CHAPTER IV

MILK PRODUCTION SYSTEM

This section deals with the milk production system in the study area. Dairy farm sizes, structure of cow herds, feeding practices, cost and profitability of cow raising, reasons for dairy farming of farmers, and problems in milk production were discussed. In addition, production costs of different cow breeds were also calculated (at actual price) in order to help new dairy farmers chose suitable breeds according to their given rearing conditions and to see which breed was better in terms of benefit.

4.1 Dairy farm size

The distribution of herd size for the interviewed farmers in the study area is shown in Table 4.1. Most of the dairy herds were small (from 1 to 3 heads of cow per household) and medium (from 4 to 7 heads) in size. The number of households having small size accounted for 60% of the total interviewed households for both locations. There were only a few farmers having the large herd size of over 7 cows. Evidence shows about 12% and 15% of the total households in Hanoi and Hatay, respectively fall under this category. The domination of a small dairy farm size could be hypothesized as due to limitation of land, capital and production technology for the farmers as well as other external factors such as disease and milk price.

The survey also revealed that dairy farmers who had small and medium farms usually start to raise cows at herd size of 1 heifer or 2 heifer calves, but the farmers having large size raised from 2 to 3 milk cows or heifers in the beginning of their

farms. The respondents indicated that lack of initial capital and rearing techniques were main reasons behind their decisions.

Table 4.1: Size distribution of farm households in the study area

Farm size	Hanoi		Hatay	
	No. of hh	Percent	No. of hh	Percent
From 1 to 3 head	30	60.0	24	60.0
From 4 to 6 head	14	28.0	10	25.0
From 7 to 10 head	5	10.0	3	7.5
Greater 10 head	1	2.0	3	7.5

Source: Survey, 1999

4.2 Structure of cow herd in the interviewed households

4.2.1 The kinds of breed in different agro-ecological regions

According to each of the ecological, economical, and rearing conditions, the different crossing formulas are being applied in Vietnam. For example, crossbred of 3/8, 1/2 and 3/4 blood of Holstein Friesian (HF) are suitable for the RRD, while the crossbred of 3/4 and 7/8 of HF blood are suitable for the areas of Ho Chi Minh, Tien Giang, and Long An provinces. The regions of Moc Chau and Lam Dong where annual average temperature is much lower could rear the dairy cows of higher HF blood. In general, the higher percentage of HF blood the cows have, the higher the yield of milk are (Vang, 1998).

Based on the survey, there were four types of cow breed raised by the households in the study area. They are crossbred Sindhi, F1 ½ blood of HF, F2 ¾

blood of HF, and F3 3/8 blood of HF. Their crossing formula can be summarized as following:

Table 4.2: Crossing formula of some cow breeds reared in the RRD

Type of breeds	Crossing formula
Crossbred Sindhi	Domestic female cow x Red Sindhi bull
F1 ½ blood of HF	Crossbred Sindhi female cow x HF bull
F2 ¾ blood of HF	F1 ½ blood of HF female cow x HF bull
F3 3/8 blood of HF	F2 ¾ blood of HF female cow x Red Sindhi bull

Source: Center of Hatay Extension, 1996

Except for crossbred Sindhi cows, most of HF crossbred cows in the region were the results of crossing among 3 bloodlines: domestic, Red Sindhi and HF blood. For example, the F1 cow had 50% of HF blood, 25% of Red Sindhi blood and 25% of domestic blood. The milk productivity and resistance varied by kinds of breed. According to Thuong (1998), the crossbred Sindhi cow did not require a large level of investment, and had high resistance with the external environment. However, its milk yield was low, ranging from 1,200 to 2,700 kg per milking cycle of 305 days. In contrast, the F2 cow could give high milk yield, which reached 2,800 – 4,000 kg per milking cycle, but its resistance was lower.

4.2.2 Structure of cow herd

There were 183 head of cows raised in 50 interviewed households in Hanoi. Each household owned an average 3.66 cow, of which milk cows constituted 57.4% (Table 4.3). The remaining percentage fell under both heifers and heifer calves. In

1999, one milk collection station was improved, and others were being built in the zone. The progress gave farmers advantages in selling raw milk, and encouraged the households to increase their dairy farm size by keeping calf. This might be a main reason to explain the high proportion of heifer calves in the household's cow herds (it amounted to 24.6% of the cow population). Because all sample households in the RRD had access to an artificial insemination service, there was no households owning bull calf or bull. As classified according to kinds of breed, most cows raised in the household were F2 ¾ bloods of HF, which contributed to 67.2% of the cow population. Some breeds having a lower yield like F3 3/8 blood of HF and crossbred Sindhi cows, were not adopted broadly by Hanoi farmers. They accounted for only 7.1% of total herd numbers.

