

# **2001 Dairy Enterprise Analysis**

## **KENTUCKY FARM BUSINESS MANAGEMENT PROGRAM**

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### A Special Note to Our Readers

*The data for this study are drawn from the detailed financial and production records of producers cooperating with the Kentucky Farm Business Management program. The data are not drawn from a random sample of farms in the state. However, these data are the most accurate and detailed farm financial information available and represent the closest approximation to “real world” farm financial data that are available to researchers and educators. Every attempt has been made to select farms for these research studies that are “typical” and have complete financial information available for analysis. These data are carefully cross-checked by our farm management specialists before inclusion in this analysis. It should be noted that farms included in this study are representative of commercial farms producing major commodities and livestock but not of all farms in Kentucky.*

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\* Dairy Enterprises KFBM 2001

# KENTUCKY FARM BUSINESS MANAGEMENT PROGRAM

## 2001 DAIRY ENTERPRISE ANALYSIS

Colby A. Blair<sup>1</sup>

### Abstract

This report contains the findings of a study of dairy enterprises on farms participating in the Kentucky Farm Business Management (KFBM) program.

1. In 2001, 33 enterprises were evaluated. Farms in this study averaged 135.1 cows, and ranged in size from 39 to 489 cows. Average milk production per cow was 16,921 pounds, with farm averages ranging from 12,144 pounds per cow to 21,178 pounds per cow.
2. Average **Net Returns Over All Costs** of dairy enterprises studied were positive. Net returns, considering both cash and non-cash costs, averaged \$253 per cow. On a per hundredweight (cwt.) basis of milk produced, net returns averaged \$1.49.
3. **Total Returns** averaged \$3,021 per cow. Milk prices averaged \$16.12 per cwt. Beef prices are presently being reported separately for market animals and breeding animals<sup>2</sup>. Producers received \$79.65 per cwt. of market beef sold and \$45.59 per cwt. of breeding animals sold in 2001. These figures show upward movement from 2000 prices of \$71.25 and \$41.81 for market and breeding animals, respectively. The studied farms produced 590 pounds of beef per cow. This is slightly higher in comparison to 2000's figure of 545 pounds of beef per cow. Beef returns averaged \$291 per cow in 2001 compared to \$224 per cow in 2000. Beef returns per cow equaled 9.63% of total dairy returns per cow in 2001 versus 8.76% recorded in the 2000 KFBM Dairy Enterprise Study.
4. These 33 enterprises averaged \$2,768 **Total Costs** per cow in 2001, an increase of \$137 per cow from the 2000 average. Non-feed costs increased \$54 per cow from 2000's \$1,395 per cow to \$1,449 per cow in 2001.
5. Dairy enterprises varied greatly in levels of production efficiency, costs and returns. Although average net returns over all costs were positive, 6 of 33 herds had negative net returns over all costs per cow. The high return farms averaged \$586 net returns per cow or \$3.58 per cwt. of milk produced. The low return farms averaged a net return of -\$81 per cow or -\$0.47 per cwt. of milk produced.

This publication expands on these highlights and on the factors contributing to the results. It includes results of analyses of the cost structure and profitability of dairy enterprises when sorted by net returns per cow, herd size, milk production per cow and total costs per cow.

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<sup>1</sup> Colby A. Blair is the Bluegrass Area Extension Specialist in Farm Business Management with the Kentucky Farm Business Management program, a cooperative effort between the Department of Agricultural Economics, University of Kentucky, and the incorporated Farm Analysis Groups whose members are farmers. These cooperator-farmers are located in 57 counties in Central and Western Kentucky (see **Figure 5** at the end of this publication). Ten different Farm Analysis Specialists work with these farms on a regular basis to ensure accurate and complete record keeping. At year's end, they provide the cooperator-farmers with a complete summary and analysis of the farm business.

<sup>2</sup> Because the figure for average price received on all beef sold on a cwt. basis no longer exists there will be no comparisons made to this figure.

## Introduction

In 1979, the Kentucky Agricultural Experiment Station initiated a study to determine how well Kentucky dairy farmers compete with other dairy farmers in this region. Physical and financial records of dairy enterprises on farms in the Kentucky Farm Business Management (KFBM) program for 1979 through 2001 have been collected and analyzed. This report focuses on the 2001 results of 33 dairy enterprise records, and compares these to findings for the past several years so that changes during this period can be examined.

Based on results from this admittedly small sample of 33 enterprises, Kentucky dairy enterprises, on average, were able to cover all costs in 2001. Milk production was higher probably due to low feed prices, mainly the price of grain. Although total costs per cow were higher in 2001 versus 2000, higher milk prices kept average net returns over all costs positive. From 1993 to 2001 only four years (1995, 1996, 1997 and 2000) showed negative average net returns over all costs per cow.

## Methods and Definitions Used in Study

Most of this study's production and financial data was calculated as a normal part of the complete farm business records kept by participants in KFBM. For inputs used by more than one enterprise, the cooperating farmers and their Farm Business Analysis Specialist allocated the appropriate proportion of the costs to the dairy enterprise. The following definitions and explanations are used:

**Total Returns** – The total returns attributable to the dairy enterprise for the year. This figure is a sum of the following variables:

- The value of milk sold.
- The value of milk and beef used for farm and family consumption.
- The value of all dairy animals sold.
- An adjustment for the difference in the value of dairy animals on the farm at the time of the beginning and ending inventories of the said animals.

In 2001 milk returns accounted for 90.4% of total dairy enterprise returns with beef returns accounting for the remaining 9.6%.

**Total Costs of Production** – The total charge, both cash and non-cash, for all factors of production, except management, used by the dairy enterprise for the year. Inputs were charged using the procedures and rates employed in KFBM. In 2001, operator and family labor was charged \$2,250 per month (\$27,000 per year). Interest on both borrowed and equity capital was charged at rates of 4.0% per year for land and 8.5% per year for buildings, equipment, cash operating expenses, and feed and livestock inventories. Land used for dairy lots and building sites was valued at its agricultural value. See **Table 2** for the interest rates and unpaid labor charges used in prior years.

Depreciation on buildings, machinery and equipment used in the dairy enterprise was taken from the operator's depreciation schedule, with adjustments to the straight-line method of depreciation when farms used expense election for new purchases. Values for machinery and building depreciation were taken from economic depreciation schedules as maintained by the KFBM program. Equipment is generally depreciated over ten years and farm buildings, excluding feed and grain bins or single purpose structures, are depreciated over 25 years.

Feed raised on the farm was charged at its yearly average market value, that is, the price farmers would have received if the feed were sold and marketing costs were deducted. For example, corn

produced and fed on the farm was charged to the dairy enterprise at \$2.08 per bushel in 2001. Charges for hay and silage depended upon type and quality. Pasture was charged at \$0.22 per day of grazing by an animal unit where 1 animal unit equals 1,000 pounds.

**Net Returns Over All Costs** – The result of **Total Returns** less **Total Costs**. Because all cash and non-cash costs, except charges for management, are deducted, **Net Returns Over All Costs** represent the financial reward attributable to the management of the dairy enterprise. This study presents this value on a per farm, per cow and per cwt. basis.

Charges must be made for all inputs to correctly determine enterprise profitability. One must recognize, however, that non-cash charges for the individual farmer’s labor and interest on her/his equity capital are also returns to these factors of production. This assumes that returns are high enough to reward these inputs. Since these are the farmer’s resources, the returns can be used for whatever purposes he/she wishes. Examples of such avenues for the excess returns could be family living, principal repayment, investment, etc.

**Returns and Costs of Milk Production** – The dairy enterprise is different from most agricultural enterprises because it has two major outputs, milk and beef. While milk is the primary product sold, the value of beef produced and sold can be substantial. Having two outputs produced simultaneously presents problems in allocating production costs and returns. The question arises as to what proportion of each cost should be charged to milk and what proportion to beef.

The method selected in this study is to make an adjustment to total cost equal to the value of beef produced by the dairy enterprise, rather than to allocate each individual cost item to milk and beef. This is illustrated with the following measures:

$$\text{Total Returns Per cwt. of Milk} = \frac{\text{Total Dairy Returns (Milk \& Beef)}}{\text{Total cwt. of Milk Produced}}$$

$$\text{Total Costs Per cwt. of Milk} = \frac{\text{Total Dairy Costs (Milk \& Beef)}}{\text{Total cwt. of Milk Produced}}$$

**Adjusted Costs of Milk** – This is the cost of producing milk assuming that the value of the beef produced equals the cost of producing that beef. This figure is calculated by subtracting the value of beef produced from the total costs of milk. Although beef is a supplemental product of milk production, it is imperative to account for its value. By making the assumption that beef production costs are equal to beef returns, one can compare the remaining costs of production to the price of milk. One should take note that by using this methodology, costs of milk produced would be increased in the case of negative beef returns. This scenario occurred on 6 of the 32 farms in the present study.

The following equation will express the aforementioned method as a formula:

$$\text{Adjusted Cost of Milk} = \frac{(\text{Total Dairy Costs}) - (\text{Total Value of Beef Produced})}{\text{Total Milk Produced}}$$

This figure is presented on a per farm, per cow and per cwt. basis in this study.

**CWT. Milk Equivalent (M.E.)** – The value of beef produced divided by the average price received per cwt. of milk sold; plus the total cwt. of milk produced.

## **Description of Dairy Enterprises Studied and Comparison with Kentucky's Dairy Industry<sup>3</sup>**

The 33 dairy enterprises in 2001 had an average of 145.1 cows in the milking herd. Enterprises ranged in size from 39 to 489 cows. Eight herds (24%) had 75 or fewer cows, seven herds (21%) had from 75 to 100 cows, seven herds (21%) had between 100 and 150 cows, and eleven herds (33%) had more than 150 cows.

Milk production per cow in this study averaged 16,921 pounds, a increase of 158 pounds from the 16,763 pounds average in 2000. The 2001 Kentucky average production as reported by the Kentucky Agricultural Statistics Service (KASS), was 12,969 pounds per cow, up 166 pounds from the 12,803 pounds per cow average reported for 2000. It can be noted here that farms that participated in the KFBM Program and are represented in this study produce at a significantly higher level on a per cow basis than the average dairy farm in Kentucky. The data shows approximately 30% more milk production per cow for the farmer-cooperator on the KFBM Program that participated in the 2001 Dairy Enterprise Study relative to the average dairy operator in Kentucky as reported by KASS.

While production per cow for Kentucky dairy herds has climbed steadily from the period when this study began, the number of cows in Kentucky has declined dramatically, from 255,000 head in 1979 to 128,000 head in 2001. In addition, milk production in Kentucky and the southeast has declined as a percentage of the nation's total production during this period. Kentucky's decline in number of cows and increase in milk per cow follows a similar national trend.

### **Average Costs and Returns**

Net returns over all costs to dairy farms in KFBM had been quite erratic in the late 80's and 90's but are expected to be less erratic in the future due to pending legislation within the new Farm Bill. Looking at the past several years of this study, 2001 shows the fifth instance of positive management returns for KFBM dairies in the past eight years. Cost and return data that detail these results are presented in **Table 1** and **Table 2**.

From 1987 to 1992, changes in net returns over all costs were driven mostly by both changing milk prices and increases in milk production per cow. However, in 1993, 1994 and 1995 increases in costs of production had a greater impact on net returns. Milk prices received per cwt. in 2001 were \$2.19 per cwt. higher than those received in 2000. The 2000 milk price of \$13.93 per cwt. halted the upward trend in milk prices that data produced from 1997 to 1999. The upward trend in milk prices coupled with the downward trend in feed prices had contributed to positive returns for the farms studied in 1999. Now with milk prices back at or near 1999 levels and cost relatively unchanged returns have rebounded.

Milk prices received over the 1990 to 2001 period have been fairly volatile. Before 2000 monthly price charts showed that production driven seasonal price patterns had given way to price patterns determined by the interaction of milk supply and an erratic demand for cheese. Local prices lagged the Basic Formula Price – a price that reflected the demand for cheese -- by a two-month period. In January of 2000, new federal legislation reduced the number of milk orders and put in place a new component pricing system to producers that responded more quickly to market prices. Analysts say that the new order system has given a slight boost to most Kentucky milk prices. In much of the South prices are now

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<sup>3</sup> Participation in this study was voluntary. No attempt was made to randomly select participants; consequently, no attempt is made to draw inferences about dairy herds outside this sample. However, the results are likely a reasonable representation of relatively progressive commercial dairy enterprises.

determined by milk supply and the demand for milk's components (skim milk and butterfat) while the rest of the country uses multiple component pricing. During 2001, butter prices were the main driver of farm-level milk prices in Kentucky. For more information on the component pricing system, the reader may contact the Milk Market Administrator, P. O. Box 19030, Louisville, Kentucky 40261 (502) 499-0040.

