

FINANCIAL ANALYSIS OF THREE VALUE-ADDED DAIRY ENTERPRISES IN
VERMONT, WISCONSIN, AND NEW YORK

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Kassidy Kampen
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AUTHOR: Kassidy Kampen

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Charles Nicholson
Senior Project Advisor

Signature

ABSTRACT

Value-added agriculture has grown in recent years and is often promoted as a rural development or business survival strategy. For dairy operations, value-added often has meant adding a processing enterprise to an existing dairy farm. This case study examined whether it was profitable to transition to a value-added operation, comparing and contrasting the business characteristics and financial performance of three businesses of similar size in Vermont, Wisconsin, and New York.

The methods included the development of income statements, balance sheets, and economic costs and returns in order to evaluate the profitability of the farming and processing enterprises for each business. The financial data were collected from a previous study done by Nicholson and Stephenson (2006) for the fiscal year 2003. Tabular summaries of the key information from these statements were constructed to facilitate comparisons of the farming and processing enterprises separately for the three businesses.

Results indicated that similar size operations in terms of cow numbers can have highly different production and financial outcomes. For two of the three businesses, the processing enterprise was profitable based on net income, but only one business had a positive (and small) rate of return on assets (accounting for equity capital and operator labor costs). None of the three processing businesses were profitable when the full economic costs of milk production and processing were accounted for. It is also important to note that none of the three operations had positive net incomes for both the dairy and processing enterprises, which appears to question a basic premise underlying value-added businesses. Although this study will be beneficial for the business owners and others interested in value-added operations, a more in-depth and up-to-date

study would be beneficial to determine the specific factors involved in a successful value-added enterprise.

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CHAPTER I

Introduction

Although the US agricultural economy has done well over the past few years due to high grain and oilseed prices, the livestock (beef cattle, dairy, swine and poultry) industry has faced financial challenges. These challenges often lead agricultural operations to explore their options for added income (Nicholson and Stephenson, 2006). One answer to this increasing problem of financial viability for many in the agriculture industry has been a value-added operation. Evans (2009) states that a value-added agricultural business can be defined as any activity an agricultural producer performs outside of traditional commodity production to receive a higher return per unit of commodity sold. For dairies, a value-added operation may involve processing their own milk to create specialty cheeses, while other areas of agriculture may incorporate things such as farm tours, farmers markets, bed and breakfasts, or even producing their own jelly. The sale of value-added products, especially cheese, has grown significantly in recent years. For example, there was an increase of 48 million pounds from 2009 to 2010 for specialty cheese sales in the state of Wisconsin alone (Geisler, no date). This growth shows that there is both interest on the part of current and potential value-added producers, and the possibility for value-added operations to succeed.

There are many driving factors that can push producers towards value-added. Many farmers are motivated to transition to a value-added operation in hopes of increasing income through gaining a higher share of the consumer dollar. Others hope to create a business opportunity for future generations that will be returning to the farm. Also, the diversification

value-added brings to the farm can reduce a business' risk. Consumers also play a large role in the value-added market because they have become increasingly interested in purchasing products that they believe are produced locally, on a small-scale, in an environmentally friendly, more sustainable way. Consumers also now have access to a diversified set of new, more interesting and flavorful products. Buying these specialty items is made possible in part because consumers have increased incomes to spend on food. All of these factors come into play when a new market, such as products produced by value-added dairies, is being developed.

Despite the growing interest by farmers and consumers, there is limited information about the financial performance of these businesses and the factors that contribute to their success (Nicholson and Stephenson, 2006). Value-added producers face additional management challenges, and there are no guarantees that they will be successful, particularly in making the transition from production to value-addition. There are many variables that need to be taken into consideration that can influence the success of the transition. Thus, additional information about financial performance will be useful to both current and potential value-added business owners. To address this lack of information, this study will document the financial performance of three value-added dairy operations in different states, and the factors associated with it.

Problem Statement

How profitable are value-added dairy operations and what factors contribute to this outcome?

Hypotheses

This study explores two main hypotheses:

Value-added dairy operations can be, but need not be, profitable in a given year based on net income or return on assets.

Four main factors will be associated with the success of the value-added dairies including: amount of milk sold vs. used on farm, pricing of product, processing costs, and feed costs.

Objectives

1. To assess the financial performance of three value-added dairies in the states of Vermont, Wisconsin, and New York.
2. To describe similarities and differences of the dairies in order to identify factors associated with success of value-added operations.

Significance of the Study

This study will contribute to additional understanding of the opportunities for profitable production of value-added dairy products and the factors that influence them. This information will be of interest to current and potential value-added dairy processors, to state governments that view value-added agriculture as an economic development opportunity and to federal policy makers trying to understand the role of value-addition and risk management through diversification.

CHAPTER II

Review of the Literature

Introduction: From Value-Added to Specialization and Back Again

The dairy industry in California began as early as the 1700's when missionaries traveled across the United States; butter and cheese were being made by 1776 by women at Mission San Gabriel. At that time farmers were producing and processing their own milk then selling their product in nearby towns. In 1899, Ferndale, California, the states' first commercial creamery opened, by this time dairying had become a major industry throughout the United States (California State Parks, 2005). The emergence of specialized commercial creameries (processing companies) allowed dairymen to focus on cow health and milk production and less on product processing and marketing. This movement towards farms specializing in production and other companies processing milk into products continued throughout the twentieth century and became the predominant arrangement in the US dairy industry. For a variety of reasons, alternatives to the common business model, which combine milk production and processing, began to increase in the 1990s—in some ways, this is a return to the past. Many conventional dairies began to consider processing their milk, motivated by financial pressures, opportunities to increase revenues and incomes, desires to include the next generation in the business and a desire to meet increasing consumer demand. Because of the financial pressures many dairymen faced, they began to evaluate alternative opportunities for generating income. A number of California dairies have since made the transition to value-addition.

Value-Added Agriculture

Value-added is often defined as “business strategies that enable the farmer to capture some of the premium that is being harvested further up the marketing channel by middlemen and retailers” (Streeter and Bills, 2003a). The possibilities that value-added agriculture has to offer attracts farmers who are struggling financially and want a larger portion of the consumer dollar rather than it going to the specialized processors. Others are looking for a way to create opportunities for future generations because they aren’t able to expand their milk production business (Nicholson and Stephenson, 2006). With cheese consumption steadily increasing each year, many farmers view this as an opportune time to transition to value-added (Greenberg, 2005). Also, the return on equity for food processors is significantly higher than that for farms. This is an additional driving force for the conversion to value-added agriculture (Coltrain et al., 2000).

Although the value-added transition can seem fairly simple, there are many challenges. To begin with, there is no well-documented information on whether value-added agriculture will be financially successful, or about the most successful business models. There have been numerous case studies or anecdotal summaries of value-added business experiences done in recent years. However, most of these studies lack detailed information about profitability or specific strategies for success (Streeter and Bills, 2003a). There are also a number of risks to be addressed in entering the value-added arena. *Market risk* is about knowing the consumer and anticipating what they want. *Industry risk* involves understanding the product entering the market--if there is a demand for it, if there are potential competitors, etc. *Financial risk* exists for

those businesses that are building additional facilities or investing in new equipment (Streeter and Bills, 2003b).