Table 4.3: Structure of cow herds in sample households

Classified criteria	Hanoi		Hatay	
	Head	Percent	Head	Percent
1. By age	183	100.0	166	100.0
- Heifer calves	45	24.6	28	16.9
- Heifers	33	18.0	52	31.3
- Milk cows	105	57.4	86	51.8
2. By breed	183	100.0	166	100.0
- F1 ½ blood of HF	47	25.7	66	39.8
- F2 ¾ blood of HF	123	67.2	71	42.8
- F3 3/8 blood of HF	5	2.7	18	10.8
- Crossbred Sindhi	8	4.4	11	6.6

Source: Survey, 1999

The average size of holding of 4.15 cows per household was calculated for Hatay. Over half of them were milk cows. Percentage of heifers raised in Hatay was much higher than that of Hanoi accounting for 31.3% of total cow population. This was largely explained by the formation of a milk processing factory in 1997, which encouraged the farmers to raise cows in the previous years. Differing from Hanoi farmers, the households in Bavi applied both the F1 ½ blood of HF and F2 ¾ blood of HF cows as main breeds. Moreover, the crossbred Sindhi cow and F_3 3/8 blood of HF cow have also received their interest. It was found that in this region about 17.4% of the cow population fell under these breed categories.

The above analysis showed the positive trend of milk production in recent years. The farmers continue to maintain and expand their cow herd through keeping the heifers and the heifer calves. In addition, many households invested high capital to rear the high - yielding crossbred cows. The results also indicated that Hanoi farmers adopted more widely the improved crossbred cows than did Hatay farmers.

4.3 The number of breeds used in the household

HF crossbred cows were being reared in all interviewed households. The number of breeds used by each household ranged from 1 to 4, and varied by locations. The farmers living in Hatay had a tendency to use more kinds of breed than Hanoi farmers. This is expressed in Table 4.4. About 70% of the interviewed farmers in Hatay used more than one breed, while that number was 50% with respect to Hanoi farmers. The main reason for raising more than one kind of breed was risk avoidance. However, 50% of total Hanoi households applied only one kind of breed (it was mainly the F2 cow). Better veterinary services and more advantages in terms of capital

and labour of the households located in Hanoi could be reasons to explain this situation.

Table 4.4: The number of breeds used in the interviewed household

Criteria	Hanoi		Hatay	
	No. of hh	Percent	No. of hh	Percent
+ 4 kinds of breed	0	0.0	2	3.3
+ 3 kinds of breed	2	4.0	6	15.0
+ 2 kinds of breed	23	46.0	20	66.7
+ 1 kind of breed	25	50.0	12	30.0

Source: Survey, 1999

4.4 Feeding practices in the study area

The dairy farmers in the study area indicated that when feeding their cows, they considered the stages of lactation and physiological characteristics of the cow. During early stage of lactation, the farmers usually applied higher levels of feeding in the hope of obtaining more milk output in the whole milking cycle. The feeding regime of milk cows was different between the milking period and the dry-off period. Commonly, a dairy cow in the region could produce a calf every 12–13 months. This permits the cow to have a milking period of 10 months and dry-off period of 2-3 months.

In lactation period, the cows received mixed rations including roughage and concentrates. Of which, concentrated feed was made of corn meals, cassava meals, rice bran, soybean meals, fish meals, etc. To mix among them, the introduced structure was 40%, 20%, 20%, 12%, 4%, 2% and 2% of corn meals, cassava meals, rice bran,

soybean meals, fish meals, mineral and salt, respectively (Thuong, 1998). However, in practice farmers fed their cows at different ratios based on their experience and perception as well as availability of feed. Most farmers in the study area fed concentrates to a cow according to her milk yield. For example, when a milking cow produced 10 kg of milk per day the farmers fed 3 - 4 kg of concentrate feed. Some other households based on age, and breed of the cow. Level of feeding was found to vary by farmers and by types of breed. Averages of investment on feed per day for selected cow groups in the milking period is illustrated in Table 4.5.

