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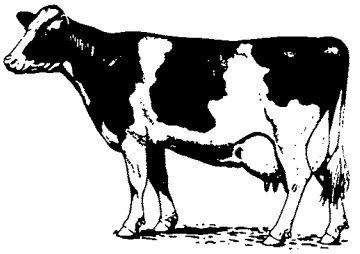

Dairy Update

POSITIONING FOR THE FUTURE: OPTIONS

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There is one certainty about the future – things will be different. Today's prescriptions will probably not work next year or in the year 2001. A clear vision of what you want your dairy business to be in five years, a positive attitude, and an open mind to change will be important for surviving and thriving in the next five years.

The dairy industry is in the midst of unprecedented change. The forces of change range from government policies, interest rates and world trade agreements to consumer preferences, new technology, and social and economic needs of dairy families. Management is challenged to control those things that can be controlled and manage around those that cannot be controlled, and to know the difference.

Family economics and lifestyle needs and wants are two critical on-farm forces of change. Dairy profit margins have become slimmer while family living costs have risen. Opportunities for quality family time and for breaks in day-to-day routines to get away are growing more important to many families. There is no single recipe for success, but there are some key ingredients; planning, profit and pleasure.

Kinds of Capital Resources

Money is only one of the capital resources needed to make a business or organization thrive. Iowa State workers discuss the importance of four kinds of capital resources; financial, human, environmental, and community or social. They suggest shortfall of any one of these capital resources can threaten the survival of the business. A dairy business is no different. Table 1 provides some brief examples of each of these capital resources.

Table 1. Capital resource requirements for a successful business.

Human	**Financial**
Education/ know-how	Savings/ investments
Values and attitude	Borrowed
Health	Business equity
Leadership	Gifts and inheritance
Environmental	**Community/ Social**
Air/ soil/ water	Mutual trust
Animal and plant diversity	Reciprocity

A dairy farm business is characterized as capital intensive. These four capital resources are interdependent and need to be balanced. Dairy management decisions of the 90's need to focus on optimizing the returns of its resources. Business success will require investing in the assets that provide the greatest returns.

Many Midwest dairies have lost their competitiveness on productivity, cost of production, capital efficiency and labor efficiency in spite of their very powerful advantage of lower feed costs. The competition from the West through use of modern technology and management techniques has lower production costs, lower investments per cow and unit of milk, and are producing more milk per hour of labor. Most Midwest dairy farms are over-capitalized and need to restructure their assets to leverage greater returns. This may mean divesting low returning lazy assets such as field machinery and investing more in those with higher yielding returns such as cows. There is no best answer that fits all. These decisions require careful study and consideration to make your business what you want it to be.

A business not growing is destined to fail. Growth must ultimately be measured by the personal fulfillment and satisfaction of those having a vested interest in the business. Profitability of a business is a survival defining criteria. An unprofitable business will eventually die. Business growth requires a road map or plan and proactive management with purpose and goals to work toward. Reactive management maintains the status quo by managing with a crisis/ fix-it management approach – this is a "don't fit it unless it's broken" approach where management waits until something breaks before they fix it.

Total Quality Management (TQM) is proactive, seeking for continuous improvement by: 1) determining what must be done, planning, seeking goals and taking action; 2) achieving, controlling and monitoring results; and 3) utilizing the efforts of oneself and others, implying importance of people and their role in plans and controls. A TQM approach focuses on getting results as opposed to just getting the job done. Dairy TQM must address the critical areas of managing production, finances and people. The primary functions of management are: planning, organizing, staffing, directing and controlling.

Have a Plan For Success

The plan is simply a draft of the road map to get from point A, where you are now, to point B, where you want to be at some future time. The plan outlines where you are now and your mission, or vision of why you have this business, with long range (strategic) goals, short range (tactical) goals, action plans/ protocols and performance standards for critical success factors. The plan focuses attention and action toward desired outcomes, mobilizes energy and effort, increases persistence, encourages development of work structure and strategies, and provides guidelines for decision making. Sharing your plan with those that work with you (suppliers, service providers and employees) will empower them to be on your team to help you reach your destination. You have a plan when you:

1. Know why you are doing it.
2. Know where you are.
3. Know where you want to be.
4. Have a strategy to reach your goals.
5. Have a means to monitor progress.
6. Have contingency plans for uncontrolled events.

Point A: Knowing Where You Are

Taking inventory and assessing the current situation is an important first step. This is an honest appraisal of Strengths, Weaknesses, Opportunities and Threats (SWOT analysis), and the resources at your disposal. This assessment should address the critical success factors; those key areas where things must go right for the business to flourish and attain the goals. This part of the plan should describe the resources available, people, land, facilities, cows, equipment and the external factors affecting the business. The past track record of performance and benchmark comparisons with others are important as are any external constraints or threats that may impact the business.

The Mission

The mission is the driving force of the business. It is a short statement that describes the vision and the reason the business exists. Exhibit 1 is an example of a mission statement for a family dairy farm. It is a people-centered statement of the vision and aspirations for the family. It identifies what is important and relates to the values of the people involved. It's critical to have consensus on the mission from all that have a vested interest in the business to engender teamwork toward a common purpose.

Business and Operational Goals

Long range or strategic goals outline what the business will look like in the future. For example:

- Produce quality milk
- Retire with no debt
- Have a safe and pleasant work environment
- Be a community leader

Strategic (DRIVE) goals are Directional, Reasonable, Inspirational, Visible and Eventual.

Short range or **tactical (SMART) goals** are revised at least annually and state what will be done to attain the DRIVE goals. They also provide benchmarks for measuring success. They are called SMART goals because they are Specific, Measurable, Attainable, Rewarding and Timed. SMART goals provide a means for benchmarking progress. Some examples are:

- Realize at least 12% return on assets in 1997
- Provide at least $40,000 for family living in 1997
- Maintain milk quality less than 200,000 SCC throughout 1997

Action plans and protocols, and control plans outline how things will be done and monitored to control the outcomes.

First Things First

Start with the end and most important. How much will you need to take from the business to support family needs, and life quality and living style aspirations: $30,000, $40,000, $50,000 or more? How much milk will you need to market to meet your goal? Begin by estimating the number of cows needed.

No. of cows = (Family living $ goal / Family living per cwt) / Production (cwt) per cow

As you plan your dairy future, start with budgeting the family living amount for each 100 pounds of milk. Remember that you are setting performance standards for production per cow and controlling production costs to ensure that the budgeted family living margin will be available for each 100 pounds of milk produced (Table 2). This helps to establish an initial target that may need fine-tuning in the planning process. Change the Midwest practice of taking what's left for family living by starting with it. The amount that Midwest farms draw for family living typically ranges from about $3.00 per cwt to nothing. Depreciation supports family living on many farms. Plan your growth with your end in mind. Many Midwest farms have unrealistic expectations of the income possible from the amount of milk marketed.