The numerous costs that are involved in the transition are often overlooked but are extremely important to consider prior to investing in the business. Previous research shows that both startup costs and management skills affect the success of the new business venture. Start up costs can often be large and the time required to re-coup the initial investment can be long. Repayment can consume the majority of the income, therefore making it difficult to earn a profit (Coltrain et al., 2000; Maynard, 2005). The management skills necessary usually differ for commodity producers and food processors (marketers), so a value-added transition will require specific management skills that address both enterprises (Maynard, 2005; Streeter and Bills, 2003a). An additional challenge is the increasingly competitive market surrounding value-added agriculture. As new businesses enter seeking increased income, success in value-added agriculture is becoming more challenging (Nicholson and Stephenson, 2006).

Consumer preferences affect the success of a new product in the market. With disposable income on the rise, consumers are more willing to pay a higher price for foods that are high quality and convenient. By targeting consumer preferences such as natural foods, convenience, etc, value-added operations will have higher success rates (Coltrain et al., 2000). The general population is also becoming more interested in where their food comes from, often, wanting it to be grown locally. Some consumers are willing to pay more for products when they know where it has come from and can hear the 'cheese story' (Gloy and Stephenson, 2006).

Government funding at both the state and federal level have assisted producers' transitions to value-added processing. The financing occurs in hopes of creating additional

employment in agriculture and to increase and stabilize farm incomes (Nicholson and Stephenson, 2006). However, Streeter and Bills (2003a, 2003b) discuss how government funding can set businesses up for failure rather than help them. Because there is a lack of research for value-added enterprises, the transition is portrayed as being simple with large returns early on. Yet, this often is not the case, and as mentioned earlier, many factors frequently aren't considered in the transition process.

The possibility of success within a niche market is dependent upon the producers' ability to identify the demands of consumers. By creating a product that consumer's desire and targeting specific markets, the new product will be much more successful than if it is introduced without specific knowledge of the market (Coltrain et al., 2000). However, it is common for value-added businesses to begin with the questions "What product can I make?" or "What products do I like to make?" rather than "For what product is there a market?" (Personal communications with current value-added processors).

Value-Added Dairy Processing

There have been multiple case studies done on the performance for value-added dairies such as one on specialty cheeses in Wisconsin (Greenberg, 2005). A questionnaire was mailed to businesses that produced specialty cheeses followed by interviews to gain more information. These were described as a "detailed case study analysis of ten different Wisconsin specialty businesses, involving comparative analysis of selected parameters related to development and operation of the businesses." The objectives were to examine business performance and recommend actions. The study concluded that the specialty cheese industry could be better promoted and separated from the commodity cheese industry in the state. Also, the case study

revealed the products could be better branded, and therefore more identifiable to consumers (Greenberg, 2005). This study did not examine the specific financial performance of these businesses, however.

Studies of the financial performance of value-added businesses are few; only two such studies were found to have evaluated the success of value-added dairies. Nicholson and Stephenson (2006) evaluated 27 small-scale processors in the states of New York, Wisconsin, and Vermont. The study sent letters to the small-scale processors inviting them to share financial information from each farm. The data were entered into a stand-alone data entry program and then analyzed using descriptive statistics and simple regression. The study collected information about both the farm (milk production) and processing (product manufacture and marketing) from cow, goat and sheep milk processors ranging in size from 6 to 700 animals.

Despite the variation in the size and other characteristics of the businesses surveyed, some patterns were consistent. The income statement revealed that raw milk sales were the primary source of revenue for the farm enterprise and the largest expenses were feed and labor. The processing enterprise received most revenue from dairy product sales whereas the main expenses were payment for the milk, labor, and equipment. A main conclusion from this study was that value-added dairy processing isn't a simple transition and can in fact result in a loss rather than a profit from the processing enterprise. Product selection, product pricing and cost control were identified as key factors for business success. The first two reinforce the idea that understanding the market is essential. Other factors to consider before transitioning are managerial skills and start-up costs. Nicholson and Stephenson reported aggregated characteristics for the

participating businesses, but did not delve more deeply into the factors that affect the performance of individual companies.

Another more recent study by De Groot (2011) used an approach similar to Nicholson and Stephenson (2006). Data from 2010 were gathered and analyzed through a stand-alone software application for one California dairy value-added business. As for the previous study, De Groot used the data to generate an income statement, a balance sheet, and economic costs and returns per cwt of milk produced and processed. Consistent with the findings for many of the businesses in the 2006 study, the farm enterprise was profitable for the 2010 fiscal year, but the processing enterprise was not. One possible reason for this was that the business had a significant inventory of cheese that had been produced but not yet sold, because it was producing an aged cheese and was in the first full fiscal year of operation. De Groot therefore analyzed the business performance if revenues had been received from the cheese produced but not yet sold, and this additional revenue would allow the processing enterprise to be profitable. The balance sheet indicated the farm had more assets than the processing side, and the net worth of the farm was larger than that of the processing. However, net worth for both was positive.

Methods for Analysis of Value-Added Businesses

There are various methods available to evaluate value-added enterprises; however, not all of them are suited for the financial performance analysis that will be undertaken for this study. One approach is partial budgeting. Partial budgeting is “a planning and decision-making framework used to compare the costs and benefits of alternatives faced by a farm business. It focuses only on the changes in income and expenses that would result from implementing a specific alternative” (Roth and Hyde, 2002). By developing a partial budget for a value-added

enterprise, one would be able to assess the profitability if an existing dairy farm operation were to transition to value-added dairy processing. In most cases, partial budgeting involves estimating future revenue streams and changes in costs from a particular management change or investment. This method ignores those revenues and costs that would be unaffected by management changes or investments. Changes in revenues and costs are compared to determine if there is a net benefit from making the change (over some relevant time horizon). If the net benefits are positive this suggests that this change will be successful. However, it is also relevant to take into consideration non-economic factors. Owner leisure time, additional knowledge or training, and safety of equipment are important contributions to the overall decision. By going through each of these steps, a business owner considering a transition to value-added enterprise could discover the potential profits or losses that may be incurred. A partial budget also makes it possible to re-analyze the outcome by changing assumptions about key factors (Roth and Hyde, 2002). This method will not be used because it entails evaluating a specific business before the addition of the value-added enterprise. This has two limitations. First, it is for a single business, and therefore may not provide significant insights for other current or potential value-added businesses (although it is certainly of value for the individual business.) Second, planned and actual financial performance can and often differ¹, so this approach can overstate the feasibility of value added.

