was still significantly lower than the revenue of 3,503,598 VND/MSU from the crossbred cattle production after including by-product too.

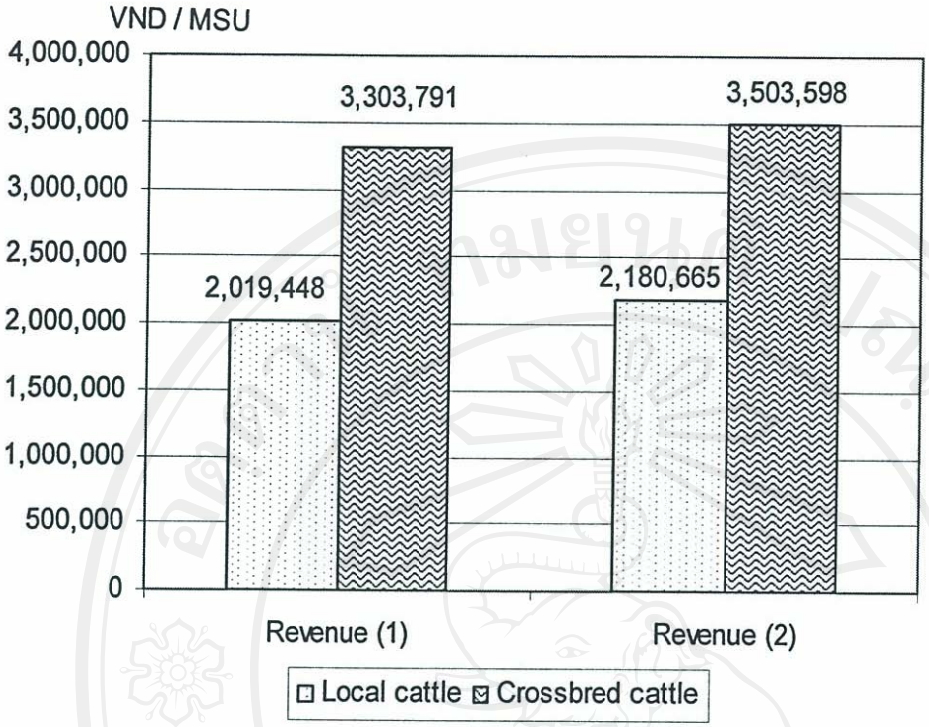

Figure 5.1 Revenue of local and crossbred cattle production

Note: Revenue (1): Revenue before including income from selling manure
Revenue (2): Revenue after including income from selling manure

1 US$ = 15,500 VND (June 2006)

5.2.1 Gross margin of local and crossbred cattle production

Gross margin (GM) in this study was defined as a difference of revenue and total operating cost. In the Figure 5.2 presented the significant difference in the gross margin between the local and crossbred cattle production at 1 per cent level, according to the independent sample T-test. The higher gross margin per MSU was found in crossbred cattle production which was 1,787,415 VND/MSU compared to 977,853 VND/MSU of the local bred cattle. It was 1.7 times higher than the gross margin of local cattle production after including income from selling manure.