Table 2. Family living goals per cwt needed.

Total annual milk lb produced	Family living goal, $ per year		
	$30,000	$40,000	$50,000
	$ per cwt of milk		
500,000	$6.00	$8.00	$10.00
800,000	$3.75	$5.00	$6.25
1,100,000	$2.72	$3.64	$4.54
1,400,000	$2.12	$2.86	$3.57
2,000,000	$1.50	$2.00	$2.50

Signs of a Healthy Business

Profitability. Returns on assets are at least 6% but are really healthy when 1.5 to 2% above prime interest rates. New investments need a greater return than lending rate on assets. Returns on equity (value of owned assets) should be greater than a CD or treasury bill considering the risk of farming (6 to 10%).

Liquidity. Bills are paid on time and current assets are at least 1.25 times current liabilities. Working capital (Current assets – Current liabilities) is more than 25% of the value of farm production.

Solvency. Equity to asset ratio (Owned assets / Total assets) greater than 60%. Ratios less than 40% are considered risky especially for a business with marginal profitability.

Financial Performance/ Efficiency Measures. How well do the business assets generate revenue and how efficient is the production system?

- Asset turnover ratio (Value of production / Total farm assets) greater than 35%.
- Operating expense ratio (Total operating expense / Value of production) less than 65%; tells how much of each dollar is going to expenses.
- Depreciation expense ratio (Depreciation expense / Value of production) less than 12%. If 5% or less, you may not be investing enough in your business to be competitive long term.
- Interest expense ratio (Interest expense / Value of production) less than 12%.

- Net farm income from operation ratio (Net farm income / Value of production) greater than 20%; tells how much of each dollar is available for family living, to build equity (growth) and service debt.

SUCCESS FACTORS

What are the critical success factors of your business, how do you measure and monitor them, and how do you control them? The dairy profit equation is basic and quite simple:

$$\textbf{Profit} = (\textbf{Price} - \textbf{Cost}) \times \textbf{Volume}$$

The three primary levers to increase profit are: 1) increase price; 2) reduce cost; 3) increase volume. The management challenge is to find the best balance. A change in price, cost or volume may affect one or both of the other factors. Changes in the production or economic components of the business are closely related and must be based in part on past performance and on forecasts of future performance. The best that a business can do is to make some estimate of the range of possible future costs and returns relative to earning a high or low profit on a particular investment. The performance of any business can be compared to similar businesses and to the goals and objectives of the manager. This is called comparative analysis or benchmarking.

Benchmarking can be a powerful tool for continuous and competitive improvement. Knowing your strengths and weaknesses helps focus on the management factors that will make the biggest difference. Tables 3 and 4 provide benchmarks for your comparison.

Key Differences Between High and Low Profit Dairies

There are wide farm-to-farm differences in the economic and production performance of producing milk. A comparison of high and low profit Minnesota dairies (Table 3) reveals some important success characteristics.

Profitability. Return on assets was 5.3% for high profit dairies while the low profit group had a negative return. This resulted in a higher return to labor management and equity capital of $4.32 compared to $-1.82 per cwt of milk.

Production Performance. High profit dairies produced 5,600 lb more milk per cow and had larger herds (61 vs 49 cows per herd). Minnesota studies showed that with good cost control and balanced management, returns to labor and management increased by $0.30 to $0.50 per cwt of milk for each additional 1,000 lb of milk produced per cow. Milk and feed values will affect this return.

Price Income Performance. High profit dairies had an income advantage of $1.42 per cwt of milk marketed. High profit dairies received almost $0.50 more per cwt for their milk largely due to quality premiums. Sales of cows and calves and animal inventory changes added $0.94 per cwt to the advantage.

Cost Control. High profit dairies had a lower operating expense ratio – spending $0.58 to generate $1.00 of income compared to $0.93 for the low profit group. Total cash cost of production was $11.08 compared to $15.79 per cwt for the low profit group. High profit dairies had lower feed costs by $2.73 per cwt ($6.19 vs $8.92), lower other variable costs ($3.26 vs $5.10) and lower depreciation costs ($1.63 vs $1.77).

Family Living and Unpaid Labor. The cost per 100 pounds of milk to generate $30,000 for family living and unpaid labor was $2.53 vs $4.48 per cwt, leaving a higher margin above family living for the high profit group.

Capital Use. High profit dairies had less debt (41% vs 59%), higher investment per cow but lower investment per cwt of milk.

Table 3. Cost profile summary - high profit vs low profit Minnesota dairies in 1994 (includes herd replacements).

	High 20%	Average	Low 20%
PROFITABILITY PERFORMANCE			
Return on assets, %	5.3	-.5	-12.3
Return to labor, capital, management, $/cwt	4.32	2.49	-1.82
Net cash dairy income, $	51,268	23,242	-12,208
PRODUCTION PERFORMANCE			
Number of farms	118	586	75
Number of cows	61	55	49
Milk/cow, lb	19,459	16,888	13,745
Calf death loss, %	9	18	21
PRICE INCOME PERFORMANCE			
Milk sales, $/cwt	13.29	13.07	12.80
Cull cows & calves, inventory adjustment, $/cwt	2.10	1.73	1.16
Gross revenue/cwt, $	15.39	14.80	13.97
COST CONTROL			
Operating expense ratio, %	58	68	93
Total cash cost & depreciation, $/cwt	11.08	12.32	15.79
Feed cost (including replacements), $/cwt	6.19	7.22	8.92
Other variable costs/cwt, $	3.26	3.44	5.10
Depreciation, $/cwt	1.63	1.65	1.77
FAMILY LIVING & UNPAID LABOR			
Family living, unpaid labor, $*	30,000	30,000	30,000
Family living, unpaid labor/cwt, $	2.53	3.21	4.48
Margin above family living, $/cwt	1.79	-.72	-6.31
CAPITAL USE**			
Investment/cow, $	8,170	6,844	6,234
Investment, $/cwt	42.00	41.00	45.00
$ debt/cow	3,351	3,218	3,647
$ debt/cwt	17.00	19.00	27.00
Debt:Asset ratio, %	41	47	59

* Family living of $30,000 is used to illustrate the differences among farms.
** 1993 values for capital use; 1994 values were not available.

Source: 1994 Farm Business Management Association Summaries, compiled by B.J. Conlin.

Table 3 takes the cost of production to another level of detail in the Cost Profile Summary of high and low profit Minnesota dairies. It is important to understand the "why's" for the differences when comparisons are being made. Be sure the differences represent real differences in the cost profile and not because of the way costs were reported. These are useful values to compare or benchmark your herd. Table 4 breaks out financial performance for herds of various sizes. This comparable summary provides insight into the financial performance of herds of various sizes. The performance values in the Table 4 are useful for benchmarking.

Table 4. Dairy farm financial performance by herd size - 1995 AgBase Participants (Farm Credit Services - preliminary).