The second method available is to collect data from existing value-added and small-scale enterprises and analyze the key dimensions of and factors associated with financial performance. This method was used by Nicholson and Stephenson (2006) and De Groot (2011) and is best suited for this case study because it will provide the most relevant information to understand

¹ Costs may be understated and revenues overstated.

what specific factors contribute to the success of a value-added dairy. It will then be possible to compare benchmarks to similar businesses to identify whether or not these enterprises are considered profitable.

CHAPTER III

Methodology

This study will use a case study approach to examine three value-added enterprises in the states of Vermont, Wisconsin, and New York. Data for this study are from the study done by Nicholson and Stephenson (2006). In their project, they invited all small-scale value-added dairy-processing businesses in three states to participate, based on listings of such enterprises maintained by the respective state departments of agriculture. Data were gathered through individual site visits, and then was inputted into a stand-alone software application used by Nicholson (2006) and De Groot (2011). The software program computed an income statement, a balance sheet, and economic costs and returns per cwt of milk produced and processed. These financial statements were closely analyzed to assess consistency and accuracy of the collected data.

The basic approach for this study is to examine key financial statements for three businesses. Each of these businesses has a similar number of milking cows (and produce only cow's milk, although other businesses produce goat and sheep milk products). One business was selected from each state (NY, VT, and WI) and in different product category areas (cheese, fluid milk, and yogurt). This case-study approach will focus on assessing the differences in performance given that the businesses are of similar production capacity (that is, milking cows) but have different locations and product emphases. The approach used is to generate the key financial statements considered in previous studies (Nicholson and Stephenson, 2006; De Groot, 2011) and to discuss the differences between the three. This is done for both the farm (milk

production) and processing (value-added) enterprises, then combined. This can provide some insights about the range of performance to be expected in value-added dairy production, and provide some initial insights about the factors that influence it.

Income Statement, Balance Sheet, Costs and Returns

The financial statements evaluated for this case study include income statements, balance sheets, and economic costs and returns. It is necessary to describe each of these statements to better understand what was looked at.

The income statement is a summary of all receipts and gains during a specified period of time (usually one year), less all expenses and losses during the same period. Because it includes a calculation of net income (or loss), it is also known as a *profit and loss statement*. The income statement is a measure of output and input in value terms. It provides one measure of liquidity, the ability of the business to meet its financial obligations, including family living expenses. Income statements are most appropriately calculated on an *accrual basis*, which makes adjustments to cash receipts and expenditures for such items as changes in accounts payable and receivable, prepaid expenses, and values of inventories of assets and materials used in milk production or dairy processing. Accrual accounting more accurately reflects the business' performance than cash accounting because it better matches receipts and expenditures in a given year. Although these businesses depend on both production and processing, separating them for the purposes of the income statement can provide useful information about which enterprise contributes what to overall financial performance. The standard income statements include the total receipts, expenses and net income for both the farm and the processing enterprises. This provides an indication of the income-generating capacity of farm and processing enterprises.

The income statement per hundredweight reports these same values per hundredweight of milk produced (for the farm) and milk processed (for the processing enterprise). The per-hundredweight calculations allow better comparisons across farms and processing enterprises of different sizes, because the values are standardized by the amount of milk produced or processed. It is also often easier to examine areas in which receipts may be increased or expenditures reduced when values are expressed in this manner.

Net Income is the total combined return to the farm/business operator and other unpaid family members for working, managing, financing and owning the farm business. It is calculated as the difference between accrual receipts and accrual expenses, expansion livestock (for the farm) and depreciation.

Labor and Management Income is the return generated by the business to the labor and management of the operator(s). It is calculated starting with *Net Income* and subtracting the value of any *Unpaid family labor* and the opportunity cost of farm equity (*Real interest on equity*). This opportunity cost assumes that if the current equity were not invested in the farm, a 5% return (that is, interest, say from a bank account) could be earned.

The *Rate of Return on Assets* is calculated by taking *Net Income*, subtracting the value of *Operator's & unpaid family labor*, adding back the *Interest* paid and dividing by the total assets owned by the enterprise. This indicates the percentage rate of return on assets owned by the enterprise, assuming that the operator and family labor are compensated at a level they indicate is acceptable.

The balance sheet is a summary of the assets and liabilities of the business, together with a statement of the owner's *equity* or *net worth*. The primary purpose of the balance sheet is to

indicate financial solvency of the business, because it shows the margin by which debt obligations would be covered if the business were terminated and all assets were sold. A balance sheet refers to a specific point in time (not a period of time). The balance sheet indicates the values of assets, liabilities and net worth. *Net worth*, or *equity*, is the difference between the value of assets and liabilities in the balance sheet.

The *debt-to-asset ratio* is calculated by dividing the total liabilities by the total assets. It is a summary measure for the solvency of the business, and reflects the capacity of for borrowing.

The *current ratio* is calculated by dividing current liabilities by current assets. If current assets are sufficient to cover current liabilities, this ratio will be greater than 100%.

The buildup of costs and returns provides an additional way of viewing the financial performance of the farm and dairy processing enterprises. It includes a calculation of the full *cost of milk production per hundredweight*, including the value of operators' labor and unpaid family labor, and the opportunity cost of farm equity ("interest on equity"). The cost per hundredweight also assumes that the costs of producing crops and livestock sold are equal to the revenues generated. This may be a poor assumption if crop sales or other forms of income are a substantial portion of total income. A similar calculation is made for the full *cost of dairy processing per hundredweight of milk processed*, again accounting for the value of operators' and unpaid family labor and the opportunity cost of equity. The *average revenue per hundredweight of product sales* is calculated as the accrual revenues for dairy product sales divided by the amount of milk processed. The *net return per hundredweight* begins with the average revenue per hundredweight of product sales, than subtracts the costs of processing and

the costs of milk production. This net return is reported per hundredweight, and as a percentage of the costs of milk production and processing. Because the full costs of operator's labor and opportunity costs are included, it is possible for the net returns to be negative, even if the farm and dairy processing enterprises together generate a net income greater than zero.

Assumptions

Throughout this study it was assumed that all of the information initially provided to Nicholson and Stephenson (2006) was at least approximately correct². Also, it was assumed that the intention of the value-added enterprises was to create additional net income and positive returns on assets. Assumptions that allow enterprise accounting include the value of milk transfers from the farm to the processing enterprise, and the risk-free interest rate to value the opportunity cost of equity in the farm and processing enterprises.

² This can be difficult to evaluate due to the limited formal record-keeping on many value-added dairy operations, but the three businesses studied here appear to have reasonably accurate records.

CHAPTER IV

Development of the Study

To evaluate the information gathered for this study, key financial statements were examined. These statements included income statements, balance sheets, and economic costs and returns for each enterprise. Factors that have an impact on the profitability of the operations were analyzed and discussed.

