

## **Using Farm Records Effectively for Business and Financial Management**

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Dairy farming is a complex business which demands accurate records and careful financial management. Both financial and production records are required in order to provide the information on which the farm manager can make critical decisions. Unfortunately, since farming is widely viewed as "a way of life" rather than a business, the financial management tools long available in other industries have not been universally embraced by producers.

In early 2008, Wisconsin has slightly less than 14,000 dairy farms. Only 800 herds are larger than 200 cows – which means we still have many small dairies. Rapid changes in economic conditions during the past decade have caused many to leave farming completely or to seek off-farm employment to supplement farm earnings.

### **History of Farm Accounting**

In contrast to most other "industries," agriculture does not have a long period of record keeping and analysis history. Subsistence farming was largely the rule throughout the 19th century. Most farms have traditionally been family owned and operated, and farmers have been guilty to some extent of leading a "lifestyle" rather than running a business.

Prior to the 1920's farm credit was relatively small. Most farm borrowing was done between generations. Farm loans, like residential real estate loans, were made on a short term basis (usually 5 year notes paying a simple annual interest payment with balloon balance due at maturity).<sup>1</sup>

In 1934, MM Winkler, a C.P.A. from Tupelo, Mississippi, wrote an article for the American Society of Farm Managers and Rural Appraisers entitled "*Farm Accounting from the Viewpoint of the Farm Manager*".<sup>2</sup> In reviewing the performance of a client's cotton plantation, he recognized the problems with an income statement which was aggregated beyond relevance for decision making. His example was:

#### **Income:**

- Cotton
- Seed (all kinds)
- Store Sales
- Gin Tolls
- Interest and
- Supervision, etc

#### **Total Income**

#### **Expenses:**

- Labor (All departments)
- Seed (All kinds)
- Repairs (Everywhere)
- Taxes
- Feed
- Depreciation
- Salaries
- Merchandise Bought

#### **Total Expenses**

#### **Net Profit or Loss**

Winkler correctly contended that enterprise accounts should have been set up to report by separate divisions or enterprises and that only by doing so could management know where its profits were coming from. Mr. Winkler's example was from a very large cotton plantation, a business much larger than most family farms. However, during the past 75 years agricultural capital requirements and farm debt have grown dramatically with the widespread adoption of mechanization and use of commercial fertilizers, pesticides and herbicides.

Harvard professors of accounting, Kaplan and Johnson,<sup>3</sup> show that many of the financial management techniques in use today originated between 100 and 150 years ago in the textile mills, railroads, and finally in the integrated industries like General Motors and DuPont. These systems were developed to provide managers the information they required to identify and correct weaknesses in the business and later to allocate resources between competing divisions. These financial management systems were developed out of necessity because organizations were much too large to manage from "the seat of the pants."

There are many reasons why farmers' financial management skills have been slow in developing. Despite greater reliance on debt financing, many farmers' primary reason for record keeping is the satisfaction of Internal Revenue Service tax reporting requirements. Since cash basis accounting provides farmers very significant advantages in managing income tax liabilities, more than 98 percent of all Wisconsin farmers report on a cash basis. Unlike the typical manufacturing or marketing firm which must use GAAP method accounting for outside reporting purposes, most farm record systems are designed around the income tax reporting function.

Accounting is one of the "least liked" tasks on the farm. In an article entitled "Farmer's Perceptions About the Management of Their Farms,"<sup>4</sup> John E. Carlson found that farmers admit to the importance of good record keeping, but rank it 4th behind field work, buying and selling (machinery and crops), and working on farm machinery. The same survey found that the average farmer estimated spending about 1-10 hours per week on farm record keeping during the winter and much less during the summer. The survey also asked: Who has the major responsibility for doing the record keeping in your farm operation? Only 16 percent hired outside help. About half the respondents named themselves and 20 percent named their spouse. Carlson concluded, "Farmers saw farm management as important to the successful operation of a farm. They also indicated that it was a serious problem for many of them. Especially problematic were issues related to long range decision making and determining the best combinations of farm enterprises."

Although this survey was conducted 20 years ago, my sense is that the results would be similar if the survey were repeated today.