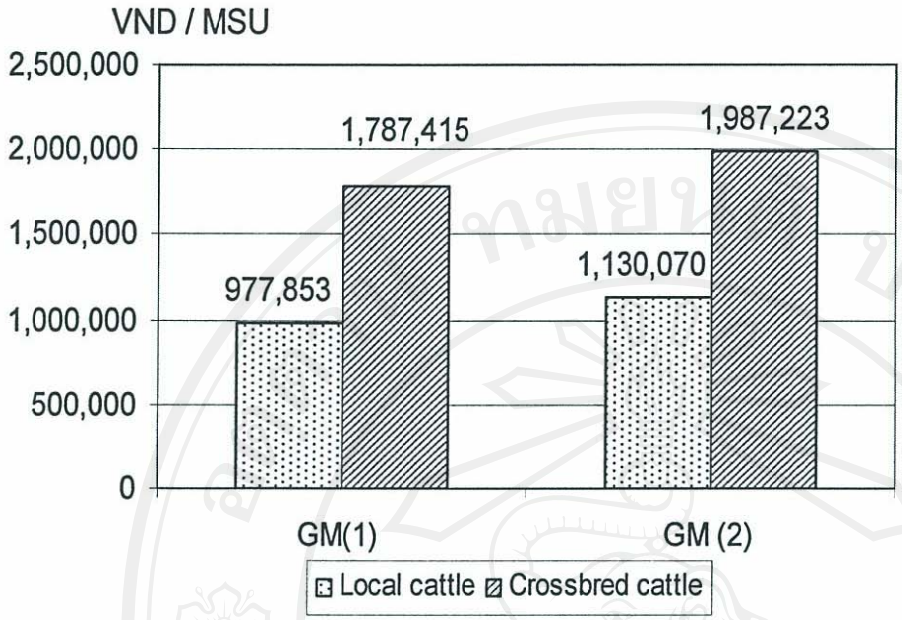

Figure 5.2 Gross Margin of local and crossbred cattle production

Note: GM (1): Gross margin before including income from selling manure

GM (2): Gross margin after including income from selling manure

1 US$ = 15,500 VND (June, 2006)

5.2.2 Returns to management of local and crossbred cattle production

Returns to Management (RMA) in this study were defined as a difference of revenue and total expenses including opportunity cost of family labor and land. RMA of local and crossbred cattle production was significantly different at 1 per cent level. For local cattle production, the averages returns to management was 717,998VND/MSU compared to 1,439,963VND/MSU for crossbred cattle production. After including the income from selling manure, return to management of local cattle increased up to 879,215VND/MSU while crossbred cattle increased up to 1,639,770VND /MSU. The average of RMA of crossbred cattle production was double of that of local cattle production.

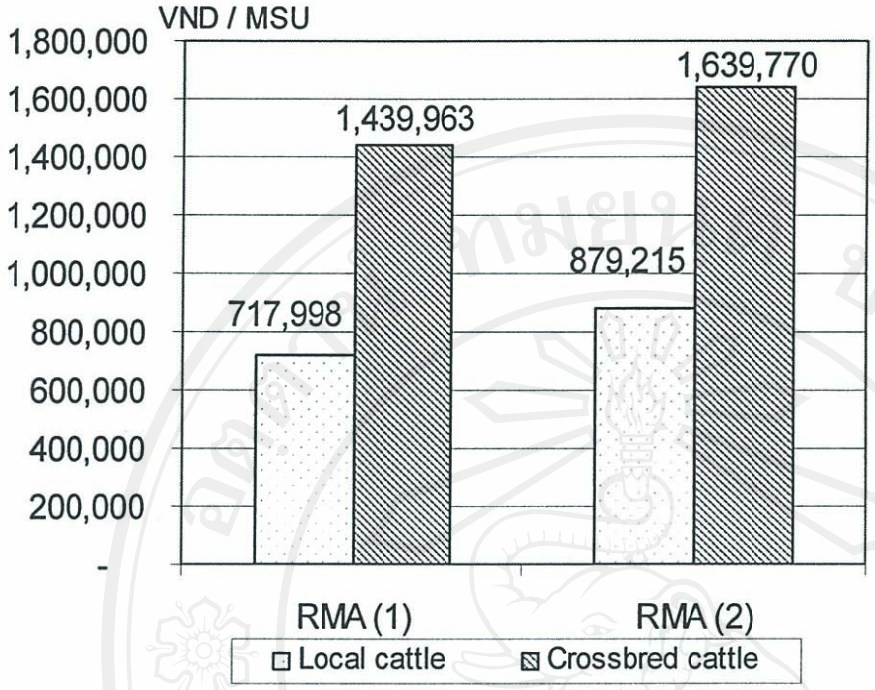

Figure 5.3 Return to Management of local and crossbred cattle

Note: RMA (1): Return to Management before including income from selling manure

RMA (2): Return to Management after including income from selling manure

1 US$ = 15,500 VND (June 2006)

5.2.3 Returns to family labor and management of local and crossbred cattle production

The return to family labor and management was calculated and was presented in Table 5.4. There were significant differences between return to family labor and management (RFLM) of local and crossbred cattle production in both sections at 1 per cent level (before and after selling manure). The average RFLM of local cattle production was 1,275,389VND/MSU compared to 2,293,696VND/MSU. Crossbred cattle production had higher return to family labor and management with a difference of 1.8 times over local cattle. After including the income from selling manure, the average RFLM of local cattle increased up to 1,436,607VND/MSU while crossbred

cattle increased up to 2,493,503VND/MSU. The difference of RFLM was a little bit reduced to be 1.7 times after including income from selling manure.