Financial performance measure	< 50 cows (n = 183)	50-100 cows (n = 431)	100-200 cows (n = 173)	> 200 cows (n = 34)
LIQUIDITY				
Current ratio	12.1:1	28.5:1	65.8:1	17.2:1
Working capital	43,336	78,146	138,598	287,551
SOLVENCY				
Debt:Asset ratio, %	20.9	27.3	27.4	33.5
Equity:Asset ratio, %	79.0	72.6	72.5	66.5
Debt:Equity ratio, %	23.5	37.0	35.2	50.4
PROFITABILITY				
Return on assets, %	5.4	7.3	8.5	10.1
Return on equity, %	4.3	6.3	9.3	12.8
Net farm income	26,370	47,325	79,699	152,168
FINANCIAL EFFICIENCY				
Asset turnover ratio	.31	.36	.41	.52
Operating profit margin ratio, %	18.5	23.4	22.9	27.3
Operating expense ratio, %	50.7	53.1	57.0	59.9
Depreciation expense ratio, %	7.4	7.0	6.2	6.4
Interest expense ratio, %	5.7	7.0	6.0	7.8
Net farm income from operations ratio, %	27.9	26.6	24.6	21.9
REPAYMENT CAPACITY				
Term debt coverage	4.1	4.1	2.4	4.6
Capital replacement and term debt repayment*	24,986	45,163	40,421	175,506

* Incomplete information; does not include values for payments on unpaid operating debt for the prior period or principal paid on personal liabilities.

Farm Financial Standards Council recommendations used for computations.

Balanced Management

The factors affecting profitability are interdependent. Profit results are dependent on managing several factors to above average levels. Table 5 was prepared by the Farm Credit Banks of Springfield, MA of 731 dairy farms in the Northeastern U.S.

Table 5. Factors in dairy farm profitability.

No. of factors above average	No. of farms	No. of cows	Net earnings per cow, $
0	87	73	-105
1	246	76	-33
2	210	123	35
3	131	183	81
4	57	256	161
All farms	731	122	44

Factors: No. of cows, milk per cow, milk per worker, and feed and crop expense per cwt (Northeast Dairy Farm Summary, 1993).

Fitting Technology to the Production Level

Dairy technologies do not work the same for everyone. Many of today's technologies need to be used as part of a package of practices to be cost effective. Figure 1 illustrates this principle. Care needs to be used in choosing the combinations of technology that will yield the best payoffs.

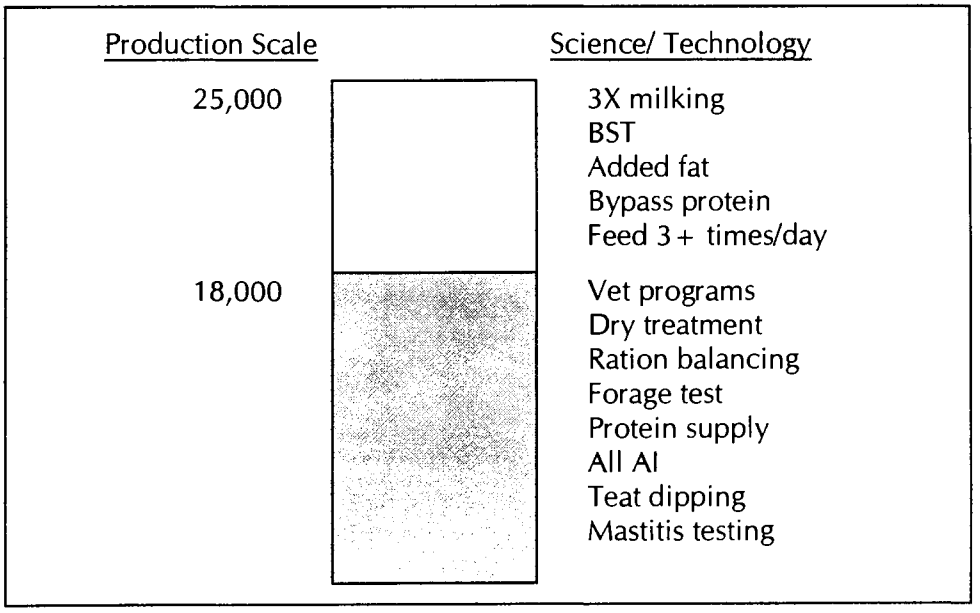

Figure 1. Fitting technology to production level.

Several management practices and some new technologies will be most cost effective when used to achieve higher levels of productivity from already high levels and be less cost effective for lower producing herds. Examples might include: milking three times per day; bypass protein; added fat; feeding three or more times per day; and use of BST. Use of DHI records, forage testing, balanced rations, mastitis control practices and milking procedures must precede the high production practices. Increased productivity is a major profit enhancing opportunity on a majority of upper Midwest dairy farms. Overcoming this profit constraint is a necessary first step to be positioned to make additional investments in the dairy farm business.

RELATING $'S TO HERD PERFORMANCE

Efforts have been made at the University of Minnesota and elsewhere to estimate how some of these production management practices and corresponding measures of performance affect profitability. Table 6 shows comparative estimates of returns over cash expenses for a 75-cow herd producing 18,000 lb milk for five factors. The first five factors in the table show single factor effects on economic efficiency independent of changes in production. Most of the gains in economic efficiency are due to longer calving intervals and mastitis infection levels. The mastitis infection level also represents a $.30 per cwt loss in milk quality premium. The single factor values can help establish the relative importance with the feed and milk prices used. The relationships will change with changing prices. The combined effect of the five factors and the impact productivity has on returns is also shown.

Increased productivity from 18,000 to 22,000 lb per cow under average management lowered economic cost by $1.87 per cwt (Table 6). The bonus for the same increase under excellent management was an extra $0.62 per cwt to lower cost by $2.49 per cwt. Table 6 shows the rewards of increasing productivity and excellent efficient production management combined to yield the largest rewards.

Table 6. Economics of management performance (*example base herd: 75 cows; 18,000 lb/cow).

			Return over cash		
Management factor	From	To	$/herd/year	$/cwt	Economic cost/cwt, $
Mastitis (SCC)	400,000	100,000	+6,566	+.38	-.59
Age at 1st calving	27	24	+7,823	+.58	-.60
Replacement ratio, %	40	27	+4,006	+.29	-.63
Calving interval, mo.	13.5	12.5	+10,084	+.61	-.55
Calf mortality, %	20	5	+285	+.02	-.55
Combined change of above five factors			+18,260	+1.09	-1.49
PRODUCTION					
Average mgmt	18,000	22,000	+20,789	+.97	-1.87
Excellent mgmt	18,000	22,000	+26,842	+1.33	-2.49

Base inputs: Milk $11.50/cwt; Corn $3.25/bu; SBOM $240/ton; Hay $75-$90/ton; Cull cows $400/hd; Veal calves $25/calf; Investment/cow $5,000; Debt/cow $1,800; Equity 64%.