In summary, the historical structure of family farms, the record keeping requirements imposed on farms for tax purposes, and the limited resources devoted to accounting have sometimes resulted in poor decision making and lost opportunities.

### **Information Needs of the Manager**

Despite the small amount of time typically given to managerial planning, complete and accurate farm records, when effectively used, can help increase profits for the farm operator. Farm records, like their business counterparts, have four basic uses: (1) service tool, (2) diagnostic tool, (3) indicator of progress, and (4) forward planning.

As a service tool the records system can provide income tax information for filing tax returns and Social Security reports, as well as providing a basis for tax management decisions. Further, the records system can provide a basis for developing equitable business arrangements for operating agreements, partnerships, and corporations. Records also help in obtaining and effectively using credit by showing

factors relating to the profitability, liquidity and solvency of the farm business.

As a diagnostic tool, records can help determine the absolute and relative profitability of the business by identifying the strengths and weaknesses of the business. Thus, the manager can see strong points and capitalize on them while recognizing weak points and taking corrective steps.

The records system can be used as an indicator of progress from both the business management and financial management standpoints. As a business indicator, records can show the manager changes in size, productivity and efficiency, and organization factors unique to his business and farms similar to his. He can measure actual performance in comparison with budgeted performance and/or standards of performance for his type of business.

As a financial indicator, records help the farm manager and/or his lender to measure the changes in the financial condition of the business and to compare actual and planned performance. This needs to be done on a regular basis so problems can be worked on as soon as they develop.

Finally, records should be used as a forward planning device for short and long-term planning. Past records can be used as a basis for projecting cash flows. The manager can then compare actual performance with the plan. The records system can provide cost information and coefficients of production unique to his situation for budgeting in both the short and long run. He can project short and long term credit needs and repayment capacities. Further, the manager can schedule purchases of inputs, compare various inputs as to costs and returns, select the kinds and sizes of enterprises, and determine capital generation capacities of different alternatives. In these volatile economic times, forward planning is becoming increasingly crucial; good computer tools are available to help with the task.

### **Types of Records Required**

#### *Income and Expense Ledgers*

An income and expense statement is required for tax purposes and can also perform other functions as a business management tool. Income and expenses should be recorded and totaled on a current basis for greatest accuracy and to provide a running account so problems can be identified when corrective action may still be taken.

#### *Depreciation*

A depreciation record is required for tax filing purposes. It provides a list of all depreciable capital assets used in the farm business and can be used in constructing the inventory record and financial statement. Depreciation records are almost always kept to conform with IRS regulations and recently have had little relevance for financial decision making. It may be necessary to maintain a second set of depreciation records that better reflects true economic costs for analysis and budgeting purposes.

#### *Profit and Loss Statement*

A profit and loss statement takes the income, expense, and inventory records and ties them together to provide the manager with information about his return to labor, management and equity capital for the year and over a series of years. Accurate measurements of feed and livestock inventories are vital to making correct accrual adjustments for calculating net farm income.

#### *Cash Flow*

A cash flow record provides a history of how cash moves in the business, and can also serve as a device

to project cash flow in future periods. The record of actual cash flow can be a monitoring device to measure actual performance against planned performance.

### *Production*

Production records for the individual crops, livestock, and other enterprises are essential for the manager to evaluate his performance as a production manager. Accurate measurements of input quantities consumed and outputs produced in each enterprise allow for construction of meaningful enterprise budgets.

### *Enterprise Accounts*

Enterprise accounts are vital records to help evaluate the performance of each of the several enterprises making up the total farm business. At a minimum they should be broken down between the crop and livestock enterprises. Ideally, each enterprise should be in a separate account. Enterprise accounts can help farm managers see which of their enterprises make the most profit, determine which production methods within an enterprise perform economically under the individual farm conditions, and help determine what level of output is economically appropriate for each enterprise.

### *Feed*

Feed is one of the largest inputs for livestock enterprises. Almost all home-grown feeds have a farm gate value. Managers should be very concerned about feed utilization and efficiency in the various livestock enterprises. A good record of purchased and farm-grown feed is essential for the manager to make economically sound decisions about the livestock program as well as to properly credit crop enterprises for their share of input into the livestock enterprise. For example, using appropriate transfer prices, corn could be "sold" to the dairy cow enterprise which "buys" the corn from the corn enterprise at its "farm gate price."