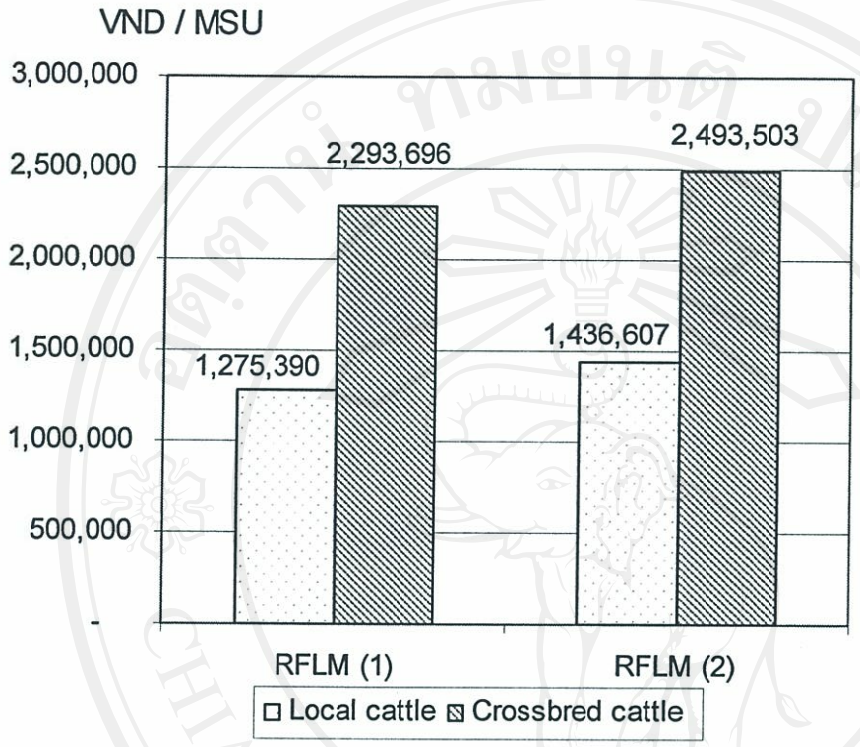

Figure 5.4 Return to family labor and management of local and crossbred cattle production

Note: RFLM (1): Return to family labor and management before including income from selling manure

RFLM (2): Return to family labor and management after including income from selling manure

1 US$ = 15,500 VND (June 2006)

5.2.4 Returns to family labor and management per day of local and crossbred cattle production

Before including income from selling manure, the average RFLMD of crossbred cattle production was 43,766 VND/day which was significantly higher than that of the local cattle (36,987 VND/day) at 5 per cent level. RFLMD of crossbred

cattle production was 1.18 times more than RFLMD of local cattle. After including the income from selling manure, the average RFLMD of local breed cattle increased up to 41,544 VND/day while crossbred cattle increased up to 47,387 VND/day. However, the difference of RFLMD of the two breed cattle was still significant at 5 per cent level.

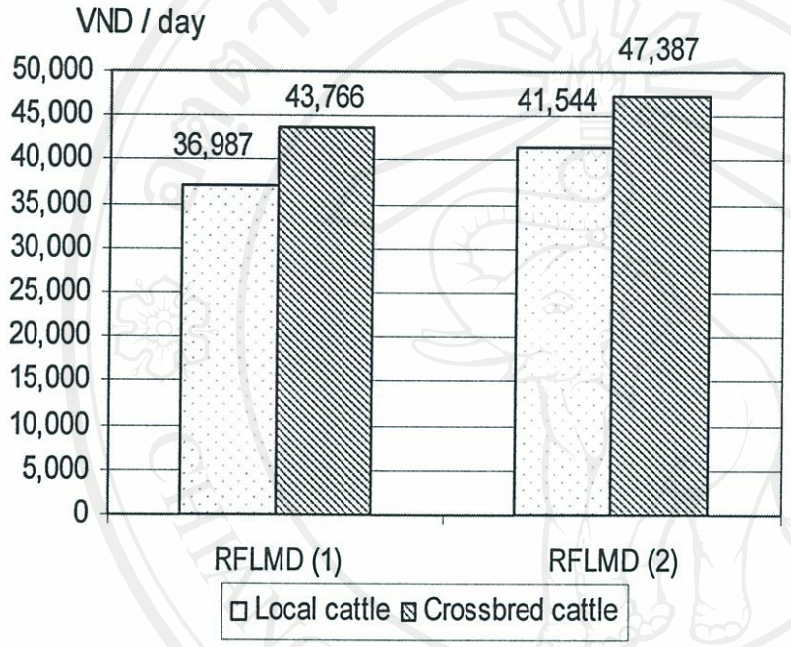

Figure 5.5 Returns to family labor and management per day of local and crossbred cattle

Note: RFLMD (1): Returns to family labor and management per day before including income from selling manure

RFLMD (2): Return to family labor and management per day after including income from selling manure

1 US$ = 15,500 VND (June 2006)

Table 5.4 Average revenue, operating and ownership cost and return of local and crossbred cattle production