Table 4.5: Feed constituents for selected milking cow groups

(Unit: kg/day/cow)

Items	Hanoi			Hatay		
	F2 cow	F1 cow	CS cow	F2 cow	F1 cow	CS cow
1. Rice bran	1.27	1.22	0.95	-	-	-
2. Whole rice meals	-	-	-	0.93	0.89	0.81
3. Cassava meals	-	-	-	1.28	1.34	1.01
4. Corn meals	2.78	2.38	1.90	1.69	1.21	0.89
5. Brewery's by-product	5.36	4.87	3.06	3.48	2.38	2.00
6. Soybean meals	0.26	0.21	0.15	0.29	0.24	0.13
7. Mineral	0.05	0.05	0.03	0.06	0.05	0.03
8. Salt	0.06	0.05	0.04	0.07	0.06	0.03
9. Fish meals	0.19	0.10	0.04	0.20	0.17	0.10
10. Green fodder	28.25	27.16	25.0	32.75	31.16	28.75
11. Dry fodder	1.58	1.65	1.44	1.48	1.43	1.56

Source: Survey, 1999

In general, the F2 ¾ blood of HF and F1 ½ blood of HF cows require higher levels of feeding than other breeds. The finding indicated that on average, one F2 milk cow was fed 1.27 kg of rice bran, 2.78 kg of corn meals, and 5.36 kg of brewery's by-

product, etc. per milking day by Hanoi farmers. While amounts of rice bran, corn meals, and brewery's by-product fed to crossbred Sindhi cow were 0.95, 1.90 and 3.06 kg, respectively. Moreover, HF crossbred cows were also fed higher amount of mineral, soybean meals, etc. The same tendency was found in Hatay where the farmers usually used rice meals and cassava meals to substitute for corn meals or rice bran.

Apart from concentrates, the cows also required certain quantities of fodder for body maintenance and growth. This amount varied by locations as well as by the kinds of breed. The Hanoi farmers fed from 25 to 29 kg of green fodder and 1.4 to 1.7 kg of dry fodder for a milking cow per day, which was lower than the feeding level of Hatay farmers.

In the dry-off period, the level of feeding was lower than that of the milking period. The farmers fed from 1 to 2 kg of concentrates to a cow per day depending on types of breed. Constituents of the ration normally included corn meals, rice bran or cassava meals, salt, mineral and fodder. Very few households used soybean meals and brewery's by-product to feed dry cows. With the purpose of producing a calf every year, the farmers usually allow the cow to be inseminated 40 - 80 days after calving. The duration of pregnancy in the cow was about 280 days. Therefore, in the dry-off period the cow was seven–nine months pregnant. The requirement of nutritious feed is necessary for the cow. According to Mailcolm and Paul (1982), a handful of concentrates can be offered to the cows 6 to 8 weeks before calving and the amount increased each week until about half to three quarters of the amount required for peak lactation is given in the last week before parturition. Despite the important role of concentrates in the dry-off period, there were still 8.9% of the total sample households not feeding concentrates to the dry cows. They thought that it would be difficult for

the cow to give birth due to a big calf if the cow was fed concentrates in that period. This influenced on foetal development and health of the cow after calving.

4.5 Disease situation of the study area

From the interview with the farmers it was revealed that mastitis, milk fever, retained placenta, diarrhea, and dyspepsia were the prominent diseases in the study area. They accounted for 80.8 % and 71.7% of the total cases in Hanoi and Hatay, respectively (Table 4.6).

Table 4.6: Common diseases in the region

(Unit: %)

Kinds of disease	Hanoi	Hatay
Total cases of diseases	100.0	100.0
- Mastitis	9.6	9.5
- Retained placenta	18.1	17.6
- Milk fever	15.7	10.8
- Diarrhea	16.9	27.0
- Dyspepsia	20.5	6.8
- Others	19.2	28.3

Source: Survey, 1999

Mastitis is the dangerous disease that affects largely the quality and quantity of raw milk. According to Barrett and Larkin (1979), cows affected with mastitis could lose 10%-20% of their yield for the entire lactation. In Vietnam, when the milking cow is affected by mastitis, its milk is not accepted by milk processing factories. Mastitis refers to an inflammation of the udder. The three main routes through which

mastitis comes are (1) dirt (dirty teats, dirty hand, etc.), (2) poor milking practices, and (3) injuries to cows because of their surroundings. Thus, assurance of hygienic condition is a very important work that should be considered by dairy farmers to prevent the spread of mastitis.