Total returns per cow averaged \$3,021 on the farms studied, \$464 more than the 2000 average of \$2,557. Beef production per cow increased compared to 2000 and beef prices received, both market animal and breeding animal, improved from 2000 levels. Beef returns increased from \$224 per cow in 2000 to \$291 per cow in 2001.

Total costs per cow were up slightly, from \$2,631 in 2000 to \$2,768 in 2001. Non-feed costs increased \$54 per cow, while feed costs increased \$83 per cow. The increase in non-feed costs continues the upward trend that has continued since 1993 with the exception of 1996 and 2000. Feed costs will continue to remain low and possibly decrease through 2003 and allow producers to capture some of the lowest feed costs in several years.

Net returns per cow were significantly higher in 2001 compared to 2000, however, it must be noted that 2000 was one of the poorest return years on record. Producers in this study experienced a \$253 per cow average net return over all costs in 2001, while 2000 showed a net return of a negative \$53 per cow. Average total returns per cwt. of milk produced, including beef returns, were \$17.85 on the farms in this study. This was an increase of \$2.60 per cwt. from 2000's \$15.25 and established a new record high for the KFBM Dairy Enterprise Study eclipsing 1999's \$17.62 per cwt.

Total costs of production averaged \$16.36 per cwt. of milk produced in 2001, an increase of \$0.60 per cwt. from the average of \$15.76 recorded in 2000. This is a combination of non-feed cash costs being \$0.22 more and feed costs being \$0.38 more per cwt. of milk produced in 2001 versus 2000. Producers spent more on every item within the category of non-feed cash costs in 2001 than they did in 2000, except for livestock supplies and interest. Net returns over all costs averaged \$1.49 per cwt. of milk produced in 2001. This year's data provides the fifth positive management return in the KFBM Dairy Enterprise Studies since 1993. So, although costs per cwt. of milk produced were higher, returns were more than enough to offset the costs to the extent that a positive return over all costs could be generated for the average farm.

The value of beef amounted to \$1.70 per cwt. of milk produced. Although dairy herds produce as much beef per cow as beef herds, the value of beef production as a percent of a cow's total returns had decreased as milk production per cow had increased. However, this year marked a difference where beef returns in 2001 (9.6%) actually made up a larger portion of total returns versus 2000 (8.8%). This is primarily due to the escalating prices that beef producers in general have received in 2001, coupled with the fact that many cash strapped farmers may have culled a little harder than usual in response to the high beef prices. After adjusting the costs of production per cwt. of milk produced by the value of beef production, \$1.70 per cwt., the adjusted cost of producing milk was lowered to \$14.66 per cwt. This figure is used to compare cost per cwt. of milk produced to milk price received per cwt. of milk produced to see if milk sales are covering milk costs.

**Table 1. Average Costs and Returns Per Cow, Dairy Enterprises, KFBM 1994-2001**

Item	1994	1995	1996	1997	1998	1999	2000	2001	3 Year Average*
<b>Number of Dairy Cows</b>	105.2	110.7	117.7	129.7	140.0	131.7	143.0	135.1	136.6
<b>Total Dairy Returns</b>	2450	2343	2614	2672	2910	2990	2557	3021	2856
<b>Costs of Production:</b>									
Feed	1208	1240	1450	1417	1349	1278	1236	1319	1277
Building & Fence	68	60	67	70	75	74	80	88	81
Machinery & Equipment	319	323	328	340	378	393	374	405	391
Labor	380	412	408	433	463**	468	431	444	447
Livestock Supplies	120	137	139	140	150	155	142	135	144
Veterinary	70	82	69	75	92	79	73	77	76
Interest	232	253	238	246	252**	242	258	252	251
Insurance, Taxes & Misc.	38	42	38	37	41	47	38	47	44
<b>Total Cost of Production</b>	2435	2553	2740	2758	2801	2735	2631	2768	2711
<b>Net Returns Over All Costs</b>	15	-210	-125	-85	109	254	-73	253	144
<b>Total Dairy Returns</b>	2450	2343	2614	2672	2910	2990	2557	3021	2856
<b>Feed Costs</b>	1208	1240	1450	1417	1349	1278	1236	1319	1277
<b>Returns Over Feed Costs</b>	1242	1103	1164	1255	1561	1712	1322	1702	1579
<b>Non-Feed Costs</b>	1227	1313	1290	1340	1452	1458	1395	1449	1434
<b>Net Returns Over All Costs</b>	15	-210	-125	-85	109	254	-73	253	144

• 3 Year Average column is a simple average of the items over the years of 1999, 2000 and 2001.

\*\* Because of a change in software provider, 1998 data did not include unpaid labor figures or non-cash interest charges. Area Extension Specialist in Farm Business Management, Craig D. Gibson, has extrapolated the data using the raw data. This has erased the gap for 1998 in calculating Total Costs of Production, Non-Feed Costs and Net Returns Over All Costs that was evident in the 1999 and 2000 KFBM Dairy Enterprise Analysis Studies.

**Table 2. Average Costs and Returns per CWT of Milk Produced, Dairy Enterprises KFBM 1994-2001**

<b>Item</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>3 Year Average*</b>
<b>Total Dairy Returns</b>	15.51	14.02	16.47	15.57	15.96	17.62	15.25	17.85	16.91
<b>Costs of Production:</b>									
Feed	7.70	7.47	9.16	8.29	7.40	7.61	7.46	7.84	7.64
Building & Fence	0.43	0.38	0.43	0.42	0.41	0.44	0.47	0.51	0.47
Machinery & Equipment	1.91	1.95	1.97	1.98	2.06	2.33	2.24	2.41	2.33
Labor	2.43	2.50	2.61	2.53	2.54**	2.76	2.58	2.62	2.65
Livestock Supplies	0.74	0.79	0.84	0.79	0.82	0.89	0.82	0.77	0.83
Veterinary	0.43	0.48	0.42	0.43	0.50	0.45	0.42	0.44	0.44
Interest	1.48	1.53	1.53	1.44	1.38**	1.44	1.55	1.49	1.50
Insurance, Taxes & Misc.	0.24	0.25	0.27	0.21	0.22	0.28	0.23	0.28	0.26
<b>Total Costs of Production</b>	15.48	15.36	17.33	16.09	15.33	16.20	15.76	16.36	16.11
<b>Net Returns Over All Costs</b>	0.04	-1.33	-0.86	-0.52	0.63	1.42	-0.51	1.49	0.80
<b>Total Dairy Returns</b>	15.51	14.02	16.47	15.57	15.96	17.62	15.25	17.85	16.91
<b>Feed Costs</b>	7.70	7.47	9.16	8.29	7.40	7.61	7.46	7.84	7.64
<b>Returns Over Feed Costs</b>	7.81	6.55	7.31	7.28	8.56	10.01	7.79	10.01	9.27
<b>Non-Feed Costs</b>	7.78	7.87	8.17	7.80	7.93	8.59	8.29	8.52	8.47
<b>Net Returns Over All Costs</b>	0.04	-1.33	-0.86	-0.52	0.63	1.42	-0.51	1.49	0.80
<b>Milk Price Received (\$/CWT)</b>	13.81	13.18	15.53	14.44	15.93	16.46	13.93	16.12	15.50
<b>Adjusted Total Cost of Milk</b>	13.78	14.52	16.39	14.96	14.34	15.04	14.44	14.66	14.71
<b>Labor &amp; Interest Rates:</b>									
Unpaid Labor Rate/Year	18000	19200	19800	21600	22800	24000	25200	27000	25400
Interest Rate: Non-Land	9.0%	9.5%	9.0%	9.0%	9.0%	8.5%	9.0%	8.5%	8.7%
Interest Rate: Land	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	4.5%	4.0%	4.5%

\* 3 Year Average column is a simple average of the items over the years of 1999, 2000 and 2001.

\*\* Because of a change in software provider, 1998 data did not include unpaid labor figures or non-cash interest charges. Area Extension Specialist in Farm Business Management, Craig D. Gibson, has extrapolated the data using the raw data. This has erased the gap for 1998 in calculating Total Costs of Production, Non-Feed Costs and Net Returns Over All Costs that was evident in the 1999 and 2000 KFBM Dairy Enterprise Analysis Studies.

## Variability in Costs and Returns

A consistent finding in all twenty-two years of this study has been the large variation among dairy enterprises in levels of production efficiency, costs per unit of production, and net returns per unit of production. This variability illustrates the complex nature of the dairy production process and the large number of factors that affect unit costs.

To show the extent of variation in costs and returns, and to examine how some important factors contribute to that variation, enterprises in this study were first divided into three approximately equal groups using net returns per cow as a basis for division into the groups. The three groups were classified as:

1. High Returns
2. Middle Returns
3. Low Returns

Averages for economic and production variables sorted by net returns over all costs per cow are presented in **Table 3**, **Table 3A** and **Table 3B**.

High returns enterprises averaged \$586 per cow of net returns over all costs. This equates to \$3.58 per cwt. of milk produced. For the farms that make up the low returns group, total costs exceed total returns by \$81 per cow, resulting in a loss of \$0.47 per cwt. of milk produced. Six (18%) of the farms in the 2001 study failed to cover all costs. This data contrasts with the 2000 study when eighteen (58%) of the thirty-one farms in the study were unable to cover all costs. In order for the low returns group of farms to become profitable in the long run (i.e., cover all costs of production) substantial improvement must occur.

Total returns averaged \$3,063 per cow for the high returns group, up from 2000's high returns group that posted an average of \$2,767 per cow. Total returns were \$407 greater for the high returns group compared to the low returns group. High returns farms received \$16.70 per cwt. for the milk they sold while low returns farms received \$15.77 per cwt. for the milk they sold. Beef returns per cwt. of milk produced were \$0.96 per cwt. higher on the high returns farms relative to the low returns group. Compared to the average farm, high returns farms' milk sales and beef sales brought \$0.58 more and \$0.34 more per cwt for milk and beef respectively. In past years of this study, high returns farms have generally received a slightly higher price for both milk and beef, but high prices received have not been a significant factor distinguishing whether or not a farm falls into the high returns group.

The difference in net returns over all costs between the high returns and low returns groups was \$667 per cow. As shown above, the high returns groups experienced \$407 more per cow on the return side, and a \$260 advantage per cow on the costs side. Milk production averaged 16,354 pounds per cow for the high returns group, 640 more pounds per cow than the average farm in the low returns group. Beef produced per cow was 169 pounds more for the high returns group than those comprising the low returns group, 628 pounds vs. 459 pounds.

Total costs averaged \$2,478 per cow on the high returns farms, and \$2,738 per cow on the low returns farms, making the difference of \$260 per cow. Thus, in 2001, cost differences between groups were much less significant than differences in returns. After an adjustment for beef income, the high returns producers had an adjusted total cost of milk equating to \$2,139 per cow, \$13.12 per cwt., compared to \$2,572 per cow, \$16.30 per cwt., on the low returns farms, a difference of \$433 per cow or \$3.18 per cwt.

The \$260 difference in total costs was made up of the high returns group incurring approximately \$12 less per cow on feed items and experiencing approximately \$248 less per cow on non-feed items when compared to the low returns group. In the breakdown of feed costs, the high returns group spent

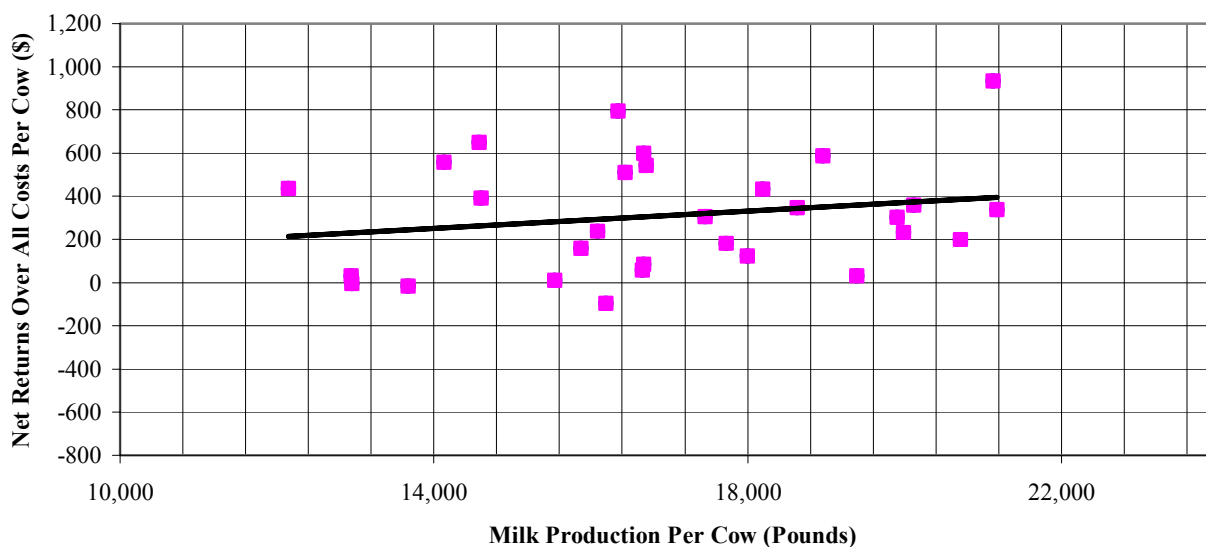
less per cow on hay and dry roughage and other silage versus the low returns group. The high returns group spent more on concentrates, corn silage, and that group's charge for pasture was more than that of the low returns group on a per cow basis. Non-feed cash costs per cow were more than 13% higher for the farms comprising the low returns group versus those farms included in the high returns group, the largest differences occurring within livestock supplies and cash interest expenses. For non-feed non-cash costs the low returns group incurred more unpaid labor charges as well as economic depreciation for buildings and machinery relative to the high returns group.