This concept of transfer pricing is often misunderstood in farm accounting. Farmers tend to view crops harvested and in storage as free goods which are then transferred to the dairy enterprise which is "where the farm profits are made." The obvious fallacy of this logic is that the actual costs of producing the crops are not recognized and tend to make the dairy enterprise look much better than it actually is.

Sophisticated managers, familiar with their costs of producing crops, have been using linear programming models to formulate "least cost" nutritionally balanced rations for many years. Although the tools for doing least cost balancing have been available for years, the concept has not been widely used in Wisconsin, again because of the difficulty in determining appropriate "costs" to assign home grown feeds.

### *Labor*

With labor costs going up and greater scarcity of competent farm help, more attention must be paid to effective labor use in the business. Constant study of labor use can make fewer hours accomplish the same task. Time study records can help provide this information. Also, labor records are needed for Social Security purposes, Workmen's Compensation, W-2 forms, etc.

### *Equipment*

Larger, more expensive, complicated equipment, with its high fixed costs plus large operating costs, calls for special analysis on many farms. It may pay managers to keep an individual set of financial records for these types of machines. This information can serve as a guide to when to buy, sell, and trade

equipment, as well as the basis for making decisions about appropriate rates to charge for doing custom work.

### *Experimental*

With exploding technological developments, managers are continually faced with decisions concerning whether new technology can be profitably used in their business. Records of trial projects in crop and livestock enterprises can provide a guide to the physical as well as financial performance of that technology for a specific farm situation.

### *Production - Field Records*

Increased concerns about ground water contamination and chemical carry-over make an accurate record of chemical and cultural practices on each field absolutely essential. As farm sizes continue to grow and the number of potential chemicals available for disease and insect control increases, even the sharpest memory will fail. Field records will be a valuable tool for the manager to analyze the effectiveness of fertility and weed and disease control programs.

### *Production - Livestock Records*

Most successful dairymen have recognized the importance and value of good production and breeding records for the dairy herd. More than half of Wisconsin's herds belong to the Wisconsin Dairy Herd Improvement Association. Those who choose to be on "official" records are visited once a month by a fieldman from the cooperative. The fieldman gathers breeding information and production records from the farmer and generates a production roster listing each cow in the herd, her current production level, estimated total lactation production level, and estimated breeding dates.

### *Forward Budgeting*

A pro forma farm plan is a basic planning and control document necessary to judge the progress of the operation throughout the year. This planning document should be done on a quarterly basis so that variances in target receipts and expenses can be monitored and corrected in a timely manner.

### *Long Range Budgeting*

When the business is just starting, or when it is contemplating major alternative investments, long run budgeting is necessary to determine if the proposed alternatives can be economically successful. Several computerized simulation models have been written to help farmers and lenders do long range financial planning. The FINPACK library from the University of Minnesota Center for Farm Financial Management is an excellent tool for both analyzing historic farm financial performance and developing long range financial projections. (More information about FINPACK can be obtained at the following web address: <http://www.cffm.umn.edu>.)

Once a strategic decision has been made to make a significant capital investment, detailed transitional plans are needed to forecast the cash flow requirements of the plan between the current period and the long range goal. Again, this process is greatly assisted by computer software.

## **AgFA Farm Record Summaries - A Case In Point**

AgFA is a dairy farm financial analysis package developed by the University of Wisconsin Center for Dairy Profitability with cooperation from the Lakeshore and Fox Valley Farm Management Associations. AgFA is an acronym for Agricultural Financial Advisor.

Unlike many other industries, the large number of relatively homogeneous dairy farms in Wisconsin has provided farmers a unique opportunity to compare their own financial performance with that of other farmers of their size and production level. The information for each farm is collected by the association accountants at the time income tax returns are prepared. The farm data is stored on the local accountant's computer and automatically synchronized with an on-campus server. As soon as a farm's data is entered, it can be compared against the average of other producers of similar size, production levels or many other technology factors.

In the 1990's a Farm Financial Standards Task Force convened to encourage consistency in the way measures of farm financial performance are calculated. AgFA has been designed from the ground up to use these recommendations in calculating measures of financial progress. Each producer can compare his rates of return on assets and equity vs the average of other dairy producers.