Table 7 illustrates how some of these factors impact feed costs with no change in feed prices. Management of SCC, age at first calving, herd replacement rate, calving interval, dry periods, calf mortality and production per cow all impact feed costs. The net impact on feed cost was $-1.15 per cwt, from $6.76 to $5.61.

Table 7. Feed costs for two management scenarios.

	No. of animals	Daily $	Per cwt $	No. of animals	Daily $	Per cwt $
Milking cows	63	2.64	4.51	63	3.06	4.34
Dry cows	12	.86	.27	12	.92	.20
Yearlings	40	1.13	1.23	27	.91	.55
Calves	32	.88	.76	32	.73	.52
			$6.76			$5.61
MANAGEMENT						
Milk production		18,000 lb			22,000 lb	
SCC		400,000			100,000	
Age at 1st calving		27 mo.			24 mo.	
Replacement, %		40%			27%	
Calving interval		13.5 mo.			12.5 mo.	
Dry period		64 days			55 days	
Calf mortality		20%			5%	

RISK MANAGEMENT

Change is risky, so why change? This is a common perception of change. We often forget to consider the risk of no change, which may be far riskier than change. One of the best risk-averse strategies is to make the change and use the technologies that make the business competitive.

Long-run returns (excluding appreciation) in agriculture have been quite low over time; therefore, it has often been difficult to justify making the necessary capital investments needed to take advantage of new technology and production systems. The capital investments in the dairy sector have often resulted in low returns (2 to 4% ROA) often due in part to over-investment in machinery, buildings, equipment and land. The challenge for the future, as margins continue to tighten, is to focus on the assets that will provide the greatest returns and reduce your investment in lower return assets. This may mean increasing the level of specialization within your dairy and having other businesses provide inputs and services (feed, heifers, contract veterinary services, contract manure handling, etc.) to your business.

Suppose that a firm you are considering investing in can earn $1 per share with certainty or, alternatively, $2 per share with a 90% probability, but there also exists a 10% chance that the firm will go bankrupt. The decision is not an easy one. One needs to assess whether or not the additional $1 of profit is sufficient to offset the 10% chance of going bankrupt. Managing your business risks will be important to the long term viability of your business. In most cases, the risk-averse entrepreneur will seek an investment strategy that will stabilize returns for a given expected profit. What impact will a percentage drop in milk price or increase in feed cost have on the profitability, cash flow and net worth of your dairy business? Using tools such as FINPACK (Center For Farm Financial Management, University of Minnesota) can help you assess some of the "what if" scenarios for your business. This will help you better understand the impact of these changes on the performance of your business.

One of the most commonly used risk management instruments is insurance. Are you covered for the catastrophic business risks associated with fire, flood, crop damage, etc.? Are you over-insured in some areas of your business? These are important questions for the astute manager to answer and review on a regular basis.

With increasing attention to maintaining and enhancing environmental quality, dairy farm managers must pay close attention to the impact of their production and management system on air, water and soil quality. Selecting from the broad range of manure and waste water collection, storage and handling strategies will directly influence capital investment requirements and annual operating costs for your nutrient management system. Comparing and contrasting the range of systems is beyond the scope of this paper. The University of Wisconsin and University of Minnesota have developed a "risk assessment" worksheet that will provide an initial assessment of various manure management systems. Addressing nutrient management issues head-on will be crucial to the success of current and expanding dairy operations today; probably more so in the future as herd sizes continue to grow and larger numbers of animals are concentrated on smaller acreages.

Managing Price Risk

We often hear dairy producers say that they have no control over their milk price. A recent analysis across several years of dairy farm business records in Wisconsin and elsewhere shows that there is often a 10% (+/-) difference between producers on milk price within a region. Much of this difference can be attributed to producing and marketing high quality milk with attention to milk composition. The recent development of a cheddar cheese and non-fat dry milk futures and options market provides dairy managers with an important tool for managing milk price risk. Futures contracts allow a hedger (usually a dairy producer or dairy products manufacturer) to lock in a set price for an upcoming cash market purchase or sale, whether or not the cash market prices rise or fall. Options contracts provide the hedger with the ability to create a minimum price floor for a sale or a maximum price ceiling for a purchase. If prices move below the minimum price ceiling, then the options are valuable and provide protection. If prices remain favorable (above the minimum floor or below the maximum price ceiling), the options are not exercised and the hedger loses only the premium payment for the options contract. At the same time, the hedger can take advantage of the more favorable market price. As more and more dairy producers become familiar and comfortable with this risk management tool, it will play a more important role in managing price risk in the future.

Management Styles

There are many ways to build a profitable dairy business. Successful managers are able to identify and leverage their management strengths. Table 8 identifies five management styles that were all in the top 25% profit group in the Northeast Dairy Farm Summary, 1993.

The management styles summary shows there are many ways to be profitable. Keeping your management in balance with your own personality, goals and resources will likely be your best route to success. Successful managers are good at optimizing the use of their resources, both human and physical.

Table 8. Management styles.

	Good with cows	Labor efficient	Superior milk price	Low cost	Generalist
Average herd size	135	185	99	129	86
Net earnings, $					
per farm	50,220	60,060	25,641	65,145	21,156
per cow	372	330	259	505	246
Return on assets, %	7.6	7.7	5.1	10.7	4.7
Milk sold, lb					
per cow	**21,956**	19,079	17,263	17,578	17,514
per worker	739,000	**1,050,000**	529,000	668,000	503,000
Net cost/cwt, $	11.80	11.82	13.46	**10.44**	12.74
Milk price, $	13.09	13.21	**14.27**	13.04	13.03
% net worth	65	66	67	67	70

CHOOSING A DESTINATION AND CHARTING A COURSE

Growing Experience

The experience of 50 Minnesota dairies between 1989 and 1993 may be helpful to others considering growth. The herds were among the 100 Holstein herds in the state that greatly increased total milk produced in 1993 compared to 1989 and having at least 75 cows. The results of this study are summarized below. In 1993 these herds produced 91% more milk than in 1989.

1. Major reasons for growth were: increased income, improve lifestyle, be more efficient, and facilities were obsolete.

2. Average increase in herd size was 51 cows, from 80 to 131 cows.

3. Average increase in production per cow was 2,086 lb milk per cow, from 17,274 to 19,320 lb annually.

4. Herds that expanded tie stall facilities had the smallest growth (28 cows), smallest increase in total milk (165%) and smallest increase in milk per worker (125,000). Expanded free stalls had the highest increase in production per cow (2,900) and milk produced per worker (262,000).

5. Herds that populated the added cows with internal herd growth had the smallest increase in herd size (38) but slightly higher increase in production per cow (2,248). Differences between purchasing cows and springers were small.

6. Greatest challenges in the transition period were: herd health (34%), obtaining finances and meeting obligations (28%), obtaining and training employees (24%), and feeding and nutrition (14%).