Death loss as a percent of total beef pounds produced was 23.1% for the high returns group compared to 28.4% and 25.4% for the middle and low returns groups, respectively. Usually the low returns group experiences the highest death loss percentage but this is not the case in this year's data. Higher death loss percentages are an indication of herd health problems and less management control.

In 2001, net returns per cow were not correlated with milk per cow (See **Figure 1**). Production for the high returns group was 2,734 less pounds per cow than that of the middle returns group and 631 more pounds per cow than that of farms in the low returns group. This was very dissimilar to the difference that existed between the two in 2000. KFBM's 2000 Dairy Enterprise Study reported milk production per cow of 17,550 pounds and 15,061 pounds for the high returns group versus the low returns group, a difference of 2,489 pounds.

There were eleven farms in this study with milk production greater than 18,000 pounds per cow. Three of these farms fell into the high returns group. Six farms are located in the middle returns group. Two of these farms are located in the low returns group. There were eight farms in this study with milk production less than 15,000 pounds per cow. Four out of the bottom ten farms, in terms of milk production per cow, were members of the low returns group. Zero farms were located in the middle returns group. Four were located in the high returns group. Net returns over all costs per cow is plotted against milk production per cow in **Figure 1** for all 33 herds studied in 2001. The pattern appears to have a no trend and helps explain why milk production was not a strong factor in determining net returns.

**Figure 1**  
**Net Returns Over All Costs Per Cow vs. Milk Production Per Cow**  
**Dairy Enterprises KFBM 2001**



**Table 3. Per Farm Averages for Economic and Production Variables by Net Returns Over All Costs Per Cow, Dairy Enterprises, KFBM 2001**

<b>Enterprise Summary:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Number of Herds	Herds	33	11	11	11
Total Dairy Returns	\$	419799	550137	453756	237880
Total Feed Costs	\$	178389	223074	183683	112635
Returns Above Feed Cost	\$	241410	327063	270073	125246
Total Non-Feed Costs	\$	197967	226691	232241	130569
Net Returns Over All Costs	\$	43443	100372	37831	(5,324)
<b>Other Economic Variables:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Returns Per \$100 Feed Fed	\$	231	244	244	212
Price Received Per CWT of Milk	\$	16.12	16.70	15.80	15.77
Price Received Per CWT Beef (Market)	\$	79.65	77.42	79.36	84.45
<b>Capital Investment Per Cow:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Livestock	\$	1629	1683	1627	1537
Non-Livestock	\$	1122	760	1500	1180
Total	\$	2751	2443	3128	2717
<b>Other Production Variables:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Average Number of Cows	Cows	135	175	136	88
Cows Dry	%	14.9	14.4	14.3	15.9
Animal Units in Herd	Units	266	351	245	175
Total Milk Production	CWT	23297	29492	25309	14164
Total Beef Production	Lbs.	83574	116776	85320	40289
Beef Per Cow	Lbs.	590	628	671	459
Milk Per Cow	Lbs.	16921	16354	19088	15714
Butterfat Per Cow	Lbs.	618	611	692	562
Value of Feed Fed Per CWT M.E.	\$	7.12	6.94	6.53	7.60
Total Concentrates Per CWT M.E.	Lbs.	62	62	57	66
Hay & Dry Forage Per CWT M.E.	Lbs.	33	33	24	43
Corn Silage Per CWT M.E.	Lbs.	116	106	108	119
Other Silage Per CWT M.E.	Lbs.	22	17	18	28
Pasture Days Per Animal Unit	Days	47	53	42	47
Hay Equivalent Per Cow	Tons	9.0	8.4	8.2	10.2
Average Purchase Price Per Breeding Animal	\$	1191	1144	1474	920
Breeding Cull Rate	%	25.4	23.1	28.4	25.4
Weight Per Breeding Animal Sold	Lbs.	1191	1153	1240	1182
Price Received Per CWT (Breeding)	\$	45.59	46.53	45.79	45.65
Death Loss: % of Pounds Produced	%	22.6	15.0	11.1	38.7
Death Loss: Total Pounds	Lbs.	14120	15046	9759	12222
Deaths: Market	Head	23	31	17	16
Deaths: Breeding	Head	10	11	10	8
Breeding Survival Rate	%	95.9	96.5	96.6	95.2
<b>Labor Summary:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Months Per Cow	Months	0.23	0.18	0.26	0.26
Milk Production Per Worker Per Year	Lbs.	972800	1191364	997634	744026

**Table 3A. Per Cow Averages for Costs and Returns By Net Returns Over All Costs Per Cow, Dairy Enterprises, KFBM 2001**

<b>Enterprise Returns:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Milk Returns	\$	2725	2725	3014	2482
Patronage Returns	\$	4	0	2	8
Dairy Market Loss Assistance	\$	0	0	0	0
Beef Returns	\$	291	338	386	166
Total Dairy Returns	\$	3021	3063	3403	2656
<b>Non-Feed Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Livestock Supplies	\$	135	85	208	137
Veterinary	\$	77	95	71	68
Fuel & Oil	\$	30	24	30	30
Machinery Repair	\$	85	73	72	94
Building & Fence Repair	\$	49	49	78	28
Machine Hire	\$	140	144	159	120
Utilities	\$	84	68	96	92
Light Vehicle	\$	0	0	0	1
Paid Labor	\$	249	222	318	210
Insurance	\$	26	17	26	37
Property Taxes	\$	3	2	4	4
Miscellaneous	\$	17	10	18	26
Cash Interest	\$	96	79	78	131
Total Non-Feed Cash Costs	\$	994	868	1157	980
<b>Feed Costs:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Concentrates	\$	851	818	942	804
Hay & Dry Roughage	\$	188	184	175	204
Corn Silage	\$	227	210	237	206
Other Silage	\$	33	26	31	38
Pasture Charge	\$	20	23	17	20
Total Feed Costs	\$	1319	1261	1402	1273
<b>Non-Feed Non-Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Unpaid Labor	\$	195	137	212	259
Machinery Depreciation	\$	66	49	84	65
Building Depreciation	\$	39	19	57	47
Non-Cash Interest	\$	156	144	212	115
Total Non-Feed Non-Cash Costs	\$	456	349	565	486
<b>Net Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Total Costs of Production	\$	2768	2478	3124	2738
Adjustment for Beef Income	\$	291	338	386	166
Adjusted Total Cost of Milk	\$	2477	2139	2738	2572
Net Returns Over All Costs	\$	253	586	279	-81
<b>Costs &amp; Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Total Dairy Returns	\$	3021	3063	3403	2656
Feed Costs	\$	1319	1261	1402	1273
Non-Feed Costs	\$	1449	1217	1722	1465
Net Returns Over All Costs	\$	253	586	279	-81
<b>Costs Summary:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Non-Feed Cash Costs	\$	994	868	1157	980
Feed Costs	\$	1319	1261	1402	1273
Non-Feed Non-Cash Costs	\$	456	349	565	486
Total Costs of Production	\$	2768	2478	3124	2738

**Table 3B. Per CWT. Averages for Costs and Returns By Net Returns Over All Costs Per Cow, Dairy Enterprises, KFBM 2001**

<b>Enterprise Returns:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Milk Returns	\$	16.12	16.70	15.80	15.77
Patronage Returns	\$	0.02	0.00	0.01	0.05
Dairy Market Loss Assistance	\$	0.00	0.00	0.00	0.00
Beef Returns	\$	1.70	2.04	2.03	1.08
Total Dairy Returns	\$	17.85	18.74	17.85	16.91
<b>Non-Feed Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Livestock Supplies	\$	0.77	0.51	1.08	0.85
Veterinary	\$	0.44	0.18	0.26	0.26
Fuel & Oil	\$	0.18	0.14	0.16	0.20
Machinery Repair	\$	0.52	0.45	0.38	0.60
Building & Fence Repair	\$	0.29	0.30	0.41	0.18
Machine Hire	\$	0.83	0.89	0.83	0.77
Utilities	\$	0.50	0.41	0.49	0.60
Light Vehicle	\$	0.00	0.00	0.00	0.01
Paid Labor	\$	1.44	1.30	1.69	1.31
Insurance	\$	0.16	0.10	0.14	0.23
Property Taxes	\$	0.02	0.01	0.02	0.03
Miscellaneous	\$	0.10	0.06	0.10	0.16
Cash Interest	\$	0.57	0.49	0.42	0.81
Total Non-Feed Cash Costs	\$	5.83	5.23	6.08	6.17
<b>Feed Costs:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Concentrates	\$	5.05	5.03	4.96	5.13
Hay & Dry Roughage	\$	1.13	1.17	0.91	1.29
Corn Silage	\$	1.33	1.28	1.24	1.29
Other Silage	\$	0.20	0.16	0.16	0.25
Pasture Charge	\$	0.12	0.15	0.09	0.14
Total Feed Costs	\$	7.84	7.78	7.36	8.10
<b>Non-Feed Non-Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Unpaid Labor	\$	1.18	0.86	1.12	1.66
Machinery Depreciation	\$	0.38	0.29	0.43	0.40
Building Depreciation	\$	0.22	0.11	0.30	0.29
Non-Cash Interest	\$	0.92	0.88	1.10	0.76
Total Non-Feed Non-Cash Costs	\$	2.69	2.14	2.95	3.11
<b>Net Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Total Costs of Production	\$	16.36	15.16	16.38	17.38
Adjustment for Beef Income	\$	1.70	2.04	2.03	1.08
Adjusted Total Cost of Milk	\$	14.66	13.12	14.35	16.30
Net Returns Over All Costs	\$	1.49	3.58	1.46	-0.47
<b>Costs &amp; Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Total Dairy Returns	\$	17.85	18.74	17.85	16.91
Feed Costs	\$	7.84	7.78	7.36	8.10
Non-Feed Costs	\$	8.52	7.38	9.03	9.28
Net Returns Over All Costs	\$	1.49	3.58	1.46	-0.47
<b>Costs Summary:</b>	<b>Units</b>	<b>Average</b>	<b>High</b>	<b>Middle</b>	<b>Low</b>
Non-Feed Cash Costs	\$	5.83	5.23	6.08	6.17
Feed Costs	\$	7.84	7.78	7.36	8.10
Non-Feed Non-Cash Costs	\$	2.69	2.14	2.95	3.11
Total Costs of Production	\$	16.36	15.16	16.38	17.38

## Cost Structure for Entire Group

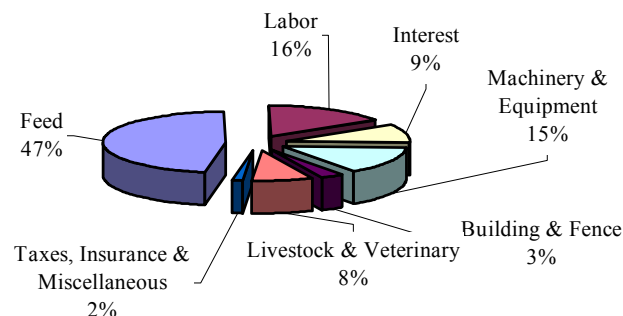
Cost items as a percentage of total cost in 2001 are shown in **Figure 2**. As expected, feed was the largest single production cost at \$1,319 per cow, amounting to 47% of total costs per cow. Labor, the second largest cost in the dairy enterprise, accounted for 16% of the total costs. In 2000, feed costs were \$1,236 per cow, amounting to 47% of total costs per cow. 1999 feed costs totaled \$1,278 per cow or 47% of total costs per cow. Labor costs have remained fairly constant during this period with 2000 and 1999 showing 16% and 17% respectively.