These reports are available to anyone with Internet access. The URL to view AgFA group financial summaries is: <http://cdp.wisc.edu/agfa.htm>. To generate reports an applet (a small program) will be downloaded the first time the site is accessed. This applet is displayed in Figure 1 and is basically the filtering tool which allows for easy financial comparisons. Reports can be generated on a whole farm basis, on a per head basis or on a per hundredweight of milk basis.

Income statements, balance sheets and cash flow summaries typically report up to three years of averages for a particular group.

AgFA measures of financial performance are computed on both the cost and farm market value basis. It is important for the manager to understand the differences in these two methods of accounting and to avoid switching methods between accounting periods.

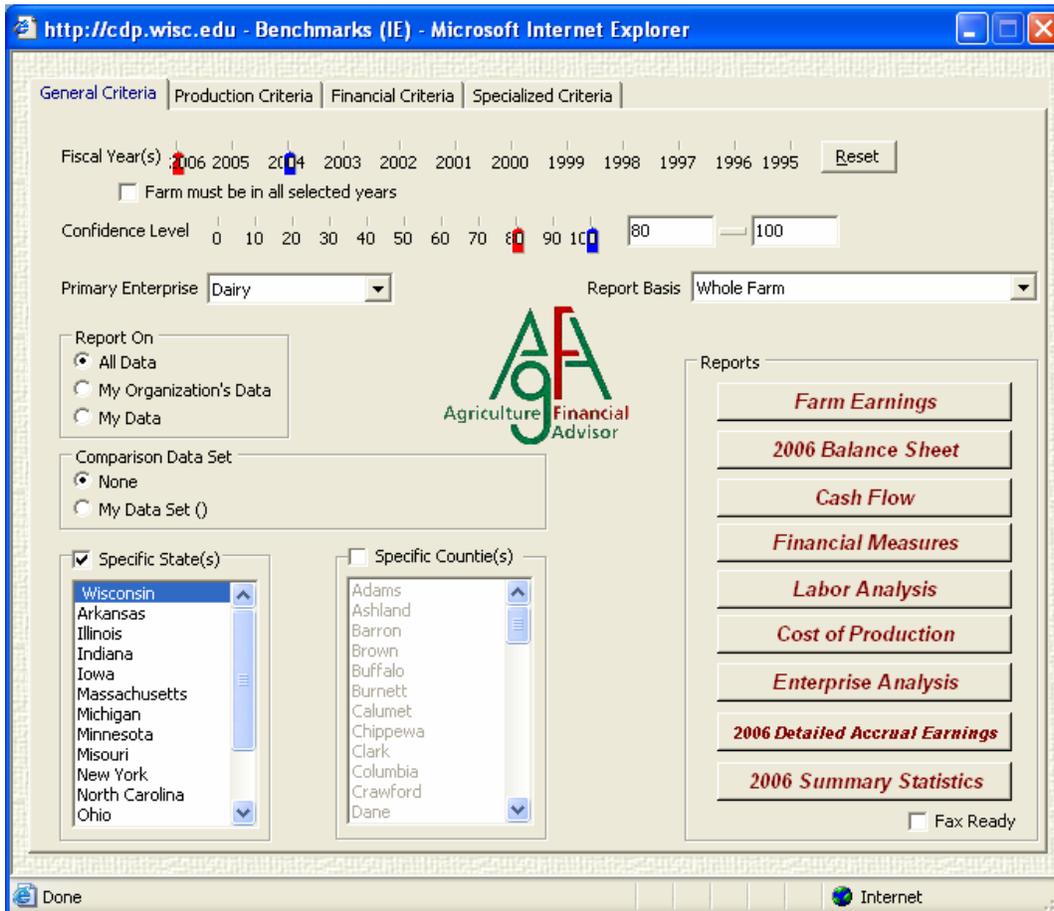


Figure 1. AgFA filtering page

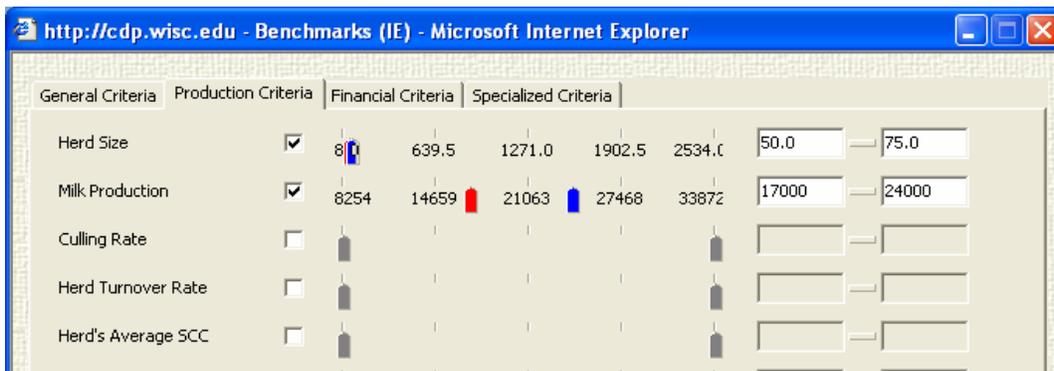


Figure 2. AgFA Production Criteria

The results of this AgFA query are illustrated on the next two pages.

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**Benchmark Criteria**

Primary Enterprise:	<b>Dairy</b>
Report On:	<b>All Data Sets</b>
2006 Data Sets:	<b>150</b>
2005 Data Sets:	<b>178</b>
2004 Data Sets:	<b>182</b>
Confidence Level Range:	<b>80 to 100</b>
Herd Size Range:	<b>50.0 to 75.0</b>
Milk Production Range:	<b>17000 to 25000</b>

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Figure 3. summarizes the filters or selection criteria used to compute these demonstration reports. These were Wisconsin dairy herds between 50 and 75 cows which averaged milk production between 17,000 and 25,000 pounds per cow. There were 150 farms in this category in 2006.



## Financial Measures

Report Basis: Whole Farm

This benchmark report's selection criteria are on the last page.