7. Positive affects attributed to growth were: more time to plan and manage (55%), less physical labor (57%), improve family lifestyle (45%), more disposable income (49%), and support of family and friends (28%).

8. Positive financial changes reported were: net worth (94%), net income (75%), current on bills (53%), return on assets (49%), family living dollars (47%), and retirement investments (35%).

9. Major changes in management included parlor milking, TMR rations, horizontal silos, hired labor, use of consultants, body condition scoring, personnel management practices, and use of computers.

10. In the same time period: of all DHI herds, smaller herds (less than 75 cows) increased from 46 to 47 cows and increased production from 16,904 to 17,758 lb per cow. Larger herds (over 75 cows) increased from 96 to 105 cows and 17,428 to 18,763 lb of milk per cow.

Positioning for the Future

What will your dairy business be like in five years? Will your family goals be fulfilled if you remain the same? Options for the future are many; the list of options is long.

Doing Things Better: Fine-tuning	Doing Better Things: Big Fixes
Increase productivity	Use grazing
Improve milk quality	Expand dairy - phased growth
Reduce replacement rate	Expand dairy - one large step
Improve rations	Limit cropping
Use consultants	Sell or lease assets
Improve genetics	Custom crop your land
Control feed costs	Contract replacements, feed, manure or other
Change milking practices	Network/ partnerships with others
Etc.	Etc.

The options are almost endless. What's good for one business may not be good for another.

ALTERNATIVE WAYS TO DAIRY

Many upper Midwest dairy farms are at a crossroads in trying to find better ways to reach their goals. Profitability and family lifestyles are two primary driving forces. The typical upper Midwest dairy farm is highly diversified in demands for capital, labor and management know-how. All of these resources are stretched so thinly that it is often difficult to compete. Farm families are looking for ways to work smarter, not harder and longer.

Options under consideration include: grazing, expansion, use of consultants, networking with other farmers, specialization, contracting, exiting the dairy business, surviving to retirement, etc. In 1994, a University of Minnesota study explored three alternative dairy production systems:

1. Purchasing all feed on minimum land base.
2. Raising forages and purchasing grains and concentrates.
3. Raising forages and grains to feed the herd.

The analysis was based on a new start-up dairy with the land and field machinery investment determined by the cropping plan. The systems were analyzed over a range of herd sizes from 138 to 828 cows. The dairy facilities, parlor, manure system, feed storage and housing were designed to meet herd sizes. Summary results are shown in Table 9.

Table 9. Economic performance comparison of three dairy farming systems.

	Herd size (stalls/cows)					
	100/138	200/276	300/414	400/552	500/690	600/828
Total assets, $/cow						
Purchase all	3,361	3,152	2,997	2,883	2,845	2,859
Raise forages only	5,393	4,831	4,590	4,447	4,402	4,410
Raise forages & grains	6,594	5,863	5,603	5,391	5,334	5,300
Return on assets, %						
Purchase all	2.5	9.9	12.8	15.6	16.8	17.5
Raise forages only	5.8	11.5	14.2	16.1	16.8	17.2
Raise forages & grains	4.7	10.0	12.4	14.3	15.2	15.5

University of Minnesota, 1994.

These estimates would be most representative of a new start-up dairy and may not be applicable to an individual farm or an existing dairy operation that is planning to expand. Exhibit 2 ranks these alternatives on asset value and provides more detail of the results. The results suggest some key points:

1. Dairying is capital intensive and there are substantial capital efficiencies gained up to 300 to 400 cows for all three systems. Gains are still realized beyond 400 cows but at a slower pace. These capital efficiencies are largely due to dilution of two large fixed cost items: the milking center and waste management systems. These costs are not increased greatly by increasing cow numbers.

2. Cropping machinery and the land base required to produce the herd feed supply add greatly to the capital requirements. Capital investment requirements are reduced by 15 to 20 % for the option of raising forages and buying grains compared to raising all the forages and grains. The capital investment was further reduced by 40 to 45% for purchasing all feed.

3. Increasing returns on assets (profitability) demonstrate substantial scale efficiency. Returns on assets increased most up to 300 to 400 cows, then more slowly up to 800 cows. This was true for all three systems.

4. Profitability levels (return on assets) favored the two more highly specialized systems: purchasing all feed, and raising forages only. The more diversified system of raising all feeds was the least favorable relative to returns on assets but still acceptable at larger herd sizes.

Phasing the Growth Path

Making the big leap from tie stalls to free stalls and pit parlors in not a good option for many farms and many reasons. New labor efficient pit parlors will usually require 350 to 400 cows at efficient and high levels of production to reach acceptable levels of profitability. Growing a step at a time will make the most sense to many for several reasons: less exposure to financial risk; accommodates learning a new management system; allows some of the growth in animals to come within the herd, more of the growth investment can be paid out of cash flow; may be able to use existing facilities in transition; and in the long run it may be a quicker way of getting to where you want to be. The key to phased growth is to start with the end in mind. What will it be like in 5, 10 and 15 years. Make each step count — a building block toward your bigger plan. Plan carefully to avoid needing to discard new investments along the way.

Location of current facilities may limit the use of existing facilities. Site location often limits how existing facilities can be used in growth steps. Sometimes machine sheds or other non-livestock facilities can be converted for use.

Holmes and Jones (WI) have provided three phased growth scenarios and comparisons. The base case is a 50-cow herd in tie stalls with a total asset value of $318,000. Three scenarios for milking facilities, each using eight milking units, compared were: flat barn back-out; flat barn walk-through; and a double-4 herringbone pit parlor. The flat barn options used the existing stall barn to milk. Four herd size scenarios were used. Table 10 summarizes the three options relative to milking time, added capital investment and annual capital cost. Table 11 shows the total added capital investment including a free stall barn and additional cows. The added annual net farm income for each case is in Table 12 with estimated rate of return on the added investment. These summaries illustrate some key points:

1. Milking through-put (cows per hour) was fastest for the flat barn parlor options each using eight milking units and one person milking.

2. The investment and annual capital costs for milking were 2.5 to 4 times greater with the pit parlor option.

3. Scale efficiencies are substantial for all three options with rates of return on added investments greatest with the lower investments. The higher the investment, the more cows needed to make it a wise investment.

Tables 10, 11 and 12 show examples for the first phase of what could be part of a plan to grow to 350 to 500 cows in three or four steps.

Table 10. Comparison of alternative milking systems.