One would have assumed that labor cost as a percent of total costs would have risen since 1996 due to both an increase in farm wages as well as an increase in the imputed charge for unpaid labor. Unpaid labor charges increased from \$2,100 per month in 2000 to \$2,250 per month in 2001. It is important to recognize that as cow numbers decreased unpaid labor per cow increased. This relationship exists due to the fact that the operator is spreading her/his unpaid labor over fewer cows (143 cows in 2000 vs. 135.1 in 2001.) To see the impact of this relationship within the 2001 study, refer to Figure 3 where unpaid labor is included in Non-feed Non-cash Costs. Paid labor costs declined from \$252 per cow in 2000 to \$249 per cow in 2001, but unpaid labor costs per cow increased slightly from \$178 per cow in 2000 to \$195 per cow in 2001. So one can see that total labor costs decreased from \$431 per cow in 2000 to \$444 per cow in 2001, but that labor as a percentage of total production costs on a dairy enterprise remained at 16%.

Machinery and equipment costs (repairs, fuel & oil, utilities, light vehicle, machinery hire and machinery depreciation) increased by \$31 per cow from 2000 and amounted to 15% of total costs per cow, up 1% from 2000. Interest costs were 9% of total costs per cow, approximately \$6 less per cow than 2000. Cash interest costs were slightly higher from \$75 per cow in 2000 to \$96 per cow in 2001, while non-cash interest amounted to \$156 per cow, down from \$183 per cow in 2000. Total investment per cow was \$2,751 per cow in 2001. This is up from 2000's figure of \$2,538 per cow. It may be the case with the onset of higher milk prices in 2001 many dairy enterprises chose to make more new capital purchases during 2001 versus 2000. Non-livestock capital investment per cow increased from 2000's \$1,019 to \$1,122 in 2001.

Livestock supplies and veterinary expenses fell \$3 per cow under 2000 to \$212 per cow and comprised 8% of total costs per cow identical in comparison to 2000. Building and fence costs (repairs and depreciation) were 3% of total costs per cow and the sum of insurance, miscellaneous and taxes accounted for the remaining 2% of total costs. Although buildings are often considered the major investment in the start up phase of a new dairy, this study has revealed that dairy producers consistently put more dollars toward machinery and dairy equipment than they do toward buildings. This is due, primarily, to purchases of new technology and new feeding systems such as Total Mixed Rations (TMR) that require a substantial investment in equipment.

**Figure 2**  
**Composition of Dairy Enterprise Production Costs**  
**Dairy Enterprises KFBM 2001**



## Implications and Analysis of Financial Returns

The consolidation of Kentucky's dairy industry in recent years is a cause for concern. Contributing factors in recent years have been stricter health standards, retirement of owners, structural changes in the industry and price volatility due to the lowering of government supports on grain and milk. In certain parts of the state, the encroachment of urbanization has closed many dairies. Higher land prices and a labor market that offers 40 hours per week and benefits have added more challenges. While all of these factors contributed to the consolidation, one can see from the data in this study that lack of profitability even in a period of high milk prices and low feed costs may continue to drive down the number of dairy farms in Kentucky. If the low return farms persist in failing to cover all costs, the farms may no longer be in the dairy business. KFBM teaches that better management is achieved through better records. It is through record keeping that one can obtain the necessary information to make informed decisions.

In the long run, an enterprise should produce returns sufficient to cover the total costs of production with something left over to reward the operator for her/his management and risk-taking. In 2001, 27 of the 33 enterprises studied, 82%, had returns that were sufficient to cover all costs. This is in sharp contrast to 2000 when only 42%, or 13 of 31, dairy enterprises generated enough returns to cover all costs. It is a challenge and one should be realistic when determining methods to overcome those obstacles. Year in and year out, regardless of prices and/or costs the best managers continue to experience success. Also, it must be noted here that because of higher input costs and lower milk prices received, many of the inefficient producers have left the dairy business and, likewise, they are no longer included in this study. Thus, the producers that remain in the present study are some of the best managers in the dairy business. A dairy farm manager's potential for success and viability depends upon the following:

- The business's financial position, that is, the proportion of capital that is borrowed.
- The relationship between the farm's returns and the composition of the cost structure.

In 2001, the low returns farms averaged a loss of \$81 per cow. Farms with this magnitude of a loss cannot expect to stay in the dairy business if these types of losses continue. Over the last 5 years Kentucky has lost approximately 600 dairy farms. This amounts to a 29% decline versus a 30% decline in the southeast and the 25% decline seen nationally. The West has been gaining market share and the Southeast has been losing market share for years. However, the declining number of dairy farms everywhere else obscure the increased presence in the West.

Since total costs of production include both cash and non-cash costs as well as feed and non-feed costs, it is useful to look at these components individually. While it is easy to play down non-cash costs as "paper" costs, accounting for both cash and non-cash costs is essential when analyzing the long run profitability of an enterprise. From such an analysis, one can envision the opportunities that he/she has to invest unpaid labor and equity elsewhere. It is imperative that all costs be included so that the profitability of competing enterprises can be compared. Through a comparison of competing enterprises, on a total costs basis, one is able to make informed decisions and can hopefully allocate the farm's resources in the most profitable manner. Further, the enterprise should pay the farm a reasonable wage for labor, a reasonable interest rate on the capital investment, and the farm should generate returns sufficient to cover the costs of depreciation (the loss in value of capital invested in machinery, equipment and buildings). Moreover, a livestock enterprise should pay for home grown feed that could be sold or used by another enterprise.

One logical way to examine a dairy enterprise's economic performance is to divide total costs into three broad components:

1. Non-Feed Cash Costs
2. Feed Costs
3. Non-Feed Non-Cash Costs

Feed costs include both the costs of purchased feeds and the market value of home grown feeds. Separating feed from the other cost categories is logical because feed is a product that can generally be sold or fed to another livestock enterprise. It follows that feed should be charged against the livestock enterprise at the price for which it could be sold, less marketing costs. Detailed breakdowns of cash and non-cash costs on a per cow and a per cwt. basis are shown in **Tables 3A, 3B, 6A, 6B, 7A, 7B, 8A and 8B.**

If dairy enterprise returns do not exceed non-feed cash costs plus the value of feed fed, one can conclude that the farm may be losing money by feeding the feed that is produced. Although this has not happened recently for the low returns group, it is important to note that such a case would present a situation where it could be more profitable to sell home grown feed instead of feeding it. KFBM prides itself in the ability to perform complete farm enterprise analysis. For any given dairy enterprise it is noted that there are other enterprises on that operation that may include hay, corn silage, other silage, etc. Costs are allocated to forage and/or grain enterprises and then the hay, silage, etc. is "sold" to the dairy enterprise at a fair market rate. KFBM then determines whether or not such sectors of the operation are cost effective to be supporting. For instance, in 2001 all home grown corn silage was "sold" to the dairy enterprise at \$20 per ton. If a given farm saw that it was costing it more than \$20 per ton to put up the corn silage then it may be more profitable to buy the corn silage from someone else at \$20/ton or find another source of feed that may be raised less expensively.

The 33 farms in this study averaged \$708 per cow above the sum of non-feed cash costs and feed costs. Total returns average \$3,021 per cow while non-feed cash costs plus the value of feed fed amounted to \$2,313 per cow. For each cwt. of milk produced, non-feed cash costs plus total feed costs averaged \$13.67. Total returns per cwt. milk produced for these farms averaged \$17.85. This left \$4.18 per cwt. or \$708 per cow to cover non-feed non-cash costs.

Non-feed non-cash costs include imputed charges for the operator's labor as well as her/his family's labor. Also included in these costs are imputed interest on the operator's own investment, primarily buildings, facilities, equipment and dairy animals, and depreciation of the value of capital items used by the dairy enterprise. Non-feed non-cash costs for this study's farms averaged \$456 per cow or \$2.69 per cwt. of milk produced.

The seriousness of covering cash costs and feed costs, but not covering non-cash costs is sometimes called "living off of depreciation," and depends on two things:

1. The magnitude of the deficiency in covering all non-cash costs.
2. How long the deficit persists.

Unless there is income from some other source such as an off-farm job, income must be provided for family living expenses as well as cash for repayment of principal on loans, replacement of current capital items and any farm improvements that must be made. Farms that consistently fail to cover all or most non-cash costs will not survive in the long run without off-farm income. If they do survive, it is because they are either willing or able to accept a return on labor and/or capital that is below the opportunity costs of these resources.

## Production and Other Variables That Can Influence Profits

The dairy enterprise involves a complex production process with a number of factors affecting costs and returns. Some are, for the most part, beyond the individual farmer's control. Examples of such factors could be milk and beef prices, weather conditions, interest rates and government programs. Other factors are directly influenced by the operator's actions or inactions.

To analyze a dairy enterprise, one must examine the level of performance achieved in different aspects of the production process. This study will look at the following two measures of performance:

1. How the enterprise has performed over time.
2. Performance variability within the enterprise.

Averages for the frequently calculated measures of dairy production performance over time are presented in **Table 4** for the years 1993 through 2001.

An upward trend is evident in milk production per cow and butterfat per cow. Another improvement has been in the amount of milk produced per worker. In calculating milk produced per worker, each full time worker is counted as 12 months of labor and part time labor is converted to a full time equivalent based on a 2,500 hour year, about 48 hours per week. Months of labor are applied to part time employees according to number of hours worked.

Capital investment per cow increased notably during the early years of this study to \$2,478 in 1982, and then declined to \$2,059 in 1987. The trend was mixed until 1993 when it took the largest increase, \$297. Capital investment per cow increased in each of the years from 1993 to 1997 and remained somewhat flat in 1998. 1999 and 2000 introduces a different method of calculating investment. A complete explanation can be found in the footnote to **Table 4**. Capital investment now includes the value of livestock, remaining undepreciated value of machinery and buildings (average of the beginning and end of the year values), and a portion of the feed inventories that are attributable to the dairy enterprise. Cash operating expenses are no longer included in the calculation.

Although the year-to-year averages of different production aspects were quite consistent, large variations were found among individual enterprises each year. To show the extent of such variations, practical ranges were determined for many of the production performance measures calculated in this study. The practical ranges are shown in **Table 5** and they include the performances of approximately 82% of all enterprises studied in 2001. To determine these ranges, the three lowest and the three highest individual values were dropped in an effort to remove unusual circumstances from the results. Large variations in performance between the production and economic variables listed clearly show that some of the farms could make a considerable improvement in production efficiency and management decisions. The poultry industry and the pork industry have made great strides in production efficiency by micro managing each part of the production process. Indications are that this trend applies to the dairy industry as well.

**Percent Dry Cows** and **Death Loss** are important indicators of management control. A high percentage of dry cows indicate breeding problems and a longer calving interval, and will likely reduce both milk production and feed efficiency. Death loss as a percent of pounds produced is obviously influenced by the death of cows. The loss of one cow has the same influence on percent of pounds produced as a dozen or more baby calves. The loss of one cow means more in dollars per head, but a loss of a high percentage of the heifer calves is also costly because it affects the future of the herd. 2001 figures represent the much lower death loss than 2000's record of 31.0%.

A high ratio of **Concentrates Fed Per CWT. of M.E.** may indicate overfeeding of concentrates, an unbalanced ration or a lack of high quality forages. A high quantity of **Hay Equivalents Per Cow** suggests that roughage is being wasted or that the farm has larger cows and/or more replacement animals are on hand per cow. Since feed is the largest cost item in the operation, cost control and management of this component can have the biggest impact on **Net Returns Over All Costs**.

**Non-Livestock Capital Investment** per cow is affected by both the stage of life of the operation and the manager's capital purchase decisions. New or expanding operations typically have high capital investments, while mature operations that are "winding down" are using up their assets and typically have low capital investments. However, wide ranges still exist regardless of stage of life due to the differences in management control and discipline. Balance should be sought in order to keep the dairy operating efficiently without making unnecessary, expensive purchases.

**Milk Price** is a function of the seasonality of sales, the buyer of the milk, butterfat and protein test results, volume and quality incentives, and location within the state. In general, the further south the milk is marketed, the higher the milk price.