An overview of the three businesses indicates some similarities and key differences (Table 1). The herd structure differs for each operation. The Vermont farm had the fewest number of heifers, 7, and 32 cows, while New York had an equal number of 30 heifers and 30 cows. The Wisconsin dairy owned 23 heifers and 35 cows. The milk production per cow is very different for the three operations. This has implications for total milk production (given similar numbers of cows), but probably also for the costs of feed per cwt, the time (labor) required for milking, and the milk potential available for processing. The proportion of milk produced that is used in the processing business is also important. The Vermont business was the only one that used all of their milk produced in the processing enterprise. New York used almost half of the milk produced at 135,369 pounds; the Wisconsin processing operation only used 52,464 pounds of their total 589,646 pounds of milk produced by the dairy.

Table 1. Descriptive Characteristics for Three Farm and Processing Enterprises, Fiscal Year 2003

| Characteristic | Vermont | Wisconsin | New York |
|---|---------|-----------|----------|
| Animals | | | |
| Cows | 32 | 35 | 30 |
| Heifers | 7 | 23 | 30 |
| Milk Production | | | |
| Total milk produced, lbs. | 177,000 | 589,646 | 300,000 |
| Milk production per Cow, lbs/yr | 5,531 | 16,847 | 10,000 |
| Raw milk sold, lbs. | 0 | 537,182 | 164,631 |
| Farm milk used in processing, lbs. | 177,000 | 52,464 | 135,369 |
| Milk purchased and used in processing, lbs. | 0 | 0 | 0 |
| Total milk used in processing, lbs. | 177,000 | 52,464 | 135,369 |
| Milk not accounted for (farm use, loss, etc.), lbs. | 0 | 0 | 0 |
| Crops | | | |
| Total crop acres per Cow | 1 | 0 | 2 |
| Total pasture acres per Cow | 2 | 2 | 0 |
| Production | | | |
| Total pounds cheese | 18,000 | 0 | 0 |
| Total gallons beverage milk | 820 | 0 | 11,775 |
| Total gallons yogurt | 0 | 6,759 | 0 |
| Sales | | | |
| Total pounds cheese | 17,100 | 0 | 0 |
| Total gallons beverage milk | 820 | 0 | 11,775 |
| Total gallons yogurt | 0 | 6,667 | 0 |

The total crop acres per cow differed by one to two acres which can affect how much feed is being bought versus grown and thus, again, feed costs. The type and amount of products produced is also different for each processing enterprise (by design in this case). The Vermont business produced cheese and beverage milk, the Wisconsin business produced yogurt, and the New York business produced only beverage milk. Because each operation produced different products, they sold into very different markets, which can have implications for their marketing costs, sales volume and the profitability of processing activities.

The Income Statement for the three farming enterprises shows that only the Wisconsin farm was profitable for the fiscal year 2003, whereas Vermont and New York lost \$9,477 and \$25,604 respectively (Table 2). The total receipts for the Wisconsin farm were at least double

Table 2. Income Statement for the Three Farming Enterprises. Fiscal Year 2003

| Financial Variable | Vermont | Wisconsin | New York |
|---------------------------------|-------------------|-------------------|-------------------|
| Receipts | | | |
| Raw milk sales | \$0 | \$78,042 | \$27,164 |
| Transfer to processing | \$35,400 | \$7,622 | \$22,336 |
| Livestock sales | \$6,500 | \$26,717 | \$7,000 |
| Crops & other farm sales | \$0 | \$0 | \$0 |
| Government & other receipts | \$9,500 | \$12,863 | \$1,461 |
| Total Receipts | \$51,400 | \$125,244 | \$57,961 |
| Expenses | | | |
| Hired labor | \$1,780 | \$9,057 | \$19,125 |
| Feed purchased | \$12,873 | \$52,906 | \$27,968 |
| Machinery & equipment | \$10,333 | \$16,086 | \$9,051 |
| Livestock | \$4,664 | \$16,052 | \$10,998 |
| Crops | \$1,000 | \$1,335 | \$3,209 |
| Real estate & buildings | \$7,626 | \$1,704 | \$3,887 |
| Utilities | \$3,651 | \$5,180 | \$2,035 |
| Interest | \$1,714 | \$12,298 | \$0 |
| Miscellaneous | \$5,598 | \$4,340 | \$5,244 |
| Total Operating Expense | \$49,239 | \$118,958 | \$81,517 |
| Expansion livestock | \$3,200 | \$0 | \$0 |
| Depreciation | \$8,438 | \$6,108 | \$2,048 |
| Net Income | (\$9,477) | \$178 | (\$25,604) |
| Unpaid family labor | \$0 | \$0 | \$0 |
| Real interest on equity | \$21,255 | \$22,541 | \$21,196 |
| Labor & mgt income | (\$30,732) | (\$22,363) | (\$46,800) |
| Value of operator's labor | \$51,534 | \$29,471 | \$13,060 |
| Rate of Return on Assets | -13.2% | -3.5% | -9.0% |

that of New York and Vermont's. However, the total operating expenses for Wisconsin were also over double those of Vermont's, but New York had costs of \$81,517, which is rather high compared to the farm's income. Wisconsin's main source of income was the sale of their raw milk. Because the Vermont farm used all of their milk produced in the processing enterprise, their main source of income was the transfer was the sale of their raw milk. Because the Vermont farm used all of their milk produced in the processing enterprise, their main source of

income was the transfer to processing³. The New York farm had similar amounts of income from the sale of their raw milk and the transfer to processing to produce beverage milk.

Another key difference was the cost of hired labor for the New York farm. At \$19,125 it was twice the cost of Wisconsin's hired labor and had the smallest number of milking cows. Another expense that differed among the three businesses was the cost of feed purchased for each farm. Wisconsin had the largest expense, but that farm had the highest number of cows as well as no crop acres per cow compared to the other farms. Vermont purchased the least amount but this is to be expected with the fewest cows and the lowest milk production. An additional expense item that stands out is the amount of interest the Wisconsin farm is paying compared to the other farms. The expense of nearly \$13,000 is inconsistent with the farm's total liabilities of \$30,000.

The Wisconsin dairy was the only one that had a positive net income, while Vermont and New York had negative net farm incomes ranging from about \$10,000 to \$25,000. Labor and management income was negative for all three businesses due to the addition of the cost of real interest on equity. All of these factors resulted in negative rate of return on assets for each operation. Although the farms were of similar sizes in terms of numbers of cows, they have very different cost structures and profitability outcomes.

Although the farms were unprofitable for Vermont and New York, their processing businesses were, whereas the Wisconsin processing enterprise had a negative net income (Table 3). The Vermont business had total dairy product sales of \$128,939; this amount is much higher than the other businesses because they produced two products, cheese and beverage milk, and the

³ The transfer to processing is the value of milk when the processing enterprise "buys" milk from the dairy. Based on enterprise accounting, it is a cost to the dairy processing enterprise but revenue to the farm enterprise.