	Stanchion	Back-out	Walk-through	Double-4 herringbone
Stalls	50	16	8	8
Cows/hr	32	43	45	39
Daily milking time (2X), hr				
50 cows	3.8	3.3	3.2	3.6
100 cows		5.7	5.4	6.1
150 cows		8.0	7.7	8.7
200 cows		10.3	9.9	11.3
300 cows		15.5	14.9	17.0
Capital investment, $	318,000	+18,000	+27,000	+70,000
Annual capital cost, $		2,700	4,050	10,500

Table 11. Total added capital investment.*

	Back-out	Walk-through	Double-4 herringbone
Total added investment, $			
50 (no cows)	67,750	76,750	119,750
100 (+50 cows)	194,600	203,600	246,600
150 (+100 cows)	319,100	328,100	371,100
200 (+150 cows)	441,800	450,800	493,800

Jones, Bruce, CDP, Univ. of WI.

Table 12. Herd size and parlor system comparative change in annual returns.

	Back-out	Walk-through	Double-4 herringbone
Base (stanchion, 50 cows), $	7,096	7,096	7,096
Change in return, $			
50 cows	-3,754	-4,422	-9,714
100 cows	+13,596	+13,304	+7,020
150 cows	+31,237	+31,241	+23,965
200 cows	+52,620	+52,952	+44,620

Jones, Bruce, CDP, Univ. of WI.

The following is an example of the overall four-phase plan to reach 350 to 500 cows.

A Phased Growth Example

Base: 50-cow stall barn
Asset value: $318,000
Lending capacity: $300,000 to $350,000

Phase I - Total Added Investment ($325,000)
- Purchase 100 cows ($120,000)
- Build 150-stall free stall barn for 150 cows, milking, dry and close up heifers ($135,000)
- Convert stall barn to flat barn parlor, holding area and maternity ($25,000)
- Convert machine shed into commodity feed storage ($2,500)
- Contract replacements to raised
- Use bags for storing forage and/or high moisture grains
- Implement TMR feeding ($20,000)
- Scrape and haul manure daily ($20,000)
- Focus cropping on corn silage and haylage with grains purchased
- Employ people to do the milking

Phase II - Total Added Investment ($290,000)
- Build second 150-cow free stall barn ($135,000)
- Phase 1 of manure short term (mini pit) storage ($10,000)
- Purchase 120 cows ($144,000), 30 cows from internal growth
- Employ a herdsperson

Phase III - Total Added Investment ($545,000)
- Build a double-8 milking center ($220,000)
- Expand waste and manure system ($30,000)
- Build third 150-cow free stall barn ($135,000)
- Purchase 120 cows ($144,000), 30 cows from internal growth
- Construct horizontal silos ($25,000)
- Convert stall barn to maternity ($2,500)

Phase VI - Total Added Investment ($125,000)
- Construct dry and close-up cow facility
- Add to feed storage and handling

This phased growth example is further illustrated in Exhibit 3. Economic projections are shown in Exhibits 4 and 5. Exhibit 3 diagrams the conceptual plan. Herd growth is phased in three 150-cow steps with conversion of an existing stall barn to a flat parlor and machine shed into feed commodity storage. The results illustrated by Jones and Holmes in A Phased Growth Example (above) provided guidance for the size of the first step. The rules for this illustration were for the overall equity to asset ratio not to fall below 40%, and at least $900 of earnings for debt service needed to be generated before the next growth step. The earnings for debt service were adequate to make the growth steps in 3-year intervals. While the total business assets and debt increased, the debt service capacity increased substantially under high management (20,000 lb per cow). This debt service increased with each growth step (Exhibit 4) from $133 for the base herd, $376 for 150 cows, $456 for 300 cows, $694 for 450 cows, and $721 for 500 cows. The impact on the asset, debt and debt service capacity

is also shown in Exhibit 4. Note how the assets per cow are greatly diluted while debt per cow increases marginally in the first step and then declines. Exhibit 5 shows the economic cost of producing milk at each growth step. The major impact is on diluting fixed costs and the family draw per cwt of milk to generate $40,000 for family living.

The first expansion step out of the stall barn is the most difficult because of major adjustments needed in the way things are done and in how people, cows and finances are managed. The size of the first phase will usually be limited by available capital while it also needs to be big enough to take advantage of scale efficiencies. Up to 300 to 400 cows the manager will also have to wear a laborer's hat. Size will limit the degree that labor can be specialized and structured in the most efficient way. It is easier to structure and specialize labor at larger herd sizes. Once growth process is started, continuous internal growth from within the herd can be generated with good management to minimize the cow replacement rate.

Positioning For The Future

Positioning your dairy business to thrive in the future will require greater attention to detail than has been typical of many managers of the past. Careful scrutiny of all investments and vigilant cost control will go a long way in increasing the chances of success today and in the years ahead. Know your strengths and weaknesses; leverage your strengths and minimize your weaknesses. Keep the end in mind on what you want from the business. Use the power of planning to chart your course and monitor progress. Your mission and goals will guide you in setting priorities and help you focus on targets along the way. These will be exciting times for those welcoming the opportunities and challenges facing them as they go about meeting their family and business goals.

Growth Guidelines

1. *Focus on growing profits.* Herd size is just one of many factors affecting profitability. Many Midwest dairies need to position themselves first by correcting existing weaknesses and leveraging their opportunities. Many farms have major opportunities to strengthen their profitability with improved cost control, increased productivity, eliminating or redirecting lazy assets or low returning enterprises.

2. *Invest in assets that generate the greatest returns.* Cows are an appreciating asset and the one that generates income in the dairy business from milk sales. Machinery and equipment require repair and maintenance, and depreciate rapidly – 12 to 18% per year. Buildings depreciate 5 to 7% per year. Land is a speculative investment that will probably appreciate with the rate of inflation.

3. *Investments made from cash flow as opposed to borrowed capital are much less costly.* An added $1,000 borrowed per cow at 20,000 lb milk will increase cost of producing milk by $.30 to $.40 per cwt.

4. *See the future as an opportunity.* Carry a positive attitude and open mind, and a thirst for learning new things and taking on new challenges. Thinking, planning, communicating, negotiating and leadership will be crucial to your success.

5. *Smell the roses and enjoy what you are doing.* Take time to cultivate the things that are really important to you and your family.

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EXHIBIT 1: Sample Mission Statement

Busy Acres Farm - Mission Statement

Our mission is to operate a dairy farm that will provide:

Financial success through the marketing of high quality milk.

A high standard of living for our family and a comfortable retirement for family farm participants.

A rural family living environment with ample time for recreation and personal growth for all involved.

Opportunities for family member involvement and advancement in the farm business.

The farm should be comfortable to work around, be labor efficient, provide a happy work environment, and express a high degree of pride.