**Table 5. Practical Ranges for Economic and Production Variables That Influence Profitability, Dairy Enterprises, KFBM 2001**

Item*	Units	High	Low
<b>Prices Received:</b>			
Milk CWT	\$	16.83	15.05
Beef CWT (Market)	\$	103.49	58.70
Beef CWT (Breeding)	\$	67.59	34.30
<b>Dry Cows</b>			
	%	19.1	12.1
<b>Beef per Cow</b>	Lbs.	876	303
<b>Milk Per Cow</b>	Lbs.	20,113	13,326
<b>Butterfat Per Cow</b>	Lbs.	721	485
<b>Death Loss:</b>			
% of Lbs. Produced	%	46.9	7.2
Breeding Cull Rate	%	41.7	11.5
Breeding Survival Rate	%	98.3	92.5
<b>Feed Per CWT M.E.:</b>			
Concentrates	Lbs.	74	51
Hay and Dry Roughage	Lbs.	57	13
Corn Silage	Lbs.	149	60
Other Silage	Lbs.	68	0
<b>Pasture Days Per Animal Unit</b>			
	Days	77	15
<b>Hay Equivalent Per Cow</b>	Tons	11.3	6.6
<b>Capital Investment Per Cow:</b>			
Livestock	\$	1,970	1,230
Non-Livestock	\$	2,121	573
Total	\$	3,796	1,911
<b>Milk Per Worker Per Year</b>			
	Lbs.	1,547,038	628,507
<b>Labor Per Cow</b>	Months	0.31	0.12

\* In determining the practical range, the 3 highest and 3 lowest values for each individual item were dropped. Thus, each practical range contains performances achieved on approximately 82% of the enterprises studied. Note that the high column can indicate either good or poor performance depending on the item listed.

**Table 4. Economic and Production Variables That Influence Profits, Dairy Enterprises, KFBM 1993-2001**

Item	Units	1993	1994	1995	1996	1997	1998	1999	2000	2001	3 Year Average
Average Number of Cows	Head	107.7	105.2	110.7	117.7	129.7	140.0	131.7	143.0	135.1	136.6
Cows Dry	%	13.9	14.7	14.6	15.4	14.6	14.0	15.6	15.9	14.9	15.5
Animal Units in Herd	Units	206.7	204.0	219.0	229.0	256.0	271.0	247.6	271.4	266	262
Milk Production	CWT	17425	16865	18691	18964	22414	24025	22508	24530	23297	23445
Beef Production	Lbs.	65483	66317	65641	67629	77800	79046	81206	77432	83574	80738
Beef Per Cow	Lbs.	590	617	564	555	576	565	578	545	590	571
Milk Per Cow	Lbs.	15999	15802	16697	15869	17187	17179	16948	16763	16921	16877
Butterfat Per Cow	Lbs.	577	584	610	586	622	624	607	618	618	614
Milk Per Worker Per Year	Lbs.	789059	779880	791478	794985	856262	N/A	815906	910637	972800	899781
<b>Death Loss:</b>											
% of Beef Production	%	17.9	15.8	18.3	21.2	21.4	25.7	20.9	31.0	22.6	24.8
<b>* Feed Fed Per CWT M.E.</b>	<b>Units</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>3 Year Average</b>
Concentrates	Lbs.	473	447	437	436	450	61	62	58	62	61
Hay & Dry Forage	Lbs.	293	261	272	302	221	24	31	35	33	33
All Silage	Lbs.	1035	894	891	948	1087	137	145	140	138	141
Pasture Days Per Animal Unit	Days	46	52	53	47	45	54	46	46	47	46
<b>Prices Received:</b>	<b>Units</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>3 Year Average</b>
CWT Milk	\$	13.35	13.81	15.53	13.18	14.44	15.93	16.46	13.93	16.12	15.50
<b>**</b> CWT Beef (All)	\$	56.96	50.70	44.23	34.94	39.72	N/A	N/A	N/A	N/A	N/A
CWT Beef (Market)	\$	N/A	N/A	N/A	N/A	N/A	46.55	58.14	71.25	79.65	69.68
CWT Beef (Breeding)	\$	N/A	N/A	N/A	N/A	N/A	37.09	37.48	41.81	45.59	41.63
<b>***</b> <b>Capital Investment Per Cow :</b>	<b>Units</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>3 Year Average</b>
Total	\$	2602	2623	2703	2706	2775	2749	2894	2542	2751	2729
Livestock	\$	1510	1533	1500	1469	1482	1535	1504	1519	1629	1551
Non-Livestock	\$	1092	1090	1203	1237	1293	1215	1390	1023	1122	1178

## Costs and Returns by Herd Size

The average size of the dairy herds studied in 200 was 135.1 cows, and the herds ranged in size from 39 to 489 cows. Determining how well different sized dairy herds compete financially is the major objective of this section of the 2001 KFBM Dairy Enterprise Study.

Economies of scale (lower costs and/or higher returns per unit of production as enterprise size increases) may exist for the dairy enterprise. If so, they can come from two sources. First, external to the production process, is the ability of an operator with a large enterprise to do the following:

1. Buy inputs in quantities large enough to receive a price discount.
2. Sell in larger quantities and receive a volume premium for products sold.

Secondly, larger operations can justify improved technology by spreading the fixed costs over more units of production. This can lower fixed labor cost, interest and depreciation on a per unit basis of production.

Economies of scale may be offset by diseconomies, primarily those associated with the greater demands on management. With a small enterprise, an operator may, for a while, get by with only moderate attention to breeding schedules, sanitation, disease control and feeding practices. This lack of attention could prove disastrous for a large enterprise.

Management of a larger herd also typically involves much more business management and less physical labor on the part of the manager/operator. Increased levels of personnel management and financial planning can be a difficult task for managers of expanding operations.

To examine the relationships between enterprise size and per unit costs and returns, the 33 enterprises studied in 2001 were divided into four size groups:

1. Fewer than 75 cows.
2. Between 75 and 100 cows.
3. Between 101 and 150 cows.
4. Greater than 150 cows.

The results are presented in **Table 6**, **Table 6A** and **Table 6B**.

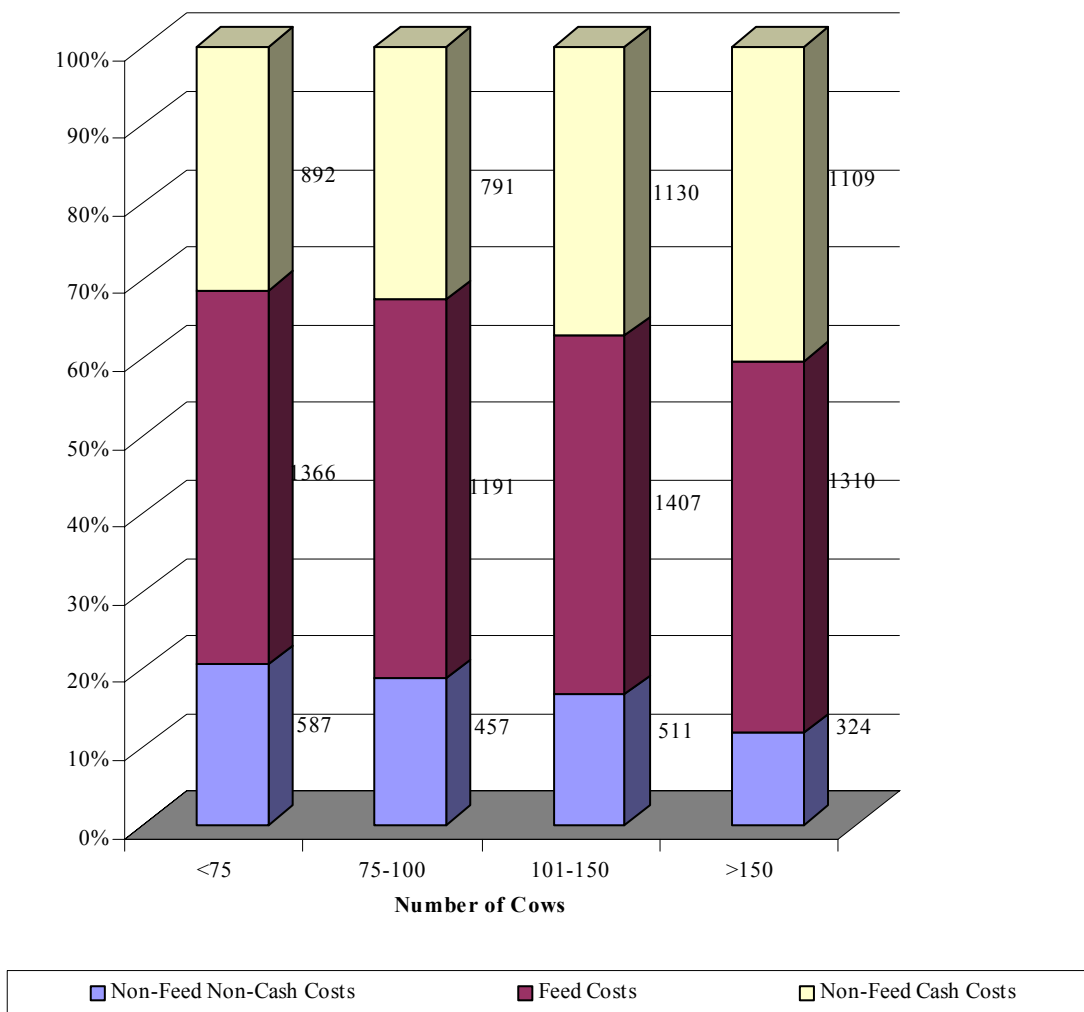
A fairly consistent finding prior to 1994 had been that the smaller enterprises tended to have the highest costs and the lowest net returns over all costs. However, for the years 1995 and 1996 this was not the case. From 1995 to 1997, all of the groups, on average, had negative returns. In 1995 and 1996, the farms with less than 75 cows fared the best on a per cow basis. In 1997, farms with fewer than 75 cows fared the worst on a per cow basis, while farms with more than 125 cows fared the best on a per cow basis. In 1999 and 2000, farms with milking herds between 101 and 150 cows realized the most returns over all costs per cow and farms with less than 75 cows realized the least.

In 2001, the group with 75 to 100 cows had the lowest non-feed cash costs, \$791 per cow and \$5.16 per cwt. of milk produced. The group with 101 to 150 cows experienced the highest non-feed cash costs at \$1,130 per cow and \$6.17 per cwt. of milk produced. Non-feed non-cash costs (unpaid labor, machinery depreciation, building depreciation and non-cash interest) were the highest on a per cow basis for the group that had less than 75 cows and the lowest on a per cow basis for the group that had more than 150 cows. This supports the theory of economies of scale for the dairy enterprise. **Figure 3** presents this data on a per cow basis. When looking at the table, the relationship between paid labor and unpaid labor as herd size increases one sees that as paid labor increases, unpaid labor decreases. Also cash labor

is the biggest component of non-feed cash costs and unpaid labor is about equally as important as non-cash interest in non-feed non-cash costs. If one were to look further into cash labor costs per month of labor it can be hypothesized that the larger dairies pay more per month for their labor, because there is an increased need for management expertise as dairies become larger. Milk production per cow and total returns per cow were the highest for herds of 101 to 150 cows. While this group had the highest milk production, 18,472 pounds per cow, those with 75 to 100 cows had the lowest milk production at 15,411 pounds per cow.

Because the number of farms in each category is small, it is difficult to draw solid conclusions about size and profitability. It is apparent, however, in Kentucky and the nation's dairy industry that average size of herds in operation is increasing. The average size herd in this study has increased from 90.3 in 1981 to 135.1 in 2001. During this same period, total milk produced for the average herd increased from 1,168,584 pounds to 2,329,700 pounds. Thus, the average farms in these studies have increased total milk production by 99% since 1981. In 2001, the herds consisting of greater than 150 cows produced the most milk per worker per year, 1,071,801 pounds. The herds consisting of less than 75 cows produced the least amount of milk per worker per year with 852,038 pounds.