Milk fever constituted 15.7% and 10.8% of the total cases in Hanoi and Hatay, respectively. It largely occurred soon after calving in high-producing cows. The disease might be due to the injudicious practice of feeding. Barrett and Larkin (1979) reported that during the advanced stage of pregnancy, there is increased demand of calcium and phosphorus in the cow body. This is because foetal development is at a faster rate and also to compensate for the amount of these mineral elements drained in milk. When the existing feeding regime does not address the increased demand, the problem of milk fever is manifested. According to Thuong (1998), the most effective preventive for milk fever appears to be that of having the correct calcium-phosphorus ratio in the ration and feeding more concentrates three weeks prior to calving. Therefore, farmers in the study area should change previous unscientific thinking. Milk cows – no matter they are in the lactation cycle or the dry period, also need to be fed symmetric rations including both roughage and concentrates in order to contribute to the prevention of the appearance of the disease. Diarrhea and dyspepsia were common in the region. However, they are less dangerous than the above two diseases.

It is said that the cows are the whole assets of farmers, so incidence of disease is always their fear. The survey showed that there were 8 head of cows died in the total sample households, of which milk cows accounted for 37.5%. Overall mortality was divided equally for two locations (four cases for each location).

4.6 Average milk yield in a milking cycle of 10 months

Milk yield varied not only by kinds of cow breed but also by months in milking cycle. The survey indicated that F2 ¾ blood of HF cow gave the highest yield, followed by F1 ½, F3 3/8 blood of HF and crossbred Sindhi cows, respectively. This is expressed in Figure 4.1. On average, milk yield per F2 cow in a milking cycle of 10 months was 3,409.6 kg, while this indicator reduced to 2,399.8 kg in the case of crossbred Sindhi cow.

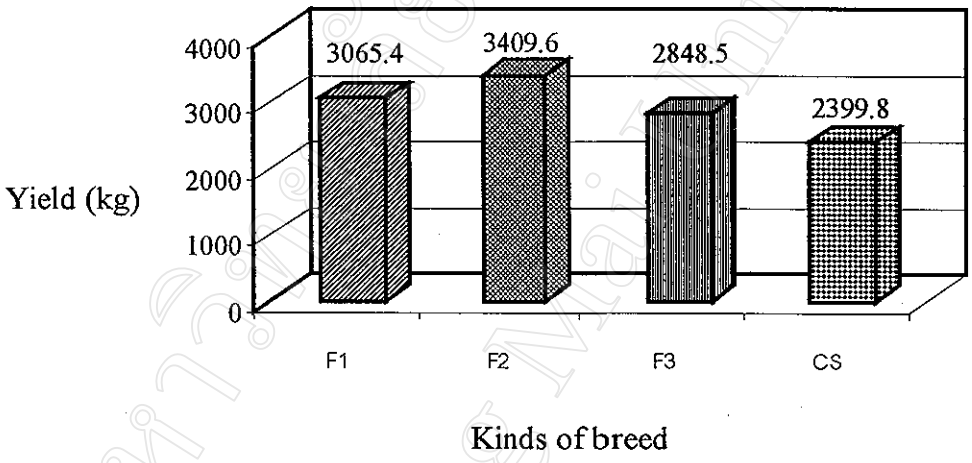

Figure 4.1: Milk yield of different kinds of cow breed in a milking cycle of 10 months
Source: Survey, 1999

The farmers also reported that milk yield increased gradually after calving, and reached maximum level at about second or third months, then it continued decreasing (Figure 4.2). The highest milk output per month of F2, F1, F3 and crossbred Sindhi cows were 477, 405, 381 and 333 kg, respectively.