Table 3. Income Statement for Three Processing Enterprises. Fiscal Year 2003

| Financial Indicator | Vermont | Wisconsin | New York |
|---------------------------------|------------------|-------------------|-----------------|
| Receipts | | | |
| Dairy product sales | \$128,939 | \$72,886 | \$91,241 |
| Government and other receipts | | \$15,200 | |
| Total Receipts | \$128,939 | \$88,086 | \$91,241 |
| Expenses | | | |
| Hired labor | \$6,063 | \$40,182 | \$420 |
| Transfer to processing | \$35,400 | \$7,622 | \$22,336 |
| Materials & supplies | \$9,406 | \$39,074 | \$11,144 |
| Machinery & equipment | \$1,871 | \$610 | \$5,721 |
| Real estate & buildings | \$2,235 | \$1,920 | \$1,068 |
| Utilities | \$5,647 | \$3,813 | \$5,607 |
| Interest | \$4,238 | \$23,138 | \$7,414 |
| Marketing | \$16,396 | \$16,510 | \$5,817 |
| Miscellaneous | \$8,212 | \$8,826 | \$3,619 |
| Total Operating Expense | \$89,468 | \$141,695 | \$63,146 |
| Depreciation | \$5,622 | \$39,079 | \$7,000 |
| Net Income | \$33,849 | (\$92,688) | \$21,095 |
| Unpaid family labor | \$7,260 | \$0 | \$0 |
| Real interest on equity | \$607 | \$0 | \$0 |
| Labor & mgt income | \$25,982 | (\$92,688) | \$21,095 |
| Value of operator's labor | \$88,466 | \$133,029 | \$26,940 |
| Rate of Return on Assets | -59.4% | -85.6% | 2.5% |

operation produced and sold a lot more product overall. The Wisconsin business only sold 6,667 lbs of product and the New York business sold 11,775 lbs of beverage milk. For selling such a small amount of yogurt, Wisconsin's plant had extremely high labor costs of \$40,182, especially compared to the Vermont and Wisconsin businesses' costs of \$6,063 and \$420, respectively.

This difference could be due in part to higher labor requirements of yogurt production and the fact that the owner delegated much of the processing activities to hired labor, but the available information does not allow a clear conclusion. Another difference in cost among the processing enterprises is unpaid family labor. The Vermont business reported more than \$7,000 for this, whereas neither the Wisconsin nor New York businesses incurred this cost.

The materials and supplies expense is lowest for the Vermont business, which is interesting because they produced both cheese and beverage milk. The Wisconsin business again had the highest cost but this may again reflect the requirements for yogurt. It is also evident that the Vermont and Wisconsin enterprises were spending nearly three times that of the New York enterprise for marketing of their products. This could be because of market proximity; fluid milk from value-added dairy operations is probably distributed in a small geographic areas. However, this could also reflect different strategies in terms of advertising and promotion (which are also included in marketing costs).

The New York and Vermont operations had positive net incomes for processing, but the Wisconsin business had a loss due to the higher expenses and lower income. The value of labor and management income subtracts unpaid family labor and real interest on equity, which had non-zero values for only the Vermont business. This lowered their income by about \$8,000. The return on assets varied greatly for each operation. This indicator of profitability is found by subtracting operator's and unpaid family labor from net income, then adding interest paid and dividing by the total processing assets. Only the New York processing business had a positive return on assets.

One hypothesis of this study is that a processing enterprise could be, but might not be, profitable, and the results of this analysis are consistent with this. The New York processing enterprise was the only operation with positive returns, whereas the Vermont and Wisconsin processing operations were not profitable.

An indicator of financial performance is the rate of return on assets for the combined enterprises (Table 4). Despite differences in net income, labor and management income and interest for the individual enterprises, the combined operations had a negative rate of return

Table 4. Combined Income Statement for the Farm and Processing Enterprises. Fiscal Year 2003

| Financial Indicator | Vermont | Wisconsin | New York |
|---------------------------------|------------------|-------------------|------------------|
| Receipts | | | |
| Raw milk sales | \$0 | \$78,042 | \$27,164 |
| Transfer to processing | \$35,400 | \$7,622 | \$22,336 |
| Dairy product sales | \$128,939 | \$72,886 | \$91,241 |
| Livestock sales | \$6,500 | \$26,717 | \$7,000 |
| Crops & other farm sales | \$0 | \$0 | \$0 |
| Government & other receipts | \$9,500 | \$28,063 | \$1,461 |
| Total Receipts | \$180,339 | \$213,330 | \$149,202 |
| Expenses | | | |
| Hired labor | \$7,843 | \$49,239 | \$19,545 |
| Feed purchased | \$12,873 | \$52,906 | \$27,968 |
| Transfer to processing | \$35,400 | \$7,622 | \$22,336 |
| Materials & supplies | \$9,406 | \$39,074 | \$11,144 |
| Machinery & equipment | \$12,204 | \$16,696 | \$14,772 |
| Livestock | \$4,664 | \$16,052 | \$10,998 |
| Crops | \$1,000 | \$1,335 | \$3,209 |
| Real estate & buildings | \$9,861 | \$3,624 | \$4,955 |
| Utilities | \$9,298 | \$8,993 | \$7,642 |
| Interest | \$5,952 | \$35,436 | \$7,414 |
| Marketing | \$16,396 | \$16,510 | \$5,817 |
| Miscellaneous | \$13,810 | \$13,166 | \$8,863 |
| Total Operating Expense | \$138,707 | \$260,653 | \$144,663 |
| Expansion livestock | \$3,200 | \$0 | \$0 |
| Depreciation | \$14,060 | \$45,187 | \$9,048 |
| Net Income | \$24,372 | (\$92,510) | (\$4,509) |
| Unpaid family labor | \$7,260 | \$0 | \$0 |
| Real interest on equity | \$21,862 | \$22,541 | \$21,196 |
| Labor & mgt income | (\$4,750) | (\$115,051) | (\$25,705) |
| Value of operator's labor | \$140,000 | \$162,500 | \$40,000 |
| Rate of Return on Assets | -21.4% | -30.6% | -7.5% |

on assets for all three businesses. It is also important to recognize that none of the businesses had both profitable farm and processing operations. Vermont had a negative net income for the farm but a positive net income for the processing operation; Wisconsin had a positive net income for the farm and a negative net income for the processing operation; the New York business was similar to Vermont in that the net income for the farm was negative but was positive for the processing operation. The difficulty involved in managing two enterprises to make them

profitable is often overlooked; however, this is an important issue to consider when evaluating these and other operations (Streeter and Bills, 2003a). In general, these assessments show that there can be a great deal of variation in financial performance even among businesses with similar cow numbers, which may make it more difficult to generalize about value-added operations more generally.

Calculating the elements of Income Statement per hundredweight for the farming enterprises facilitates comparisons of the receipts and expenses among the three businesses (Table 5). The receipts per cwt are important to evaluate because they reflect the differences in each operation. The Vermont farm business did not sell any milk but reported a price of \$20.00 per cwt, which is the price the operators believed they could receive for raw milk sold. This may be overstated given the lower prices actually received by other farms during the same year. It also had the highest government and other receipts which, combined, provided the highest receipts per cwt.