**Figure 3**  
**Composition of Total Costs Per Cow by Herd Size**  
**Dairy Enterprises KFBM 2001**



**Table 6. Per Farm Averages for Economic and Production Variables by Herd Size, Dairy Enterprises, KFBM 2001**

<b>Enterprise Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Number of Herds	Herds	33	8	7	7	11
Total Dairy Returns	\$	419799	162997	242172	383927	742429
Total Feed Costs	\$	178389	73556	107966	165976	307346
Returns Above Feed Cost	\$	241410	89440	134206	217951	435083
Total Non-Feed Costs	\$	197967	81167	113255	188380	342920
Net Returns Over All Costs	\$	43443	8273	20950	29571	92163
<b>Other Economic Variables:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Returns Per \$100 Feed Fed	\$	231	220	226	236	238
Price Received Per cwt. of Milk	\$	16.12	16.03	15.90	16.15	16.32
Price Received Per cwt. Beef (Market)	\$	79.65	77.21	71.60	83.02	84.41
<b>Capital Investment Per Cow:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Livestock	\$	1629	1730	1523	1598	1642
Non-Livestock	\$	1122	1087	805	1619	1032
Total	\$	2751	2817	2328	3217	2674
<b>Other Production Variables:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Average Number of Cows	Cows	135	53	91	117	234
Cows Dry	%	14.9	16.3	15.3	13.1	14.8
Animal Units in Herd	Units	266	114	180	239	447
Total Milk Production	CWT	23297	8760	13969	21587	40893
Total Beef Production	Lbs.	83574	39064	47352	69085	148216
Beef Per Cow	Lbs.	590	694	512	586	566
Milk Per Cow	Lbs.	16921	16204	15411	18472	17418
Butterfat Per Cow	Lbs.	618	602	548	671	642
Value of Feed Fed Per CWT M.E.	\$	7.12	7.44	7.17	7.00	6.92
Total Concentrates Per CWT M.E.	Lbs.	62	66	58	59	64
Hay & Dry Forage Per CWT M.E.	Lbs.	33	44	32	26	30
Corn Silage Per CWT M.E.	Lbs.	116	80	138	150	106
Other Silage Per CWT M.E.	Lbs.	22	19	44	16	15
Pasture Days Per Animal Unit	Days	47	54	55	49	35
Hay Equivalent Per Cow	Tons	9.0	10.1	9.2	9.4	7.9
Average Purchase Price Per Breeding Animal	\$	1191	1000	943	1066	1441
Breeding Cull Rate	%	25.4	33.3	16.0	27.8	24.1
Weight Per Breeding Animal Sold	Lbs.	1191	1166	1166	1232	1200
Price Received Per CWT (Breeding)	\$	45.59	54.58	40.26	40.55	45.65
Death Loss: % of Pounds Produced	%	22.6	31.3	18.2	20.3	20.6
Death Loss: Total Pounds	Lbs.	14120	6869	8464	12346	24120
Deaths: Market	Head	23	7	16	21	41
Deaths: Breeding	Head	10	5	6	8	19
Breeding Survival Rate	%	95.9	95.9	96.7	96.4	95.1
<b>Labor Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Months Per Cow	Months	0.23	0.25	0.23	0.24	0.21
Milk Production Per Worker Per Year	Lbs.	972800	852038	934185	993858	1071801

**Table 6A. Per Cow Averages for Costs and Returns by Herd Size, Dairy Enterprises, KFBM 2001**

<b>Enterprise Returns:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Milk Returns	\$	2333	2173	2193	2412	2464
Beef Returns	\$	224	253	275	175	211
Total Dairy Returns	\$	2557	2426	2468	2586	2675
<b>Non-Feed Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Livestock Supplies	\$	142	136	104	140	173
Veterinary	\$	73	60	75	67	83
Fuel & Oil	\$	29	28	18	37	30
Machinery Repair	\$	72	56	48	80	91
Building & Fence Repair	\$	47	33	55	46	49
Machine Hire	\$	135	157	114	144	129
Utilities	\$	76	76	77	68	81
Light Vehicle	\$	1	2	0	0	0
Paid Labor	\$	252	122	270	236	332
Insurance	\$	22	14	21	24	26
Property Taxes	\$	2	2	1	2	3
Miscellaneous	\$	14	15	10	12	16
Cash Interest	\$	75	104	37	48	106
Total Non-Feed Cash Costs	\$	938	805	830	905	1120
<b>Feed Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Concentrates	\$	786	846	765	739	803
Hay & Dry Roughage	\$	186	180	172	174	210
Corn Silage	\$	200	217	172	219	193
Other Silage	\$	45	53	48	56	30
Pasture Charge	\$	19	20	24	16	16
Total Feed Costs	\$	1236	1315	1182	1203	1252
<b>Non-Feed Non-Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Unpaid Labor	\$	178	291	201	174	99
Machinery Depreciation	\$	62	57	55	74	60
Building Depreciation	\$	33	28	36	22	43
Non-Cash Interest	\$	183	149	208	201	171
Total Non-Feed Non-Cash Costs	\$	456	524	500	472	373
<b>Net Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Total Costs of Production	\$	2631	2646	2512	2580	2745
Adjustment for Beef Income	\$	224	253	275	175	211
Adjusted Total Cost of Milk	\$	2406	2393	2237	2405	2535
Net Returns Over All Costs	\$	-73	-219	-44	7	-70
<b>Costs &amp; Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Total Dairy Returns	\$	2557	2426	2468	2586	2675
Feed Costs	\$	1236	1315	1182	1203	1252
Non-Feed Costs	\$	1395	1329	1330	1377	1493
Net Returns Over All Costs	\$	-73	-219	-44	7	-70
<b>Costs Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Non-Feed Cash Costs	\$	938	805	830	905	1120
Feed Costs	\$	1236	1315	1182	1203	1252
Non-Feed Non-Cash Costs	\$	456	524	500	472	373
Total Costs of Production	\$	2631	2646	2512	2580	2745

**Table 6B. Per CWT. Averages for Costs and Returns by Herd Size, Dairy Enterprises, KFBM 2001**

<b>Enterprise Returns:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Milk Returns	\$	13.93	13.66	13.73	14.06	14.13
Beef Returns	\$	1.32	1.59	1.72	1.03	1.11
Total Dairy Returns	\$	15.25	15.25	15.46	15.09	15.24
<b>Non-Feed Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Livestock Supplies	\$	0.82	0.84	0.60	0.79	0.98
Veterinary	\$	0.42	0.36	0.44	0.37	0.47
Fuel & Oil	\$	0.17	0.18	0.12	0.21	0.17
Machinery Repair	\$	0.42	0.36	0.31	0.45	0.51
Building & Fence Repair	\$	0.27	0.21	0.32	0.27	0.28
Machine Hire	\$	0.81	0.97	0.73	0.85	0.72
Utilities	\$	0.46	0.48	0.52	0.39	0.47
Light Vehicle	\$	0.00	0.01	0.00	0.00	0.00
Paid Labor	\$	1.48	0.76	1.65	1.37	1.88
Insurance	\$	0.13	0.08	0.14	0.14	0.15
Property Taxes	\$	0.01	0.01	0.01	0.01	0.02
Miscellaneous	\$	0.08	0.09	0.07	0.07	0.09
Cash Interest	\$	0.45	0.66	0.24	0.29	0.60
Total Non-Feed Cash Costs	\$	5.53	5.04	5.15	5.22	6.35
<b>Feed Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Concentrates	\$	4.73	5.35	4.81	4.35	4.59
Hay & Dry Roughage	\$	1.15	1.15	1.12	1.05	1.25
Corn Silage	\$	1.20	1.33	1.14	1.29	1.10
Other Silage	\$	0.27	0.34	0.29	0.34	0.16
Pasture Charge	\$	0.12	0.13	0.17	0.09	0.09
Total Feed Costs	\$	7.46	8.30	7.53	7.12	7.19
<b>Non-Feed Non-Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Unpaid Labor	\$	1.10	1.84	1.29	1.03	0.57
Machinery Depreciation	\$	0.36	0.36	0.33	0.43	0.34
Building Depreciation	\$	0.20	0.18	0.21	0.13	0.27
Non-Cash Interest	\$	1.10	0.95	1.29	1.17	1.01
Total Non-Feed Non-Cash Costs	\$	2.76	3.33	3.11	2.75	2.19
<b>Net Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Total Costs of Production	\$	15.76	16.68	15.79	15.09	15.72
Adjustment for Beef Income	\$	1.32	1.59	1.72	1.03	1.11
Adjusted Total Cost of Milk	\$	14.44	15.09	14.07	14.05	14.61
Net Returns Over All Costs	\$	-0.51	-1.43	-0.33	0.00	-0.48
<b>Costs &amp; Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Total Dairy Returns	\$	15.25	15.25	15.46	15.09	15.24
Feed Costs	\$	7.46	8.30	7.53	7.12	7.19
Non-Feed Costs	\$	8.29	8.37	8.27	7.97	8.53
Net Returns Over All Costs	\$	-0.51	-1.43	-0.33	0.00	-0.48
<b>Costs Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;75</b>	<b>75-100</b>	<b>101-150</b>	<b>&gt;150</b>
Non-Feed Cash Costs	\$	5.53	5.04	5.15	5.22	6.35
Feed Costs	\$	7.46	8.30	7.53	7.12	7.19
Non-Feed Non-Cash Costs	\$	2.76	3.33	3.11	2.75	2.19
Total Costs of Production	\$	15.76	16.68	15.79	15.09	15.72

## Costs and Returns by Milk Production Per Cow

Historically, studies have shown that high milk production per cow is important in determining the profitability of a dairy enterprise. **Table 7, Table 7A** and **Table 7B** divide the 33 studied farms into three groups based on pounds of milk production per cow.

As would be expected, total returns per cow increased as production level increased, with the highest producing group, over 18,000 pounds of milk per cow grossing \$1,103 more per cow than the lowest producing group, under 15,000 pounds of milk per cow. This barely offset the \$1,046 per cow cost advantage held by the group producing less than 15,000 pounds of milk per cow.

In contrast to 2000, where all groups were not profitable when divided according to milk production per cow, 2001 data shows all groups being profitable in terms of net returns over all costs of production. The group producing more than 18,000 pounds of milk per cow did experience the highest net returns over all costs. Scanning the data after sorting by milk production revealed that, of the 8 farms that fell into the milk production per cow category of less than 15,000 pounds, four were members of the low returns group based on net returns over all costs per cow, yet the other four were members of the high returns group. This makes it difficult to conclude that low milk per cow equates in lower returns. Of the 11 farms that fell into the milk production per cow category of greater than 18,000 pounds, only two were members of the low returns group based on net returns over all costs per cow while three were in the high returns and six fell into the middle returns group. From 1993 to 2001, with the exception of 1995, the group with the highest milk production per cow had the highest net returns over all costs on a per cow basis.

Non-feed cash costs per cow ranged from a low of \$663 for the under 15,000 pounds of milk production per cow to \$1,188 for the over 18,000 pounds of milk production per cow. The higher producing herds spent \$195 more per cow on livestock supplies (DHIA, BST, breeding fees, cleaning supplies, etc.) and veterinary services. Livestock supplies ranged from \$86 per cow for the under 15,000 pound herds to \$212 per cow for the over 18,000 pound herds. Veterinary costs exhibited a similar relationship, \$51 per cow for the low producing group and \$120 for the high producing group. The lowest producing herds also had the lowest non-feed cash costs on a per cwt. basis. Feed costs per cow were higher for the higher producing herds than that of the herds in the less than 15,000 pounds category, as one would expect. Feed costs per cwt. of milk produced were highest for the less than 15,000 pound group and lowest for the greater than 18,000 pound group. On a per cwt. of milk produced basis, the 15,000 to 18,000 group had the lowest non-feed non-cash costs. Labor costs can be either cash (hired) or non-cash (operator). Labor costs per cwt. of milk produced were fairly flat across production groups.