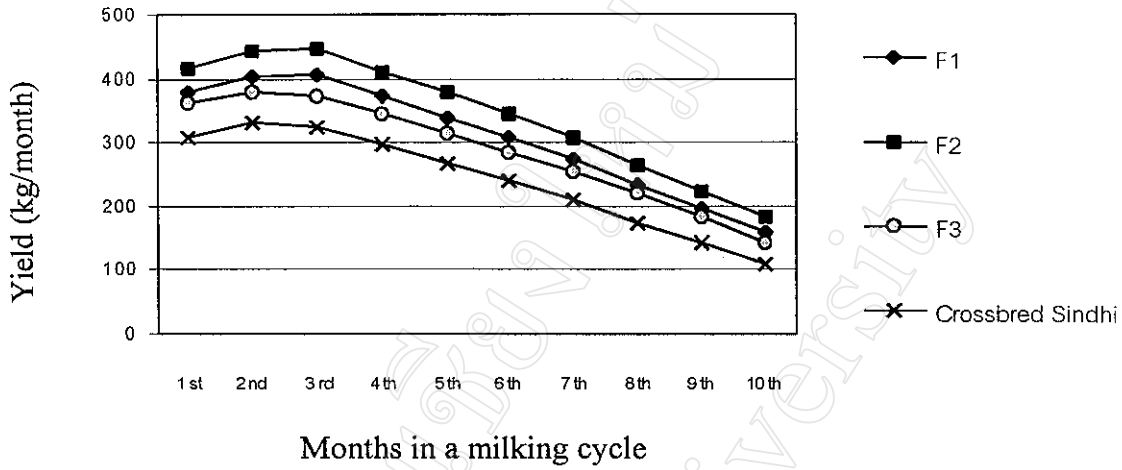

Figure 4.2: Average milk yield in different months of a milking cycle

Source: Survey, 1999

The finding was consistent with research results of Them (1996). He reported that peak milk output was about 6 to 10 weeks after calving. Similarly, Dat *et al.* (1998) indicated that the lactation curve of the milking cow had a peak at second month or third month after giving birth, and varied by kinds of breed. Regarding quality of the milk, they revealed that fat and protein contents of the milk declined gradually according to percentage of HF blood. Those contents fell as milk yield increased to a peak. Thereafter, both the fat and the protein increased slowly during the remainder of the lactation.

4.7 Costs of milk production

After carrying out economic reform in agriculture, Vietnamese farmers were encouraged to make their own decisions on what to produce for higher income according to the market condition. In recent years, demand for milk and milk products

has been rapidly increased due to population growth, urbanization and increases in the level of income. This encouraged the farm households to enter dairy farming. Having different rearing conditions, so farmers selected different kinds of cow breed to raise. In this section, production costs are discussed according to three major types of breed, namely the crossbred Sindhi, F1 ½, and F2 ¾ blood of HF. The cost of milk production for the F3 ¾ HF blood cow is not presented here because of its small sample size (6 heads of F3 cow).

4.7.1 Costs of crossbred Sindhi (CS) cow production

Most of the annual expenditure on milk production incurred by the farmers was feed cost. On average, Hanoi farmers had feed cost of 4.8 million VND per CS milk cow in a year accounting for 70.5% of the total variable cost. Feed cost in Hatay was found to be slightly lower than that of Hanoi zone. Between two kinds of feed, expenditure on concentrates was higher, constituting over 55% of the total feed cost for both locations. In addition to feed, labour cost also contributed significantly to variable cost. In Hanoi, the labour cost accounted for 1.9 million VND or 27.8% of the total variable cost. Since most of the Hatay farmers practiced a confinement system, the labour cost was lower than that of Hanoi. On average, a Hatay farmer had the labour costs of 1.25 million VND, which was about 21% of the total variable cost. The cost details of CS cow production in the study area are described in Table 4.7.

Table 4.7: Costs of CS cow production

(Unit: '000 VND/cow/year)

Items	Hanoi		Hatay	
	Cost	Percent	Cost	Percent
1. Variable cost	**6,770.9**	**80.9**	**5,962.3**	**78.8**
Of which:				
* Feed cost	4,776.4	70.5	4,570.1	76.7
- Concentrates	2,668.4	55.9	2,521.6	55.2
- Fodder	2,108.0	44.1	2,048.6	44.8
* Veterinary service	28.8	0.4	30.0	0.5
* Labour cost	1,882.0	27.8	1,254.7	21.0
2. Fixed cost	**1,592.1**	**19.1**	**1,603.7**	**21.2**
Of which: Depreciation of cow	787.5	49.5	818.8	51.1
3. Total cost	**8,363.0**	**100.0**	**7,566.0**	**100.0**
4. Cost per kg of milk (VND/kg)	3,119.0		2,849.3	

Source: Survey, 1999

Total cost of raising a CS cow per year in Hanoi was 8.4 million VND. The total cost estimated for Hatay was about 0.8 million VND lower than that of Hanoi. This level of cost is considered to be manageable for households having limited capital and technique. However, the cost per kg of milk was quite high. It reached to 3,119 and 2,849 VND per kg of milk in Hanoi and Hatay, respectively, which was slightly higher than average selling prices. Thus, farmers only could benefit from raising a CS cow when their labour force and other resources were idle and abundant.

4.7.2 Costs of F1 ½ blood of HF cow production

As mentioned, different kinds of cow breed were invested at different levels, so production cost among breeds was not the same. Table 4.8 shows the production costs of raising one F1 cow in a year.