Expenses per cwt also differed among the businesses. The operation in New York was paying \$6.38 per cwt for labor while the other farms were paying just over a dollar. The machinery and equipment and real estate expenses were substantially larger for the Vermont farm as well as utilities and interest costs compared to the other operations. Although the receipts per cwt were higher than the average dairy farms without value-added in the respective states, they also had relatively high costs. The New York and Wisconsin farms had a substantially negative net income per cwt, but Vermont had a small profit per cwt. Another figure that stood out was the value of operator's labor for the Vermont farm. At \$29.12 per cwt, it was significantly higher than the other farms that were around only \$5.00 per cwt.

Table 5. Income Statement per Hundredweight for Three Farming Enterprises. Fiscal Year 2003

| Financial Indicator | Vermont | Wisconsin | New York |
|---------------------------------|------------------|------------------|------------------|
| Receipts | | | |
| Raw milk sales | \$0.00 | \$13.24 | \$9.05 |
| Transfer to processing | \$20.00 | \$1.29 | \$7.45 |
| Livestock sales | \$3.67 | \$4.53 | \$2.33 |
| Crops & other farm sales | \$0.00 | \$0.00 | \$0.00 |
| Government & other receipts | \$5.37 | \$2.18 | \$0.49 |
| Total Receipts | \$29.04 | \$21.24 | \$19.32 |
| Expenses | | | |
| Hired labor | \$1.01 | \$1.54 | \$6.38 |
| Feed purchased | \$7.27 | \$8.97 | \$9.32 |
| Machinery & equipment | \$5.84 | \$2.73 | \$3.02 |
| Livestock | \$2.64 | \$2.72 | \$3.67 |
| Crops | \$0.56 | \$0.23 | \$1.07 |
| Real estate & buildings | \$4.31 | \$0.29 | \$1.30 |
| Utilities | \$2.06 | \$0.88 | \$0.68 |
| Interest | \$0.97 | \$2.09 | \$0.00 |
| Miscellaneous | \$3.16 | \$0.74 | \$1.75 |
| Total Operating Expense | \$27.82 | \$20.17 | \$27.17 |
| Expansion livestock | \$1.81 | \$0.00 | \$0.00 |
| Depreciation | \$4.77 | \$1.04 | \$0.68 |
| Net Income | (\$5.35) | \$0.03 | (\$8.53) |
| Unpaid family labor | \$0.00 | \$0.00 | \$0.00 |
| Real interest on equity | \$12.01 | \$3.82 | \$7.07 |
| Labor & mgt income | (\$17.36) | (\$3.79) | (\$15.60) |
| Value of operator's labor | \$29.12 | \$5.00 | \$4.35 |
| Rate of Return on Assets | -13.2% | -3.5% | -9.0% |

Although the Wisconsin farm had the lowest labor and management income, all three operations had negative figures. The rates of return on assets were also negative for each farming enterprise.

The Income Statement per cwt milk processed for the three processing enterprises also highlights some important differences (Table 6). A key objective of value-added dairy processing is to enhance returns per cwt of milk produced (and then processed). The New York business received \$67.40 per cwt for dairy product sales while Wisconsin made \$138.93 per cwt. This probably reflects primarily differences in product prices. Fluid milk tends to have a lower price per cwt than products like cheese and yogurt.

Table 6. Income Statement per Hundredweight for Processing Enterprises. Fiscal Year 2003

| Financial Indicator | Vermont | Wisconsin | New York |
|---------------------------------|----------------|-------------------|----------------|
| Receipts | | | |
| Dairy product sales | \$72.85 | \$138.93 | \$67.40 |
| Government & other receipts | \$0.00 | \$28.97 | \$0.00 |
| Total Receipts | \$72.85 | \$167.90 | \$67.40 |
| Expenses | | | |
| Hired labor | \$3.43 | \$76.59 | \$0.31 |
| Transfer to processing | \$20.00 | \$14.53 | \$16.50 |
| Materials & supplies | \$5.31 | \$74.48 | \$8.23 |
| Machinery & equipment | \$1.06 | \$1.16 | \$4.23 |
| Real estate & buildings | \$1.26 | \$3.66 | \$0.79 |
| Utilities | \$3.19 | \$7.27 | \$4.14 |
| Interest | \$2.39 | \$44.10 | \$5.48 |
| Marketing | \$9.26 | \$31.47 | \$4.30 |
| Miscellaneous | \$4.64 | \$16.82 | \$2.67 |
| Total Operating Expense | \$50.55 | \$270.08 | \$46.65 |
| Depreciation | \$3.18 | \$74.49 | \$5.17 |
| Net Income | \$19.12 | (\$176.67) | \$15.58 |
| Unpaid family labor | \$4.10 | \$0.00 | \$0.00 |
| Real interest on equity | \$0.34 | \$0.00 | \$0.00 |
| Labor & mgt income | \$14.68 | (\$176.67) | \$15.58 |
| Value of operator's labor | \$49.98 | \$253.56 | \$19.90 |
| Rate of Return on Assets | -59.4% | -85.6% | 2.5% |

In fact, Wisconsin was receiving \$1.18 per pound for their yogurt; nearly five times the amount New York was receiving which was \$0.25 for a pound of milk. The Wisconsin operation also had a significant amount of other revenues which came from a marketing grant and in-store sampling of their products.

As was the case for the total hired labor expense, the hired labor expense per cwt for the Wisconsin business was many times larger than it was for the other two businesses. This and other cost differences per cwt such as those for materials and supplies caused the total operating expense of the Wisconsin processing enterprise to be more than five times the values for the other businesses (Table 6). Not surprisingly, the net income per cwt for the processing enterprise in Wisconsin was highly negative. The Vermont and New York businesses had positive net

incomes. However, for all of the businesses, the value of labor and management income was lower than the stated value of operator's labor per cwt of milk processed. This suggests that the operators were not being compensated as fully as they would have wanted for their labor contribution to the processing enterprise. In addition, only one of the businesses experienced a positive Rate of Return on Assets (New York). When looking at the financial results gathered it is easy to see that the businesses have captured a larger share of the consumers' dollar however, the additional expenses of producing and marketing the product results in less to owner's labor than they expected (and sometimes substantially less).

The total value of assets for all three farms is fairly similar, but the debt structure (but not amount) varies among the businesses (Table 7). The biggest variation in current assets was New York's farm feed and supplies, which was more than double that for the other operations. The total values of intermediate assets were similar for the three businesses, but the value of livestock was higher in Wisconsin and the value of machinery and equipment was larger in the other states. Only the Wisconsin farm enterprise had intermediate debt and only Vermont had long-term debt. The New York farm only had \$8,000 of current debt, which resulted in the lowest debt/asset ratio of 1.9%. It is also important to note that none of the farm enterprises had any particular problems with debt or net worth as all numbers were positive and in a good range from a lender's perspective.