Items	Local cattle (N=40)	Crossbred cattle (N=40)	Prob.
(1) Revenue (VND/MSU)	2,019,448	3,303,791	.000***
Revenue from by-product (VND/MSU)	161,216	199,807	
(2) Total revenue (VND/MSU)	2,180,665	3,503,598	.000***
Operating cost			
Feed (VND/MSU)	341,867	492,372	.000***
Salt, minerals (VND/MSU)	18,136	26,782	.000***
Veterinary service and health expenses (VND/MSU)	18,058	28,878	.001***
Breeding fees (VND/MSU)	23,325	42,750	.000***
Fertilizer for grass (VND/MSU)	34,293	15,522	.001***
Repair cattle-shed (VND/MSU)	18,764	16,886	.745^{NS}
Interest of equity capital (VND/MSU)	28,864	39,448	
(3) Family Labor Cost (VND/MSU)	558,284	853,733	.000***
(4) Total operating cost	1,041,594	1,516,375	.000***
(5) Enterprise Gross Margin (VND/MSU) (1-4)	977,853	1,787,415	.000***
Ownership cost			
Cattle-shed depreciation+ interest (VND/MSU)	59,767	103,590	.000***
Breeding cows depreciation +interest (VND/MSU)	146,157	217,165	.000***
Opportunity of land (VND/MSU)	48,006	18,520	.000***
Equipment depreciation + interest (VND/MSU)	6,816	8,176	.119^{NS}
(6) Total ownership cost (VND/MSU)	260,748	347,452	.000***
(7) Total expense (VND/MSU) [4+6]	1,301,450	1,863,828	.000***
(8) Number of Family labor (Days/MSU)	37.2	56.9	
Profitability Measures			
(9) Profit (Return to management) (VND/MSU) [1-7] or [5- 6]	717,998	1,439,963	.000***
(10) Return to family labor and management (RFLM) (VND/MSU) [9 +3]	1,275,390	2,293,696	.000***
(11) Return to family labor and management per day (RFLMD) (VND/day) [10/8]	36,987	43,766	.018**
Profitability after including income from selling of by-product			
(12) Enterprise Gross Margin (VND/MSU)	*1,139,963*	*1,987,223*	*.000****
(13) Profit (Return to management) (VND/MSU)	*879,215*	*1,639,770*	*.000****
(14) Return to family labor and management (RFLM) (VND/MSU)	*1,436,607*	*2,493,503*	*.000****
(15) Return to family labor and management per day (RFLMD) (VND/day)	*41,544*	*47,387*	*.047***

Note: (^{NS}) Not significant level; (**) Significant at 5% level; (***) Significant at 1% level

Opportunity cost of family labor was valued at the wage rate of 15,000VND/day

Opportunity cost of equity capital was valued at 7% of operating cost for 12 months

1US$ = 15,500 VND (April, 2006)

In summary, the results of enterprise budget analysis show that the revenue of crossbred cattle production, 3,303,791 VND/MSU, was significantly higher with a difference of 60 per cent over local breed cattle, 2,019,448 VND/MSU, before including income from selling manure. Revenue from local breed cattle production increased up to 2,180,665 VND/MSU after including income from selling manure of cattle, but it was still significantly lower than the revenue of 3,503,598 VND/MSU from the crossbred cattle production after including income from selling manure.

Considering the total production cost, crossbred cattle production had a significantly higher cost, 1,863,828 VND/MSU, when compared to the cost of local breed cattle which was 1,301,450 VND/MSU. The difference of total cost between the two groups came from both differences in operating cost and ownership cost but mainly from the operating cost. The total operating cost of crossbred production was 1,476,923 VND/MSU which was 43 per cent over the local breed cattle production (1,012,727 VND/MSU). For the ownership cost, the crossbred cattle had a higher cost, about 32 per cent over the local breed cattle.

Regarding gross margin, there was a significant difference in the gross margin between the local breed and crossbred cattle production at 1 per cent level. Before including income from selling manure, the higher gross margin was found in crossbred cattle production which was 1,787,415 VND/MSU compared to 977,853 VND/MSU of the local breed cattle production. Gross margin of crossbred cattle was

about 70 per cent higher than the gross margin of local breed cattle production after including income from selling manure.

Profit or returns to management and returns to family labor and management were calculated in both groups. The results show that there were significant differences in both profit and return to family labor and management (RFLM) of local breed and crossbred cattle production at 1 per cent level in both before and after selling manure. The average profit of crossbred cattle production were 1,439,963 VND/MSU, 2 times over that of local breed cattle which was 717,998 VND/MSU. The average RFLM of local cattle production was 1,275,390VND/MSU with a difference of 80 per cent lower than the cost of 2,293,696VND/MSU of crossbred cattle production. After including the income from selling manure, the average RFLM of local breed cattle increased up to 1,436,607VND/MSU while the average RFLM of crossbred cattle increased up to 2,493,503VND/MSU. The difference of RFLM was slightly reduced to be 70 per cent after including income from selling manure. Returns to family labor and management per day of both groups were also calculated but there was no significant difference between the two groups at 1 per cent level since the family labor used for cattle production of crossbred cattle was about 50 per cent higher than that of local breed cattle.