### These Financial Measures Were Calculated Using the Cost Basis of Assets and Cost (Tax) Depreciation

The financial calculations using the Market Basis of Assets and Economic Depreciation are on the following page.

	2006	2005	2004
<b>Profitability</b>			
Net Farm Income From Operations	\$40,398	\$46,168	\$44,222
Net Farm Income	\$41,009	\$46,907	\$46,298
Rate of Return on Assets (ROROA)	5.16%	6.65%	6.20%
Cost (Tax) Depreciation Claimed	\$23,729	\$32,425	\$40,253
Rate of Return on Equity	4.52 %	7.22 %	6.80 %
Net Profit Margin	9.92 %	11.95 %	11.10 %
<b>Financial Efficiency Ratios (These ratios are calculated using Total Farm Income, not Value of Farm Production.)</b>			
Asset Turnover Ratio	0.520	0.557	0.559
Basic Cost Ratio	0.606	0.577	0.567
Wages Paid Ratio	0.094	0.091	0.084
Interest Paid Ratio	0.043	0.036	0.034
Depreciation Ratio	0.090	0.117	0.142
Net Farm Income from Operations Ratio	0.167	0.180	0.173
<b>Repayment Capacity</b>			
Capital Replacement & Debt Repayment Capacity	\$41,574	\$45,617	\$56,977
Coverage Margin	\$25,278	\$28,273	\$37,642
Term Debt Coverage Ratio	2.71	2.92	3.25
<b>Liquidity</b>			
Net Cash Income	\$61,688	\$73,484	\$86,483
Working Capital	\$69,075	\$60,632	\$52,828
Current Ratio	4.99	4.39	3.56
<b>Solvency (Assets at Cost, including current assets and raised breeding livestock)</b>			
Beginning Total Farm Assets	\$458,508	\$453,767	\$450,987
Beginning Total Farm Liabilities	\$162,493	\$160,262	\$168,330
Beginning Farm Net Worth	\$296,015	\$293,506	\$282,657
Farm Debt to Asset Ratio - Beginning of Year	0.361	0.368	0.380
Ending Total Farm Assets	\$472,467	\$470,061	\$466,619
Ending Total Farm Liabilities	\$165,441	\$166,784	\$171,443
Ending Farm Net Worth	\$307,026	\$303,277	\$295,176
Year Ending Farm Debt to Asset Ratio	0.350	0.355	0.367
Cost Basis Change in Farm Net Worth	\$11,011	\$9,771	\$12,519

Figure 4. AgFA Financial Measures Calculated with Cost Basis Assets and Tax Depreciation.