Jeffrey Peterson Family
Busy Acres Farm
Marshall, Minnesota

EXHIBIT 2: Dairy Farm Alternatives Ranked On Asset Value

	Herd size	Asset value		40% equity	Ret. on assets, %	Cash surplus	Oper. exp., %	Land base, acre
		Total	Per cow					
Purchase all feed	138	464,000	3,400	185,600	2.5	none	88	20
Raise forage/ purchase grains	138	745,000	5,400	298,000	6.5	19,000	74	242
Purchase all feed	276	870,000	3,200	348,000	9.9	50,775	83	30
Raise forage & grains	138	910,000	6,600	364,000	4.7	32,000	77	400
Purchase all feed	414	1,241,000	3,000	496,400	12.8	82,000	81	40
Raise forage/ purchase grains	276	1,334,000	4,900	533,600	10.1	55,000	76	483
Purchase all feed	552	1,592,000	2,900	636,800	15.6	121,000	79	50
Raise forage & grains	276	1,619,000	5,900	647,600	10.0	85,000	72	789
Raise forage/ purchase grains	414	1,901,000	4,600	760,400	12.7	99,000	73	725
Purchase all feed	690	1,964,000	2,850	785,600	16.8	160,000	78	60
Raise forage & grains	414	2,320,000	5,600	928,000	12.4	143,000	69	1,179
Purchase all feed	828	2,368,000	2,850	947,200	17.5	199,000	78	70
Raise forage/ purchase grains	552	2,455,000	4,500	982,000	14.5	141,000	72	966
Raise forage & grains	552	2,977,000	5,400	1,190,800	14.3	207,000	67	1,568
Raise forage/ purchase grains	690	3,038,000	4,400	1,215,200	15.1	182,000	71	1,208
Raise forage/ purchase grains	828	3,652,000	4,400	1,460,800	15.4	220,000	71	1,449
Raise forage & grains	690	3,667,000	5,350	1,466,800	15.2	270,000	66	1,958
Raise forage & grains	828	4,388,000	5,300	1,755,200	15.5	326,000	66	2,347

Stahl, T.J., Univ. of MN, 1994.