Table 4.8: Costs of F1 cow production

(Unit: '000 VND/cow/year)

Items	Hanoi		Hatay	
	Cost	Percent	Cost	Percent
1. Variable cost	**8,364.7**	**82.2**	**7,233.3**	**77.9**
Of which:				
* Feed cost	6,083.4	72.7	5,631.2	77.9
- Concentrates	3,792.8	62.3	3,483.9	61.9
- Fodder	2,290.7	37.7	2,147.3	38.1
* Veterinary service	58.1	0.7	55.3	0.8
* Labour cost	2,124.4	25.4	1,445.8	20.0
2. Fixed cost	**1,811.5**	**17.8**	**2,049.9**	**22.1**
Of which: Depreciation of cow	909.4	50.2	1,040.0	50.7
3. Total cost	**10,176.2**	**100.0**	**9,283.2**	**100.0**
4. Cost per kg of milk (VND/kg)	2,934.0		2,640.8	

Source: Survey, 1999

Total cost of raising an F1 cow was 10.2 million VND and 9.3 million VND per year in Hanoi and Hatay, respectively which was about 1.7 million VND higher than that of raising a CS cow. Variable cost in Hanoi accounted for 82.2 % of the total cost or 8.36 million VND being 1.1 million VND higher than the item of Hatay. This was largely due to a higher labour cost incurred by Hanoi farmers. They spent few hours grazing the cow on the dyke of the Red River, so their labour cost reached to 2.1 million VND. In comparison with the production cost of a CS cow, all cost items of F1 cow production were found to be higher, especially feed cost. For example, the feed expenditure of raising an F1 cow reached to 6 million VND in Hanoi, which was about 1.3 million VND higher compared to that of CS cow production.

To buy a HF milk cow, a dairy farmer needed about 9-12 million VND which was higher than the investment on buying a CS cow. Therefore the fixed cost of F1 cow production, which largely included the items of cow depreciation and interest on investment, was quite high. On average, Hatay household had fixed cost of 2 million and VND, and this item was 1.8 million VND with respect to Hanoi.

Although requiring a high level of investment, an F1 cow had a higher capability of producing milk than a CS cow. Consequently, its total cost per kg of milk was found to be around 200 VND lower than that of the CS cow. On average, the farmers located in Hanoi and Hatay had to expend 2,934 and 2,641 VND, respectively to produce 1 kg of milk, which was lower than average selling prices. Therefore, farmers could get higher benefit from rearing an F1 cow when compared to raising a CS cow.

4.7.3 Costs of F2 ¾ HF blood cow production

The F2 ¾ blood of HF cow gave highest milk yield, but it also required intensive level of investment, especially feed (Table 4.9). As compared with the above kinds of breed, the expense of feed was much higher. For example, Hatay farmers spent 4.6 million VND and 5.6 million VND of feed cost raising a CS cow and an F1 cow within a year, respectively. Meantime the expenditure on raising an F2 cow was over 6.5 million VND. With regard to locations, Hanoi farmers slightly had a higher feed cost than Hatay farmers did. The biggest difference occurred in the labour cost. Owing to these features, the total variable cost in Hanoi went up to 9.2 million VND accounting for 82.1% of the total cost, which was about 1.1 million VND higher than that of Hatay.

Table 4.9: Costs of F2 cow production

(Unit: '000 VND/cow/year)

Items	Hanoi		Hatay	
	Cost	Percent	Cost	Percent
1. Variable cost	**9,204.2**	**82.1**	**8,118.8**	**78.6**
Of which:				
* Feed cost	6,848.9	74.4	6,526.2	80.4
- Concentrates	4,517.5	66.0	4,275.7	65.5
- Fodder	2,331.5	34.0	2,250.4	34.5
* Veterinary service	94.8	1.0	98.4	1.2
* Labour cost	2,149.4	23.4	1,394.8	17.2
2. Fixed cost	**2,007.0**	**17.9**	**2,210.9**	**21.4**
Of which: Depreciation of cow	1,018.0	50.7	1,133.9	51.3
3. Total cost	**11,211.2**	**100.0**	**10,329.7**	**100.0**
4. Cost per kg of milk (VND/kg)	2,829.3		2,603.6	

Source: Survey, 1999

The survey results revealed that F2 cows usually had problems of adaptation to hot weather, so it was easier for them to get diseases than the CS and F1 cows. Farmers in the study area had to expend more money on precaution and treatment. Evidently, veterinary cost estimated for an F2 cow was nearly 100,000 VND constituting over 1% of the total variable cost, while this expense was less than 0.5% of the total variable cost in the case of CS cow. Total cost of raising an F2 cow was 11.2 million VND per year with respect to Hanoi zone, which was about 2.8 million VND higher than that of a CS cow. The same tendency was found for Hatay. Hence, the F2 cow was recognized to be more suitable for households having high capital and production technology. The cost per kg of milk ranged from 2,603 to 2,829 VND indicating that the F2 cow breed was better in terms of benefit than other breeds.