**Table 7. Per Farm Averages for Economic and Production Variables by Milk Production Per Cow**

<b>Enterprise Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Number of Herds	Herds	33	8	14	11
Total Dairy Returns	\$	419799	243369	407635	563595
Total Feed Costs	\$	178389	111425	176386	229641
Returns Above Feed Cost	\$	241410	131944	231250	333953
Total Non-Feed Costs	\$	197967	96788	198963	270285
Net Returns Over All Costs	\$	43443	35157	32287	63669
<b>Other Economic Variables:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Returns Per \$100 Feed Fed	\$	231	212	236	238
Price Received Per CWT of Milk	\$	16.12	16.38	16.07	16.01
Price Received Per CWT Beef (Market)	\$	79.65	72.67	82.25	81.43
<b>Capital Investment Per Cow:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Livestock	\$	1629	1428	1682	1708
Non-Livestock	\$	1122	704	1213	1310
Total	\$	2751	2132	2894	3018
<b>Other Production Variables:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Average Number of Cows	Cows	135	101	137	157
Cows Dry	%	14.9	16.3	15.0	13.8
Animal Units in Herd	Units	266	176	277	317
Total Milk Production	CWT	23297	13851	22930	30633
Total Beef Production	Lbs.	83574	38941	78457	122547
Beef Per Cow	Lbs.	590	424	604	694
Milk Per Cow	Lbs.	16921	13544	16627	19753
Butterfat Per Cow	Lbs.	618	507	608	712
Value of Feed Fed Per CWT M.E.	\$	7.12	7.82	6.93	6.84
Total Concentrates Per CWT M.E.	Lbs.	62	69	61	59
Hay & Dry Forage Per CWT M.E.	Lbs.	33	56	25	26
Corn Silage Per CWT M.E.	Lbs.	116	99	127	113
Other Silage Per CWT M.E.	Lbs.	22	25	24	18
Pasture Days Per Animal Unit	Days	47	73	41	35
Hay Equivalent Per Cow	Tons	9.0	11.2	8.2	8.6
Average Purchase Price Per Breeding Animal	\$	1191	1099	1063	1421
Breeding Cull Rate	%	25.4	18.6	27.8	27.3
Weight Per Breeding Animal Sold	Lbs.	1191	1081	1231	1222
Price Received Per CWT (Breeding)	\$	45.59	46.54	48.70	40.93
Death Loss: % of Pounds Produced	%	22.6	27.3	25.2	16.0
Death Loss: Total Pounds	Lbs.	14120	6764	17137	15630
Deaths: Market	Head	23	11	22	33
Deaths: Breeding	Head	10	5	12	13
Breeding Survival Rate	%	95.9	97.0	95.3	95.8
<b>Labor Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Months Per Cow	Months	0.23	0.17	0.25	0.25
Milk Production Per Worker Per Year	Lbs.	972800	1076514	858046	1043424

**Table 7A. Per Cow Averages for Costs and Returns by Milk Production Per Cow**

<b>Enterprise Returns:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Milk Returns	\$	2725	2220	2671	3161
Patronage Returns	\$	4	2	7	2
Dairy Market Loss Assistance	\$	0	0	0	0
Beef Returns	\$	291	199	290	360
Total Dairy Returns	\$	3021	2421	2968	3524
<b>Non-Feed Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Livestock Supplies	\$	135	86	104	212
Veterinary	\$	77	51	58	120
Fuel & Oil	\$	30	23	37	26
Machinery Repair	\$	85	58	111	74
Building & Fence Repair	\$	49	34	49	61
Machine Hire	\$	140	111	145	155
Utilities	\$	84	82	72	100
Light Vehicle	\$	0	1	0	0
Paid Labor	\$	249	131	264	315
Insurance	\$	26	17	32	26
Property Taxes	\$	3	2	4	3
Miscellaneous	\$	17	9	22	18
Cash Interest	\$	96	58	132	78
Total Non-Feed Cash Costs	\$	994	663	1029	1188
<b>Feed Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Concentrates	\$	851	720	830	974
Hay & Dry Roughage	\$	188	223	146	216
Corn Silage	\$	227	155	242	259
Other Silage	\$	33	25	38	32
Pasture Charge	\$	20	29	19	15
Total Feed Costs	\$	1319	1152	1275	1496
<b>Non-Feed Non-Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Unpaid Labor	\$	195	178	203	199
Machinery Depreciation	\$	66	39	62	90
Building Depreciation	\$	39	178	47	47
Non-Cash Interest	\$	156	131	132	204
Total Non-Feed Non-Cash Costs	\$	456	362	444	539
<b>Net Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Total Costs of Production	\$	2768	2177	2748	3223
Adjustment for Beef Income	\$	291	199	290	360
Adjusted Total Cost of Milk	\$	2477	1978	2458	2863
Net Returns Over All Costs	\$	253	244	220	300
<b>Costs &amp; Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Total Dairy Returns	\$	3021	2421	2968	3524
Feed Costs	\$	1319	1152	1275	1496
Non-Feed Costs	\$	1449	1025	1473	1727
Net Returns Over All Costs	\$	253	244	220	300
<b>Costs Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Non-Feed Cash Costs	\$	994	663	1029	1188
Feed Costs	\$	1319	1152	1275	1496
Non-Feed Non-Cash Costs	\$	456	362	444	539
Total Costs of Production	\$	2768	2177	2748	3223

**Table 7B. Per CWT. Averages for Costs and Returns by Milk Production Per Cow**

<b>Enterprise Returns:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Milk Returns	\$	16.12	16.38	16.07	16.01
Patronage Returns	\$	0.02	0.02	0.04	0.01
Dairy Market Loss Assistance	\$	0.00	0.00	0.00	0.00
Beef Returns	\$	1.70	1.47	1.74	1.82
Total Dairy Returns	\$	17.85	17.87	17.84	17.84
<b>Non-Feed Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Livestock Supplies	\$	0.77	0.64	0.62	1.07
Veterinary	\$	0.44	0.38	0.35	0.61
Fuel & Oil	\$	0.18	0.17	0.22	0.13
Machinery Repair	\$	0.52	0.44	0.67	0.38
Building & Fence Repair	\$	0.29	0.25	0.29	0.30
Machine Hire	\$	0.83	0.82	0.88	0.79
Utilities	\$	0.50	0.61	0.43	0.50
Light Vehicle	\$	0.00	0.01	0.00	0.00
Paid Labor	\$	1.44	0.96	1.59	1.59
Insurance	\$	0.16	0.13	0.19	0.13
Property Taxes	\$	0.02	0.01	0.03	0.02
Miscellaneous	\$	0.10	0.07	0.13	0.09
Cash Interest	\$	0.57	0.41	0.80	0.40
Total Non-Feed Cash Costs	\$	5.83	4.89	6.21	6.02
<b>Feed Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Concentrates	\$	5.05	5.31	4.99	4.95
Hay & Dry Roughage	\$	1.13	1.63	0.87	1.10
Corn Silage	\$	1.33	1.14	1.46	1.31
Other Silage	\$	0.20	0.20	0.23	0.17
Pasture Charge	\$	0.12	0.22	0.11	0.07
Total Feed Costs	\$	7.84	8.50	7.66	7.60
<b>Non-Feed Non-Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Unpaid Labor	\$	1.18	1.34	1.22	1.00
Machinery Depreciation	\$	0.38	0.28	0.37	0.45
Building Depreciation	\$	0.22	0.11	0.28	0.24
Non-Cash Interest	\$	0.92	0.99	0.79	1.03
Total Non-Feed Non-Cash Costs	\$	2.69	2.72	2.66	2.72
<b>Net Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Total Costs of Production	\$	16.36	16.11	16.52	16.34
Adjustment for Beef Income	\$	1.70	1.47	1.74	1.82
Adjusted Total Cost of Milk	\$	14.66	14.64	14.79	14.52
Net Returns Over All Costs	\$	1.49	1.76	1.32	1.50
<b>Costs &amp; Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Total Dairy Returns	\$	17.85	17.87	17.84	17.84
Feed Costs	\$	7.84	8.50	7.66	7.60
Non-Feed Costs	\$	8.52	7.61	8.87	8.74
Net Returns Over All Costs	\$	1.49	1.76	1.32	1.50
<b>Costs Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;15000</b>	<b>15000-18000</b>	<b>&gt;18000</b>
Non-Feed Cash Costs	\$	5.83	4.89	6.21	6.02
Feed Costs	\$	7.84	8.50	7.66	7.60
Non-Feed Non-Cash Costs	\$	2.69	2.72	2.66	2.72
Total Costs of Production	\$	16.36	16.11	16.52	16.34

## Costs and Returns by Total Costs Per Cow

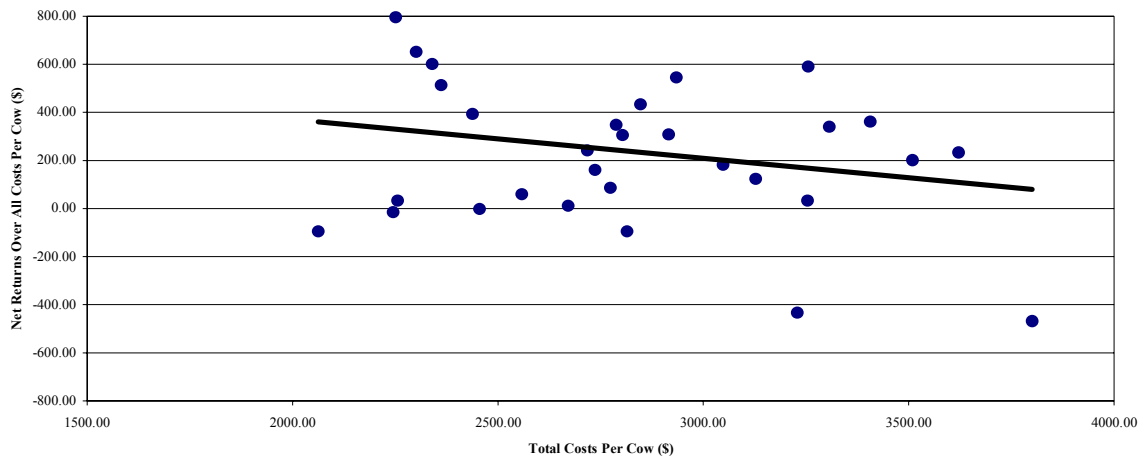
When the 1995 KFBM Dairy Enterprise Study was published, the authors, Darwin V. Foley and Herb Holloway, theorized that perhaps the declining milk and beef prices in 1995 had shifted importance away from milk production to the area of cost control. We have continued to look at total costs per cow as they relate to net returns over all costs. These results are tabulated in **Table 8**, **Table 8A**, and **Table 8B**.

The 33 enterprises were divided into three total costs per cow ranges:

1. < \$2,300
2. \$2,301 - \$2,800
3. >\$2,801

As in 1995 through 1999, milk production per cow and total returns per cow increased as total costs per cow increased. As we move to higher average cost groups in the 2001 study, we see that returns also increase as costs increase, but net returns decline from the lowest cost group \$285 to the mid level cost group \$277 and then decline further \$224 for the high cost group. The low cost group (<\$2,300 per cow) had the lowest adjusted cost of producing milk (\$14.35) in 2001. **Figure 4** shows the same trend line for 2000 (net returns over all costs per cow declining as total costs per cow increase) as was shown for 2000. When the highest cost farms were compared to the lowest cost farms in 2001, they spent an average of \$1,092 more per cow, and received \$1,031 more per cow in total returns. This study has shown over time that cost control is extremely important in dairy operations. It also has shown that the lowest cost per cow operations are not likely to have the lowest adjusted cost of producing milk, because they are not likely to have production levels high enough to optimize per unit costs.

**Figure 4**  
**Net Returns Over All Costs Per Cow vs. Total Costs Per Cow**  
**Dairy Enterprises, KFBM 2001**



**Table 8. Per Farm Averages for Economic and Production Variables by Total Costs Per Cow**

<b>Enterprise Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Number of Herds	Herds	33	6	11	16
Total Dairy Returns	\$	419799	270673	392479	494504
Total Feed Costs	\$	178389	114177	175033	204776
Returns Above Feed Cost	\$	241410	156497	217446	289728
Total Non-Feed Costs	\$	197967	110046	176284	245844
Net Returns Over All Costs	\$	43443	46451	41162	43884
<b>Other Economic Variables:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Returns Per \$100 Feed Fed	\$	231	227	221	239
Price Received Per CWT of Milk	\$	16.12	16.30	16.21	16.00
Price Received Per CWT Beef (Market)	\$	79.65	78.55	85.42	76.10
<b>Capital Investment Per Cow:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Livestock	\$	1629	1444	1458	1816
Non-Livestock	\$	1122	702	889	1439
Total	\$	2751	2146	2347	3255
<b>Other Production Variables:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Average Number of Cows	Cows	135	114	137	142
Cows Dry	%	14.9	15.5	15.0	14.7
Animal Units in Herd	Units	266	200	260	295
Total Milk Production	CWT	23297	15821	22190	26861
Total Beef Production	Lbs.	83574	39481	66687	111719
Beef Per Cow	Lbs.	590	368	507	730
Milk Per Cow	Lbs.	16921	13761	15882	18821
Butterfat Per Cow	Lbs.	618	500	593	680
Value of Feed Fed Per CWT M.E.	\$	7.12	7.39	7.43	6.80
Total Concentrates Per CWT M.E.	Lbs.	62	70	63	59
Hay & Dry Forage Per CWT M.E.	Lbs.	33	56	33	24
Corn Silage Per CWT M.E.	Lbs.	116	114	124	111
Other Silage Per CWT M.E.	Lbs.	22	33	15	23
Pasture Days Per Animal Unit	Days	47	66	44	41
Hay Equivalent Per Cow	Tons	9.0	9.7	9.5	8.5
Average Purchase Price Per Breeding Animal	\$	1191	963	1058	1347
Breeding Cull Rate	%	25.4	15.5	24.2	29.9
Weight Per Breeding Animal Sold	Lbs.	1191	1123	1177	1227
Price Received Per CWT (Breeding)	\$	45.59	38.84	50.84	44.51
Death Loss: % of Pounds Produced	%	22.6	36.5	21.6	18.1
Death Loss: Total Pounds	Lbs.	14120	9452	12210	17184
Deaths: Market	Head	23	15	18	30
Deaths: Breeding	Head	10	7	11	12
Breeding Survival Rate	%	95.9	95.9	95.9	96.0
<b>Labor Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Months Per Cow	Months	0.23	0.21	0.21	0.25
Milk Production Per Worker Per Year	Lbs.	972800	904764	1013023	970661