## Financial Measures

Report Basis: Whole Farm

### These Financial Measures Were Calculated Using the Market Value of Assets and Economic Depreciation

The financial calculations using the Cost Basis of Assets and Cost (Tax) Depreciation are on the previous page.

Profitability	2006	2005	2004
Net Farm Income From Operations	\$36,653	\$53,138	\$58,915
Net Farm Income	\$37,264	\$53,876	\$60,990
Rate of Return on Assets (ROROA)	2.47 %	4.65 %	5.63 %
Economic Depreciation Claimed	\$27,473	\$25,455	\$25,561
Rate of Return on Equity	1.50 %	4.40 %	5.75 %
Net Profit Margin	8.38 %	14.66 %	16.83 %
<b>Financial Efficiency Ratios (These ratios are calculated using Total Farm Income, not Value of Farm Production.)</b>			
Asset Turnover Ratio	0.295	0.317	0.334
Note: Some methods of calculating ratios combine the Basic Cost and Wages Paid Ratios into a single ratio (Operating Cost Ratio).	Basic Cost Ratio	0.612	0.576
Wages Paid Ratio	0.094	0.091	0.084
Interest Paid Ratio	0.043	0.036	0.034
Depreciation Ratio	0.100	0.091	0.090
Net Farm Income from Operations Ratio	0.151	0.207	0.230
<b>Repayment Capacity</b>			
Capital Replacement & Debt Repayment Capacity	\$41,574	\$45,617	\$57,698
Coverage Margin	\$25,278	\$28,273	\$37,642
Term Debt Coverage Ratio	2.71	2.92	3.29
<b>Liquidity</b>			
Net Cash Income	\$61,688	\$73,484	\$86,483
Working Capital	\$69,075	\$60,632	\$52,828
Current Ratio	4.99	4.39	3.56
<b>Solvency (Assets at Market Value)</b>			
Beginning Total Farm Assets	\$815,072	\$798,864	\$751,521
Beginning Total Farm Liabilities	\$162,493	\$160,262	\$168,330
Beginning Farm Net Worth	\$652,579	\$638,602	\$583,191
Farm Debt to Asset Ratio - Beginning of Year	0.199	0.201	0.224
Ending Total Farm Assets	\$825,841	\$823,123	\$781,916
Ending Total Farm Liabilities	\$165,441	\$166,784	\$171,443
Ending Farm Net Worth	\$660,400	\$656,339	\$610,473
Year Ending Farm Debt to Asset Ratio	0.200	0.203	0.219
Total Change in Farm Net Worth	\$7,821	\$17,736	\$27,282

Figure 5. AgFA Financial Measures Using FMV and Economic Life Assumptions.

While we're proud of the database we've assembled, we know there are limitations to what can be measured. Most farm business analysis reporting is done as a byproduct of the federal income tax reporting system. Accelerated depreciation and Section 179 expensing can distort measures of profitability. Timing of the analysis is also a problem since tax filing continues until April 15th. Although AgFA can accept data at any time during the year, most farm data isn't entered until May. By then, all the short run decisions for the next growing season have been made, and crop expenses for seed, fertilizer, fuel, and field labor have become sunk costs.

Measuring the correlation between financial success and business success can be difficult. Two common measures of financial profitability are: rate of return on assets (ROROA) and the rate of return on equity (ROROE). These average rates of return vary with milk prices which have been very volatile over the past decade.

### **Conclusions**

Dairy farm management is becoming an increasingly complex task. Dairy farms are larger and more capital intensive, and they are increasingly competing in a global market. Price changes have been frequent and abrupt in response to changes in supply and demand. New technology has resulted in other changes. A recent survey by the Ohio State University found that more than 70% of farms with \$500,000 in gross sales are using farm computers to assist in the complex tasks of farm management.<sup>5</sup>

As production processes grow more complex, more time and managerial skills are required to handle the non-routine tasks. Major modernization projects can easily depress the ROA and ROE during the construction and start-up process while the economic benefits may not be measurable until a few years later. No two dairy farms are identical, and correlating profitability with specific production practices is a challenge.