4.8 Profitability of milk production

Gross revenue received by a Hanoi farmer was 11.4 million VND, which was higher than that of a Hatay farmer (Table 4.10 and Appendix Table 1). This was largely due to a lower price of raw milk paid to Hatay farmers (i.e. price of 1 kg of raw milk in Hanoi was 3,100 VND, while it was only 2,800 VND in Hatay for the same standard of quality)

Table 4.10: Economics of raising a milk cow

(Unit: '000 VND/year/cow)

Items	Hanoi	Hatay
1. Gross revenue:	**11,418.0**	**9,927.1**
2. Total variable costs	**8,751.2**	**7,378.4**
Of which: * Feed cost	6,445.3	5,800.5
* Hired labour cost	70.2	85.9
* Family labour cost	2,052.4	1,325.3
3. Gross margin	**2,666.8**	**2,548.7**
4. Total fixed costs	1,912.8	2,042.9
5. Total costs	10,664.0	9,421.3
6. Net return	**754.0**	**505.8**
7. Net return to family labour (NRL)	2,806.4	1,831.1
8. Net return to labour and fodder	**5,106.2**	**3,992.9**
9. Return to family labour (1000 VND/man-day)	13.7	13.8

Source: Survey, 1999

Total cost of production per milk cow also varied by location. The Hanoi farmers incurred a total cost of 10.7 million VND per cow, when the farmers in Hatay had the cost of 9.4 million VND. Lower labour cost and higher percentage of F1,

crossbred Sindhi cows in the cow herd may be reasons behind the case. Hanoi households usually spent from 2 to 3 hours per day grazing their cows on the dyke of Red River. Consequently, the labour cost reached to 2.1 million VND per year. Hatay farmers had less labour cost as the confinement system was practiced in this area. With regard to components of the labour cost, the table showed that family labour dominated most dairy activities as it accounted for over 94% of the total labour costs.

Farmers could benefit from raising a cow, but net return was only moderate. On average, farmers received about 500,000-750,000 VND of net return within a year. As comparison to rice cultivation, return to labour (measured as '000 VND/man-day) from milk production were lower for both locations (Table 4.11). Similarly, ratio of net return/total cost was also found to be higher for rice production.

Table 4.11: Comparison on return from rice and dairy in the study area

Items	Unit	Hanoi		Hatay	
		Rice	Dairy	Rice	Dairy
Return to family labour	'000 VND/m.day	17.99	13.68	15.08	13.82
Return to variable cost	VND	1.38	1.09	1.24	1.07
Ratio of net return/total cost	VND	0.30	0.07	0.21	0.05
Net return per kg of output	'000 VND/ kg	0.48	0.23	0.37	0.16
Number of man-days were utilized in a year per cow (sao)	Man-days	21.4	212.2	22.6	141.1
NRL in a year per cow (sao)	'000 VND/year	356.2	2806.4	316.4	1831.1

Source: Survey, 1999

Note: Farmer grew rice two times per year, so total number of man-days and the net return to family labour (NRL) per sao was calculated for both two seasons in a year.

However, the outcome of the analysis should be interpreted cautiously because looking into the return to labour and the ratio of net return over total cost of rice production were more promising than dairy cow. But dairy-farming activities occurred everyday and most of them were done by family labourers, whereas for rice production only few man-days were utilized in a year. Therefore, farmers could get higher income from raising cow than cultivating rice, as their labour forces were abundant. If adding family labour to net return (measured as '000 VND in a year), the indicator became much higher for dairy cow. Moreover, dairy and the crop had a complementary relationship. Farmers in the study area still used all assigned lands for crop cultivation and integrated with dairy farming in order to increase their total incomes.

4.9 Reasons for dairy farming of farmers

As mentioned above, net return received by farmers was not so high, but there were still 71% of the total interviewed households wanting to expand their dairy farms. In response to the question of why they raised cows, most farmers answered that utilization of their available resources (family labourers, on-farm feeds) was the most important reason. This is expressed in Tables 4.12 and 4.13.