Table 7. Balance Sheet for Three Farming Enterprises. Fiscal Year 2003

| Financial Indicator | Vermont | Wisconsin | New York |
|---------------------------------------|------------------|------------------|------------------|
| Current Assets | | | |
| Cash, checking & savings | \$6,500 | \$0 | \$500 |
| Accounts receivable | \$0 | \$0 | \$1,500 |
| Prepaid expenses | \$0 | \$0 | \$0 |
| Farm feed & supplies | \$5,200 | \$4,875 | \$12,520 |
| Total Current | \$11,700 | \$4,875 | \$14,520 |
| Intermediate Assets | | | |
| Livestock | \$44,800 | \$81,500 | \$57,400 |
| Machinery & equipment | \$35,000 | \$7,000 | \$20,000 |
| Farm Credit & other stock | \$0 | \$0 | \$2,000 |
| Total Intermediate | \$79,800 | \$88,500 | \$79,400 |
| Land & buildings | \$357,000 | \$387,600 | \$338,000 |
| Other assets | \$0 | \$0 | \$0 |
| NPV of Leases | \$0 | \$0 | \$0 |
| Total Assets | \$448,500 | \$480,975 | \$431,920 |
| Current Debt | | | |
| Operating & short-term | \$4,000 | \$1,500 | \$0 |
| Accounts payable | \$0 | \$0 | \$8,000 |
| Current portion of inter. & long debt | \$2,409 | \$3,258 | \$0 |
| Total Current Debt | \$6,409 | \$4,758 | \$8,000 |
| Intermediate Debt | \$0 | \$25,396 | \$0 |
| Long-term Debt | \$17,000 | \$0 | \$0 |
| NPV of Leases | \$0 | \$0 | \$0 |
| Total Liabilities | \$23,409 | \$30,154 | \$8,000 |
| Net Worth | \$425,091 | \$450,821 | \$432,920 |
| Debt/Asset Ratio | 5.2% | 6.3% | 1.9% |
| Current Ratio | 182.6% | 102.5% | 181.5% |

The balance sheet for the processing enterprise shows that the amount of assets and debt varied greatly between operations and is in general much less positive than the balance sheet for the farm enterprise (Table 8). Vermont had the greatest total current assets mostly due to accounts receivable and processed product inventories. Wisconsin and New York had much smaller numbers for these items. The Wisconsin processing business had \$236,750 of total assets from the high amount of machinery and equipment as well as land and buildings. The Wisconsin operation had \$593,693 of total liabilities, which resulted in a negative net worth.

Table 8. Balance Sheet for Three Processing Enterprises. Fiscal Year 2003

| Financial Indicator | Vermont | Wisconsin | New York |
|---------------------------------------|-----------------|--------------------|--------------------|
| Current Assets | | | |
| Cash, checking & savings | \$3,822 | (\$1,000) | \$500 |
| Accounts receivable | \$10,250 | \$2,250 | \$500 |
| Prepaid expenses | \$0 | \$0 | \$3,750 |
| Processed products & supplies | \$16,500 | \$3,500 | \$60 |
| Total Current | \$30,572 | \$4,750 | \$4,810 |
| Intermediate Assets | | | |
| Machinery & equipment | \$52,000 | \$130,000 | \$45,000 |
| Farm Credit & other stock | \$0 | \$0 | \$2,000 |
| Total Intermediate | \$52,000 | \$130,000 | \$47,000 |
| Land & buildings | \$0 | \$100,000 | \$12,000 |
| Other assets | \$0 | \$2,000 | \$0 |
| NPV of Leases | \$14,499 | \$0 | \$0 |
| Total Assets | \$97,071 | \$236,750 | \$63,810 |
| Current Debt | | | |
| Operating & short-term | \$6,000 | \$0 | \$15,000 |
| Accounts payable | \$0 | \$2,000 | \$0 |
| Current portion of inter. & long debt | \$11,423 | \$46,627 | \$8,762 |
| Total Current Debt | \$17,423 | \$48,627 | \$23,762 |
| Intermediate Debt | \$53,000 | \$247,891 | \$207,883 |
| Long-term Debt | \$0 | \$297,175 | \$0 |
| NPV of Leases | \$14,499 | \$0 | \$0 |
| Total Liabilities | \$84,922 | \$593,693 | \$231,645 |
| Net Worth | \$12,149 | (\$356,943) | (\$167,835) |
| Debt/Asset Ratio | 87.5% | 250.8% | 363.0% |
| Current Ratio | 175.5% | 9.8% | 20.2% |

The Vermont business was the only one that had a positive net worth where as the New York and Wisconsin businesses had negative net worth values, which may be explained by over-investment in intermediate debt for both businesses (but in current and long-term debt as well for Wisconsin). Because of this over investment, both states have current ratios that are 80 to 90%, which is below a desired ratio of 100%.

The combined farm and processing enterprise balance sheet shows a positive net worth for all three operations (Table 9). Vermont had the highest current assets and Wisconsin the lowest. However, Wisconsin had the highest total assets due to land and buildings.

Table 9. Combined Balance Sheet for Farming and Processing Enterprises. Fiscal Year 2003

| Financial Indicator | Vermont | Wisconsin | New York |
|---------------------------------------|------------------|------------------|------------------|
| Current Assets | | | |
| Cash, checking & savings | \$10,322 | (\$1,000) | \$1,000 |
| Accounts receivable | \$10,250 | \$2,250 | \$2,000 |
| Prepaid expenses | \$0 | \$0 | \$3,750 |
| Farm feed & supplies | \$5,200 | \$4,875 | \$12,520 |
| Processed products & supplies | \$16,500 | \$3,500 | \$60 |
| Total Current | \$42,272 | \$9,625 | \$19,330 |
| Intermediate Assets | | | |
| Livestock | \$44,800 | \$81,500 | \$57,400 |
| Machinery & equipment | \$87,000 | \$137,000 | \$65,000 |
| Farm Credit & other stock | \$0 | \$0 | \$4,000 |
| Total Intermediate | \$131,800 | \$218,500 | \$126,400 |
| Land & buildings | \$357,000 | \$487,600 | \$350,000 |
| Other assets | \$0 | \$2,000 | \$0 |
| NPV of Leases | \$14,499 | \$0 | \$0 |
| Total Assets | \$545,571 | \$717,725 | \$495,730 |
| Current Debt | | | |
| Operating & short-term | \$10,000 | \$1,500 | \$15,000 |
| Accounts payable | \$0 | \$2,000 | \$8,000 |
| Current portion of inter. & long debt | \$13,832 | \$49,885 | \$8,762 |
| Total Current Debt | \$23,832 | \$53,385 | \$31,762 |
| Intermediate Debt | \$53,000 | \$273,287 | \$207,883 |
| Long-term Debt | \$17,000 | \$297,175 | \$0 |
| NPV of Leases | \$14,499 | \$0 | \$0 |
| Total Liabilities | \$108,331 | \$623,847 | \$239,645 |
| Net Worth | \$437,240 | \$93,878 | \$256,085 |
| Debt/Asset Ratio | 19.9% | 86.9% | 48.3% |
| Current Ratio | 177.4% | 18.0% | 60.9% |

Wisconsin also had the most debt with total liabilities generating the lowest net worth. The low current ratios of Wisconsin and New York could not be offset by the addition of the farms' assets, which remain below recommended levels.