Farm owner/operators are unique in that, in many cases, they must play the roles of both senior management and laborer. It will be difficult but increasingly important for them to spend more of their time in the management role since that is where the decisions critical to the success of the business will have to be made. In spite of some imperfections, the AgFA farm business summaries do show that vast differences exist between farms with seemingly identical resource bases. We know that some of the differences are due to varying management abilities.

Farm management is a planning, decision-making and problem solving process. The problems generally fall into three categories: what to produce, how much to produce, and how to market. Problem solving is a continual process. The challenge facing farm managers in the future will be to effectively utilize computers and the Internet to develop a management information system to meet these problem solving needs.

The AgFA database has been designed to summarize financial records from many farm types and from any geographic area. Individual Kentucky producers or farm accountants are welcome to examine the reports generated from our website. Anyone interested in becoming a participant in our database should contact the UW Center for Dairy Profitability for current subscription information and copies of the software. The general office number is 608-263-5665. The Center for Dairy Profitability web address is: <http://cdp.wisc.edu>.

As dairy farms continue to grow in size and complexity, the importance of managerial accounting techniques will also increase. Obviously the needs for greater financial management skill will be acute in the years ahead.



## Enterprise Analysis

Report Basis: Whole Farm

### Dairy

	2006	2005	2004
<b>Physical Values</b>			
Total Number of Dairy Cows	62	62	62
Total Pounds of Milk Sold	1,298,985	1,306,316	1,281,527
Pounds of Milk Sold per Cow	20,997	20,969	20,684
Pounds Butterfat Sold/Cow	774	753	755
Average ButterFat Test (%)	3.71 %	3.59 %	3.66 %
Average Somatic Cell Count (SCC)	269,713	229,930	247,787
Pounds Protein Sold per Cow	683	604	598
Average Protein Test (%)	3.27 %	2.88 %	2.90 %
Pounds Other Solids Sold per Cow	1,167	1,171	1,114
Average Other Solids Test (%)	5.64 %	5.66 %	5.40 %
Total Crop Acres per Cow	4.3	3.8	3.9
Forage Acres per Cow	2.3	2.0	2.2
Pasture Acres per Cow	0.1	0.2	0.1
<b>Monetary Values</b>			
Value of Dairy Production	\$193,357	\$225,544	\$232,581
Milk Income per Cow	\$2,759	\$3,283	\$3,434
Gross Milk Price	\$13.14	\$15.66	\$16.60
Net Milk Price	\$12.82	\$15.38	\$16.31
Dairy Livestock Sales per Cow	\$348	\$311	\$306
Purchased Feed Fed	\$46,876	\$60,019	\$58,807
Purchased "Dairy" Feed Fed	\$45,945	\$59,824	\$55,611
Value of Raised Crops Fed	\$52,025	\$46,965	\$47,954
Dairy Income/\$100 of "Dairy" + Raised Feed	\$197	\$211	\$225
Purchased "Dairy" + Raised Feed Fed/Cow	\$1,584	\$1,714	\$1,672
"Dairy" + Raised Feed/CWT of Milk Sold	\$7.54	\$8.17	\$8.08
Purchased Feed per Cow	\$743	\$960	\$898
Vet & Medicine per Cow	\$165	\$153	\$151
Breeding Fees per Cow	\$74	\$84	\$78
Supplies Purchased per Cow	\$194	\$196	\$177
Debt per Cow	\$2,679	\$2,587	\$2,654
<b>Labor Values</b>			
Farms that Completed a Labor Summary	61	69	77
Total Hours of Paid Labor	1,957	1,812	1,448
Total Hours of Unpaid Labor	3,538	3,160	2,586
Full Time Equivalent (FTE) Employees	1.9	1.7	1.4
Cows per FTE	32.5	36.2	44.8
Pounds of Milk Sold per FTE	676,159	748,683	918,348
Wages & Benefits Paid per Hour	\$10.52	\$10.51	\$10.27

An FTE  
is 2,860  
hours.

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