Table 4.12: Reasons for dairy farming of Hanoi farmers

Factors	Farmers responses with priorities (%)				Respo.	Total
	1st	2nd	3rd	4th	percent	score
1. Utilization of family's resources	66	30	4	0	100	181
2. Generating amount of cash regularly	30	56	10	4	100	156
3. Market proximity	2	14	64	20	100	99
4. Providing manure for cultivation	2	0	16	66	84	53
5. Other	0	0	6	10	16	11

Source: Survey 1999

Table 4.13: Reasons for dairy farming of Hatay farmers

Factors	Farmers responses with priorities (%)				Respo.	Total
	1st	2nd	3rd	4th	percent	score
Utilization of family resources	57.5	25	5	10	97.5	130
Providing manure for crop	27.5	45.0	25.0	2.5	100	119
Generating amount of cash regularly	7.5	20.0	37.5	20.0	85.0	74
Market proximity	5	7.5	10	45	67.5	43
Other	2.5	2.5	22.5	22.5	50	34

Source: Survey 1999

Note: Respo. percent denotes responding percentage

First to fourth under farmers responses indicates farmers rank to respective reasons.

To calculate total score, first important order was accorded 4 score, second equals 3 score and fourth important order equals 1 score.

A second important reason was that dairy farming provided by-products for crop cultivation. However, this reason was only significant for households located in Hatay where average area per household member was large. In contrast, Hanoi farmers who have limited land considered it as a less important reason, because wastes from dairy farm (i.e. urine, manure) carried negatively impact on the environment. In addition to the above reasons, dairy farming was also attractive because it generated the farmer a relatively high amount of cash everyday. Moreover, cow raising transformed available physical resources of the household such as family labour, cultivated fodder, and on-farm feed stuffs into cash quickly. The farmers indicated that a F1 cow in milking cycle of 300 days could produce an average of 300 kg of milk per month, which was about 450 kg of rice, equivalent. Based on the national level, the

amount of cash generated by raising a cow in a month equals to the revenue obtained by cultivating 800 m^2 of paddy in 4 months.

4.10 Farmers' problems in milk production and marketing

When asked about the problems in milk production and marketing, Hanoi farmers indicated that incidence of diseases was the most important problem with a 220 score, followed by lack of fodder (Tables 4.14 and 4.15). In Hatay zone, the farmers were not satisfied with the price they received, so they accorded first priority to low price of raw milk. The incidence of disease was considered as the second most important constraint in milk production. The poor access to credit (high interest rate, complex process of loan, etc.) was ranked as the third most important constraint for both locations.

Analysis of the problems and priorities gave the indication that with regards to some problems related to milk production, such as diseases, lack of technical support and poor access to credit were almost comparable for both locations. The considerable difference between the locations was that while Hanoi farmers considered lack of fodder as a main problem in their production process, it was not as serious for Hatay farmers. Looking into the marketing problems it was evident that Hatay farmers placed higher priority to the lower milk price. This could be explained by the significant difference in the prices between two locations. Market outlet was no longer a serious problem for farmers in the study areas. The formation of milk collection stations last year helped them sell raw milk easily. The farmers could sell as much raw milk as they had at predetermined prices. However, there were some communes in the region that still did not have any milk collection points, so dairy farmers still had difficulty selling their products. Those topics will be discussed in detail in the next chapter where marketing issues are presented and analysed.

Table 4.14: Problems in milk production as perceived by the farmers in Hanoi

Problems	Percentage of farmers responses with					Resp. percent	Total score
	1st	2nd	3rd	4th	5th		
1. Low price of raw milk	2	22	22	34	20	100	126
2. Incidence of diseases	48	44	8	0	0	100	220
3. Lack of fodder	34	16	20	14	12	96	167
4. Poor access to credit	16	16	30	26	12	100	149
5. Lack of technical support	0	2	18	28	42	90	80
6. Limited market outlet	0	0	0	2	12	14	8

Source: Survey, 1999

Table 4.15: Problems in milk production as perceived by the farmers in Hatay

Problems	Percentage of farmers responses with					Respo. percent	Total score
	1st	2nd	3rd	4th	5th		
1. Low price of raw milk	50.0	37.5	12.5	0	0	100	175
2. Incidence of diseases	42.5	45.0	10.0	2.5	0	100	171
3. Lack of fodder	0	0	0	0	75.0	75	30
4. Poor access to credit	7.5	15.0	52.5	22.5	2.5	100	121
5. Lack of technical support	0	2.5	25.0	72.5	0	100	92
6. Limited market outlet	0	0	0	2.5	22.5	25	11

Source: Survey, 1999

Note: n = 50 for Hanoi, n = 40 for Hatay,

First to fifth under percentage of farmers response indicates farmers rank to respective problems.

To calculate total score, first was accorded 5 score, second equals 4 score and fifth equals 1 score.