Another measure of performance is the economic costs and returns of a business or enterprise (Table 10). Essentially, these account for the full "economic cost" of production and processing, which includes the opportunity cost of capital and the full value of the operator's labor.

Table 10. Buildup of Costs and Returns per Hundredweight. Fiscal Year 2003

| Financial Indicator | Vermont | Wisconsin | New York |
|---|------------------|-------------------|------------------|
| Milk Production | | | |
| Net feed & crop | \$2.47 | \$7.02 | \$9.91 |
| Hired labor | \$1.01 | \$1.54 | \$6.38 |
| Operator's & unpaid family labor | \$29.12 | \$5.00 | \$4.35 |
| <i>Total Labor</i> | \$30.12 | \$6.53 | \$10.73 |
| Net farm machinery | \$5.84 | \$2.73 | \$3.02 |
| Net livestock purchases | (\$0.85) | (\$4.53) | (\$2.33) |
| Marketing & livestock expense | \$1.22 | \$2.72 | \$3.67 |
| Farm utilities & other farm expenses | \$2.06 | \$0.88 | \$0.68 |
| Farm real estate repair, taxes & rent | \$4.31 | \$0.29 | \$1.30 |
| Farm depreciation | \$4.77 | \$1.04 | \$0.68 |
| Interest paid | \$0.97 | \$2.09 | \$0.00 |
| Interest on equity | \$12.01 | \$3.82 | \$7.07 |
| <i>Total Interest</i> | \$12.98 | \$5.91 | \$7.07 |
| Net miscellaneous expense | \$3.16 | \$0.74 | \$1.75 |
| Cost per cwt. Of milk Production | \$66.08 | \$23.32 | \$36.45 |
| Product Processing | | | |
| Hired labor | \$3.43 | \$76.59 | \$0.31 |
| Operator's & unpaid family labor | \$54.08 | \$253.56 | \$19.90 |
| <i>Total Labor</i> | \$57.51 | \$330.15 | \$20.21 |
| Materials & supplies | \$5.31 | \$74.48 | \$8.23 |
| Processing equipment repair/expense | \$1.06 | \$1.16 | \$4.23 |
| Processing real estate repair, taxes & rent | \$1.26 | \$3.66 | \$0.79 |
| Processing utilities | \$3.19 | \$7.27 | \$4.14 |
| Processing depreciation | \$3.18 | \$74.49 | \$5.17 |
| Interest paid | \$2.39 | \$44.10 | \$5.48 |
| Interest on equity | \$0.34 | \$0.00 | \$0.00 |
| <i>Total Interest</i> | \$2.74 | \$44.10 | \$5.48 |
| Marketing | \$9.26 | \$31.47 | \$4.30 |
| Net miscellaneous & other expenses | \$4.64 | \$16.82 | \$2.67 |
| Cost per cwt. Of Milk Processed | \$88.15 | \$583.60 | \$55.22 |
| Average per cwt. Revenue on Product Sales | \$72.85 | \$138.93 | \$67.40 |
| Net Return per cwt. Over Cost | (\$81.38) | (\$468.00) | (\$24.27) |

The buildup of costs and returns per hundredweight was done for both the production and processing of the milk. The operator's and unpaid family labor costs for milk production in Vermont was significantly higher than that of Wisconsin and New York. The interest on equity was also relatively high for Vermont while Wisconsin had the lowest cost. The highest cost for milk production in Vermont was more than three times the lowest, largely due to labor costs. The

cost per cwt of milk production was the lowest for the Wisconsin farm at \$23.32 while Vermont and New York had costs of \$66.08 and \$36.45 respectively.

Although the Wisconsin farm had the lowest economic cost for milk production, it had the highest cost per cwt of milk processed. Most of this expense came from labor costs, materials and supplies, depreciation, interest, and marketing. The materials and supplies cost was nearly twenty times the amount of the lowest cost and the total labor cost was over sixteen times the lowest cost for the other operations. A key finding is that the net return per cwt over full economic costs for each enterprise was negative. This suggests that the full economic cost of producing value-added products is not being covered by the returns, despite significantly higher revenues per cwt of milk processed.

CHAPTER V

Summary, Conclusions, and Recommendations

Summary

The dairy industry is ever-changing and in need of information to improve the success of dairy operations across the nation. Although there has been increased interest in value-addition in general, information regarding the benefits of value-added dairy remains limited. The main objective of this study was to provide additional information about the outcomes of businesses that have invested in small-scale dairy processing in addition to milk production. This case study analyzed financial documents such as the income statements, balance sheets, and economic costs and returns per hundredweight for the farming and processing enterprises separately, and for the business as a whole. Because this is a study of only three businesses for one year, the information gathered should not be considered a general result for all value-added dairy operations. However, this information is useful for the businesses as well as others that are considering the transition to value-added. By separating the farm and processing, the performance of each enterprise can be assessed the financial situation of each can be improved.

Conclusions

The main conclusion drawn is that similar size operations in terms of cow numbers can have highly different production and financial outcomes. This is evident for many of the outcomes examined even though only three businesses were examined. This suggests that there is unlikely to be a small set of value-added enterprise models that potential entrants can easily follow to achieve success. Another important conclusion is that the profitability of value-added

operations should not be assumed, given that even when net income is positive (as it was for two businesses) the rate of return on assets and a full economic costing indicated negative returns overall for all three of the businesses examined in this study. (One implication of this is that it is valuable to examine multiple indicators of financial performance.) Another finding is that it appears challenging to have both profitable milk production and dairy processing (marketing) enterprises. None of the businesses examined in this study had both profitable milk production and processing enterprises. This calls into question one of the fundamental premises of value-added agriculture, that the combined enterprise will be more profitable than a specialized one. It is also consistent with the concerns about value-added agriculture raised by Streeter and Bills (2003a, 2003b) that adding enterprises will add management challenges in addition to the need for more assets. This knowledge is important for potential value-added businesses to consider when investigating the possibility of a value-added dairy operation. Finally, there is a need for more information to understand which factors affect the differences in outcomes. High costs for some resources (e.g. labor in some cases) appear to play a role for some, but the small number of businesses examined in this study allows only a qualitative discussion of these factors.

Recommendations

To further understand the factors that affect the success of a value-added operation it will be necessary to have more accurate detailed information regarding the enterprises as a whole. It would be beneficial to conduct research on businesses for a more recent time period as well as for more than one year. Doing this would generate a better understanding of what factors affect the performance of the enterprises separately and as a whole. Although this study will be beneficial for the business owners and others interested in value-added operations, a more in-

depth study will be more beneficial in determining the specific factors involved in a successful value-added enterprise.

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