**Table 8A. Per Cow Averages for Costs and Returns by Total Costs Per Cow**

<b>Enterprise Returns:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Milk Returns	\$	2725	2240	2574	3011
Patronage Returns	\$	4	3	5	4
Dairy Market Loss Assistance	\$	0	0	0	0
Beef Returns	\$	291	121	256	380
Total Dairy Returns	\$	3021	2364	2835	3395
<b>Non-Feed Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Livestock Supplies	\$	135	52	113	182
Veterinary	\$	77	41	60	103
Fuel & Oil	\$	30	21	35	30
Machinery Repair	\$	85	66	88	91
Building & Fence Repair	\$	49	28	49	58
Machine Hire	\$	140	115	131	156
Utilities	\$	84	83	72	92
Light Vehicle	\$	0	2	0	0
Paid Labor	\$	249	183	199	307
Insurance	\$	26	25	22	30
Property Taxes	\$	3	2	4	3
Miscellaneous	\$	17	8	15	23
Cash Interest	\$	96	33	107	113
Total Non-Feed Cash Costs	\$	994	657	896	1187
<b>Feed Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Concentrates	\$	851	617	855	937
Hay & Dry Roughage	\$	188	198	172	195
Corn Silage	\$	227	176	225	247
Other Silage	\$	33	33	24	39
Pasture Charge	\$	20	26	19	18
Total Feed Costs	\$	1319	1051	1295	1436
<b>Non-Feed Non-Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Unpaid Labor	\$	195	170	168	224
Machinery Depreciation	\$	66	32	57	84
Building Depreciation	\$	39	10	35	53
Non-Cash Interest	\$	156	160	108	187
Total Non-Feed Non-Cash Costs	\$	456	371	367	548
<b>Net Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Total Costs of Production	\$	2768	2079	2558	3171
Adjustment for Beef Income	\$	291	121	256	380
Adjusted Total Cost of Milk	\$	2477	1958	2302	2791
Net Returns Over All Costs	\$	253	285	277	224
<b>Costs &amp; Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Total Dairy Returns	\$	3021	2364	2835	3395
Feed Costs	\$	1319	1051	1295	1436
Non-Feed Costs	\$	1449	1028	1263	1735
Net Returns Over All Costs	\$	253	285	277	224
<b>Costs Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Non-Feed Cash Costs	\$	994	657	896	1187
Feed Costs	\$	1319	1051	1295	1436
Non-Feed Non-Cash Costs	\$	456	371	367	548
Total Costs of Production	\$	2768	2079	2558	3171

**Table 8B. Per CWT. Averages for Costs and Returns by Total Costs Per Cow**

<b>Enterprise Returns:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Milk Returns	\$	16.12	16.30	16.21	16.00
Patronage Returns	\$	0.02	0.02	0.03	0.02
Dairy Market Loss Assistance	\$	0.00	0.00	0.00	0.00
Beef Returns	\$	1.70	0.85	1.69	2.03
Total Dairy Returns	\$	17.85	17.18	17.93	18.05
<b>Non-Feed Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Livestock Supplies	\$	0.77	0.39	0.71	0.96
Veterinary	\$	0.44	0.30	0.38	0.54
Fuel & Oil	\$	0.18	0.15	0.23	0.16
Machinery Repair	\$	0.52	0.49	0.56	0.50
Building & Fence Repair	\$	0.29	0.19	0.31	0.30
Machine Hire	\$	0.83	0.83	0.83	0.83
Utilities	\$	0.50	0.61	0.46	0.48
Light Vehicle	\$	0.00	0.01	0.00	0.00
Paid Labor	\$	1.44	1.31	1.22	1.64
Insurance	\$	0.16	0.18	0.14	0.16
Property Taxes	\$	0.02	0.02	0.03	0.02
Miscellaneous	\$	0.10	0.06	0.10	0.13
Cash Interest	\$	0.57	0.24	0.68	0.63
Total Non-Feed Cash Costs	\$	5.83	4.78	5.63	6.35
<b>Feed Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Concentrates	\$	5.05	4.53	5.44	4.99
Hay & Dry Roughage	\$	1.13	1.46	1.10	1.03
Corn Silage	\$	1.33	1.28	1.40	1.31
Other Silage	\$	0.20	0.26	0.14	0.22
Pasture Charge	\$	0.12	0.19	0.12	0.10
Total Feed Costs	\$	7.84	7.72	8.20	7.64
<b>Non-Feed Non-Cash Costs:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Unpaid Labor	\$	1.18	1.24	1.09	1.21
Machinery Depreciation	\$	0.38	0.23	0.36	0.44
Building Depreciation	\$	0.22	0.07	0.22	0.29
Non-Cash Interest	\$	0.92	1.16	0.69	0.98
Total Non-Feed Non-Cash Costs	\$	2.69	2.70	2.35	2.92
<b>Net Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Total Costs of Production	\$	16.36	15.21	16.19	16.91
Adjustment for Beef Income	\$	1.70	0.85	1.69	2.03
Adjusted Total Cost of Milk	\$	14.66	14.35	14.50	14.89
Net Returns Over All Costs	\$	1.49	1.97	1.74	1.13
<b>Costs &amp; Returns Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Total Dairy Returns	\$	17.85	17.18	17.93	18.05
Feed Costs	\$	7.84	7.72	8.20	7.64
Non-Feed Costs	\$	8.52	7.48	7.99	9.28
Net Returns Over All Costs	\$	1.49	1.97	1.74	1.13
<b>Costs Summary:</b>	<b>Units</b>	<b>Average</b>	<b>&lt;2300</b>	<b>2300-2800</b>	<b>&gt;2800</b>
Non-Feed Cash Costs	\$	5.83	4.78	5.63	6.35
Feed Costs	\$	7.84	7.72	8.20	7.64
Non-Feed Non-Cash Costs	\$	2.69	2.70	2.35	2.92
Total Costs of Production	\$	16.36	15.21	16.19	16.91

## **Conclusions and Observations**

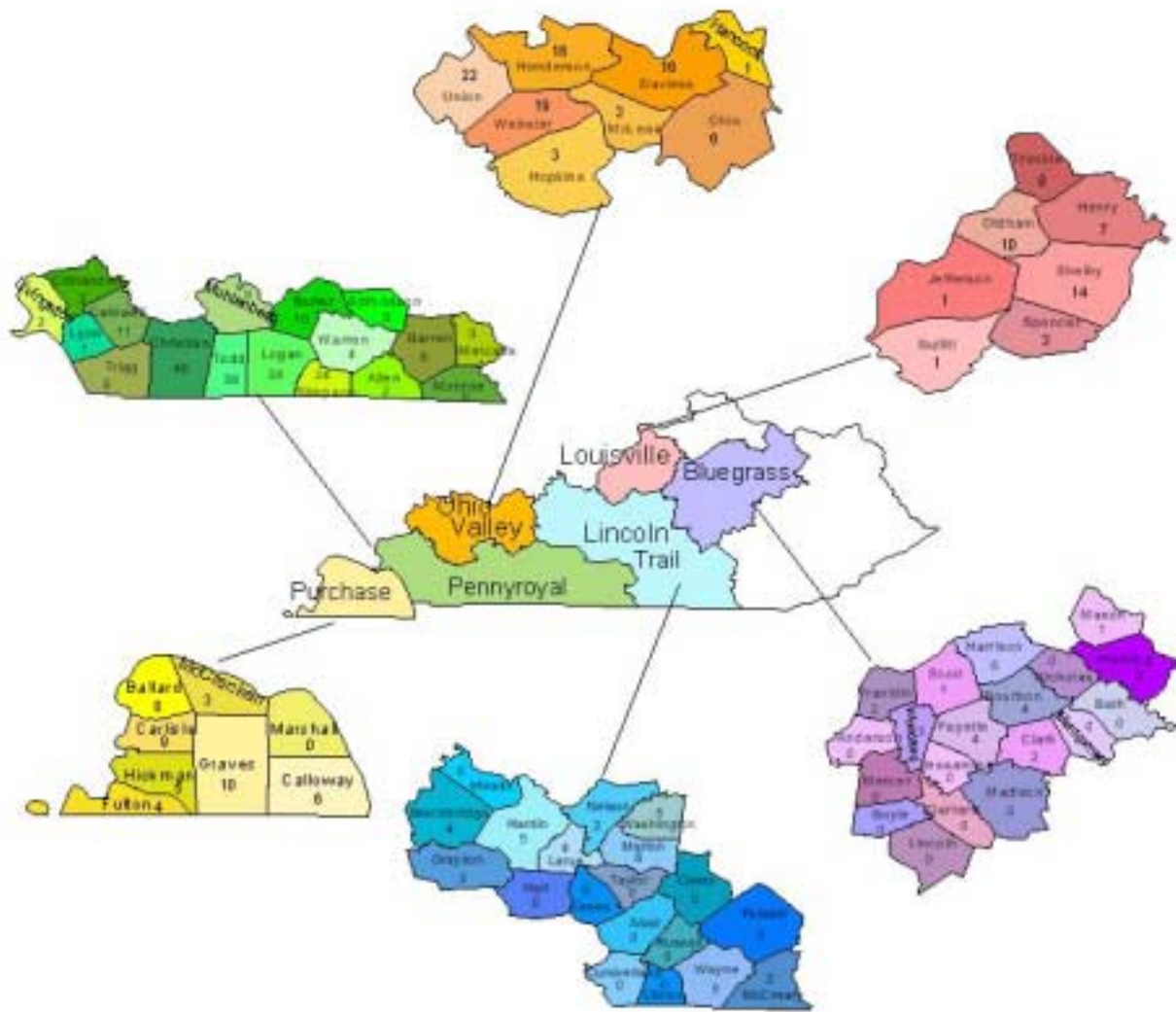
While these 33 enterprises cannot be claimed as statistically representative of all dairy herds in the state of Kentucky, some conclusions can be drawn about these enterprises:

1. Net Returns Over All Costs Per Cow are substantially different from the 2000 KFBM Dairy Enterprise Study. Primarily, this is a result of higher milk prices.
2. As always, enterprises varied greatly in Net Returns Over All Costs, Milking Herd Size, Milk Production Per Cow and Total Costs. These variances occurred both on a per cow basis and on a per cwt. of milk produced basis. These enterprises also showed great variability within each production cost category.
3. There seems to be somewhat of a relationship that associates higher milk production per cow with higher net returns over all costs per cow.
4. Kentucky has been gradually losing dairy market share, recently falling below 1%, but with average milk per cow around 13,000 lbs./cow versus a national average approaching 19,000 lbs./cow it is amazing that the rate of exit hasn't been even faster. However, it must be noted that lower gross per cow doesn't always equate with a lower net per cow.

This study helps to illustrate the wide range in profitability witnessed by Kentucky dairy enterprises and why the lack of profitability with individual herds has put many farms out of business. The trends for Kentucky dairy herds that remain in business are larger herd sizes and more milk per cow. While the increase in herd size and production level may be necessary to generate sufficient total returns for the operator, this study also points out that cost control, through effective management decisions that are based on sound record keeping, is extremely important in arriving at more than adequate net returns over all costs. Producers along with dairy consultants must carefully study the costs associated with increased production, and determine where the marginal return of increased production no longer exceeds marginal costs. Those who are susceptible to price risk should look to avenues that may allow them to lock in prices for feed inputs and/or milk price received that will insure cash flow requirements.

Planning, organizing, directing, coordinating and controlling the available resources of land, labor and capital is the essence of farm management. Management decisions must be based on sound information and it is the belief of KFBM that sound information can be gleaned from solid record keeping. Enterprise analysis is an essential component of the total analysis of the farm business. There is no substitute for keeping and using comprehensive production and financial records such as those provided through the Kentucky Farm Business Management program. Should you have any questions regarding membership into KFBM please contact your Area Extension Specialist in Farm Business Management. Your local County Extension Agent for Agriculture can assist you in arranging a meeting with your Area Extension Specialist in Farm Business Management.

# Map of Cooperator's Locations by Area and County, 2001



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