EXHIBIT 3: Stepping Into The Future Diagram

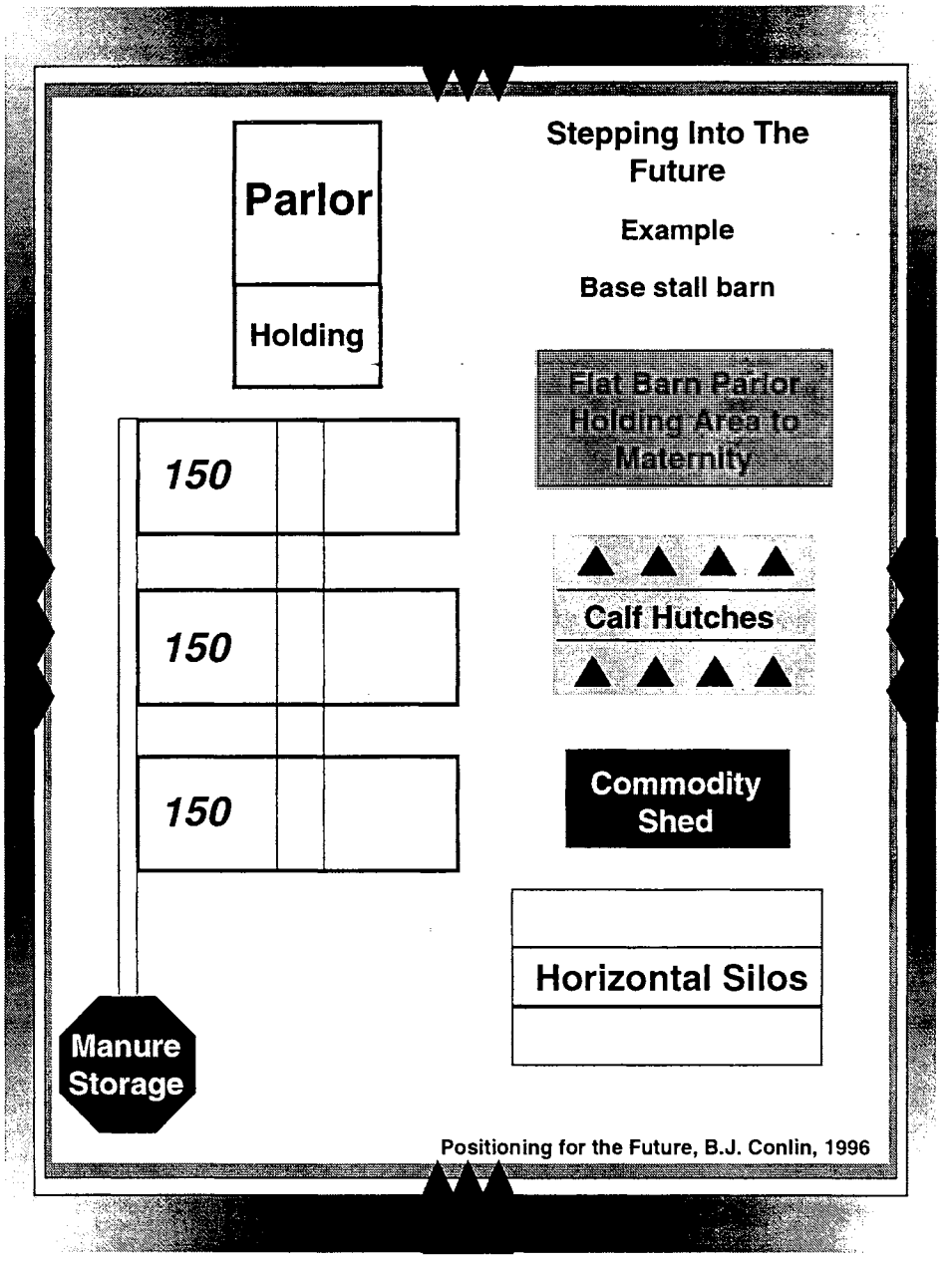


EXHIBIT 4: Asset, Debt and Debt Service Per Cow Example

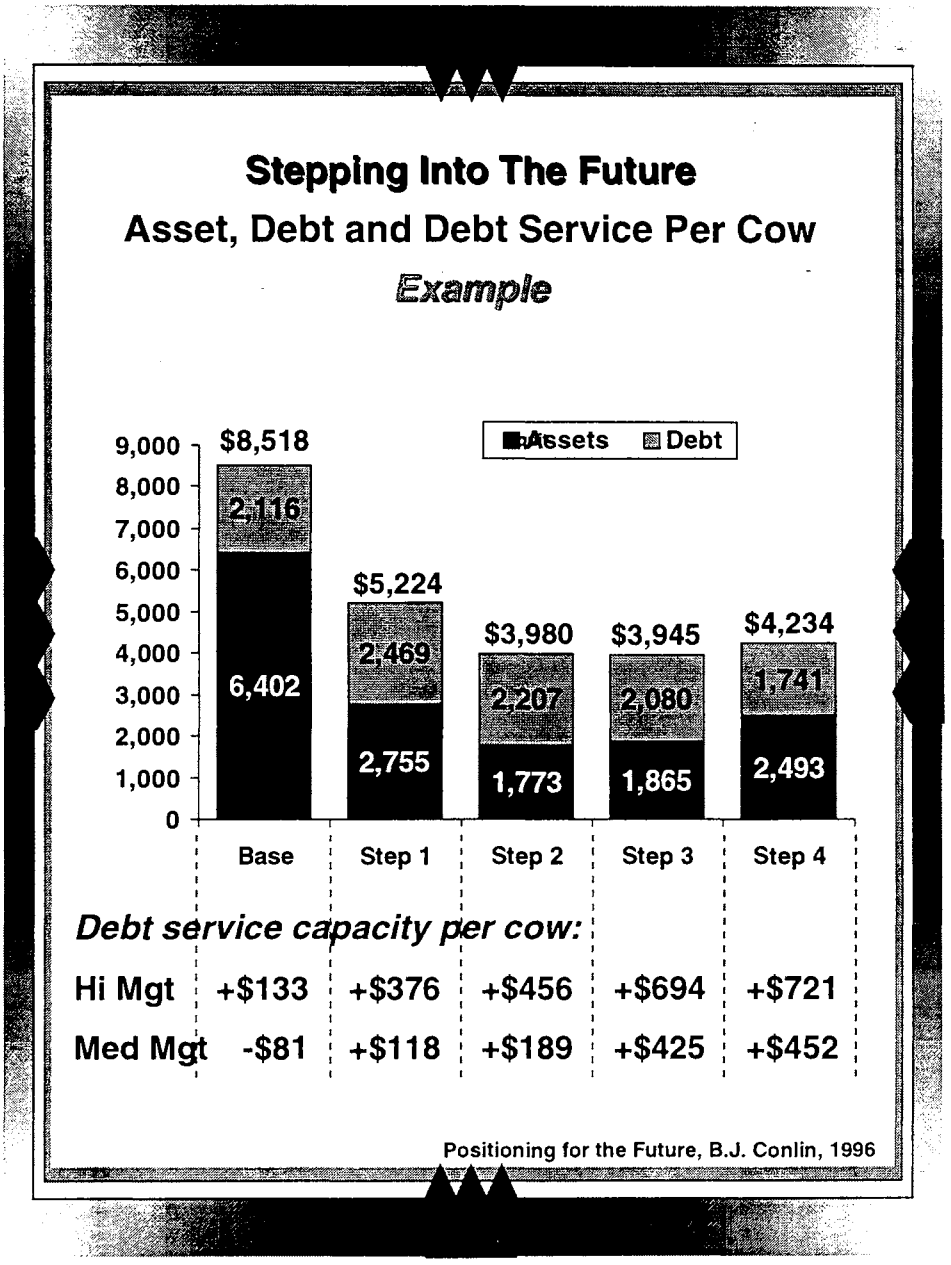
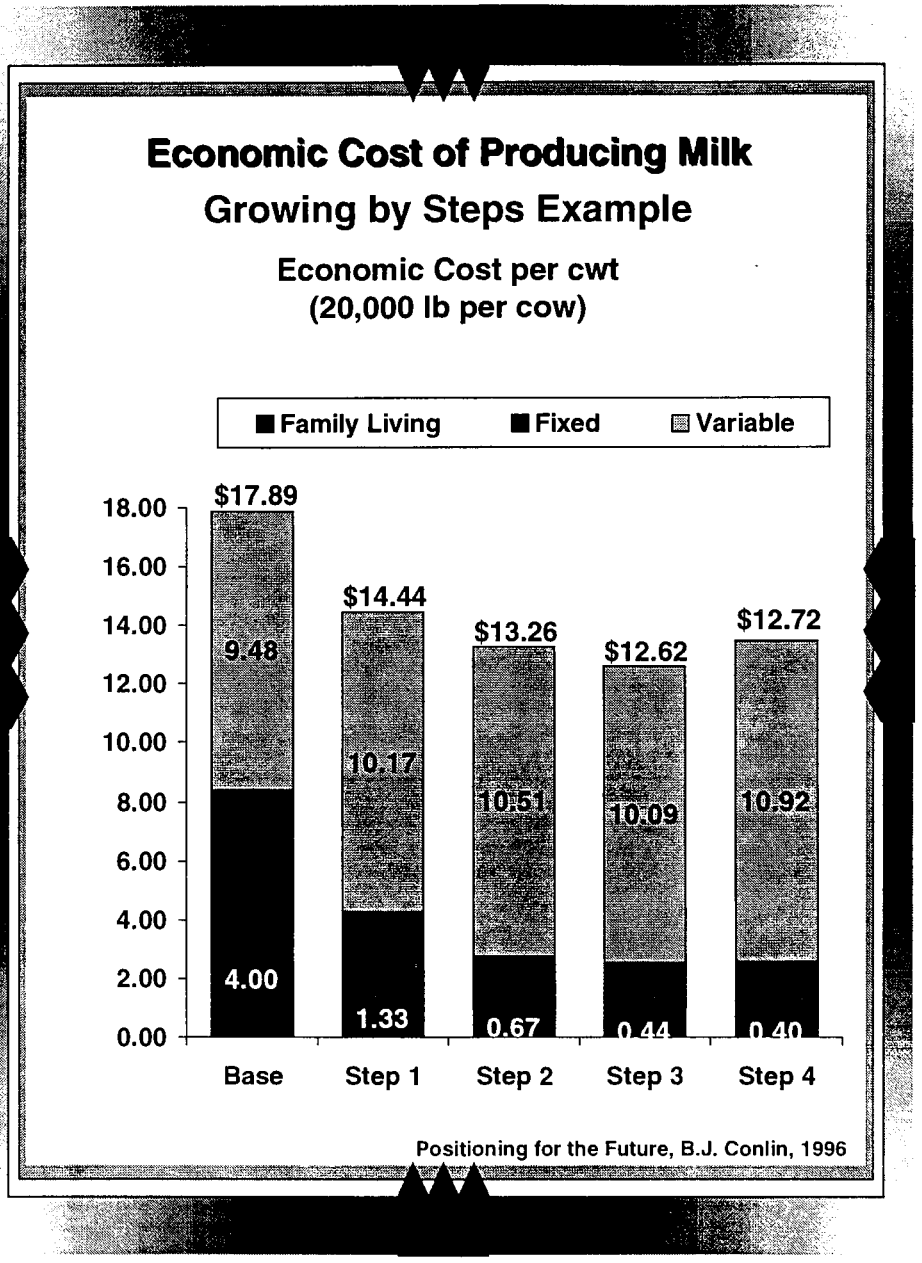


EXHIBIT 5: Economic Cost of Producing Milk



APPENDIX
to
Dairy Update 124

Ball Park Planning Values

Values are approximate and are intended only
to initialize the planning process.

Individual farm circumstances, specific materials and
service providers, and demands/shortages can vary greatly.

Estimated Ball Park Planning Figures

	Cost Range
New Free Stall Barn	$600 to $1,400 per stall ***(see Appendix Table 1 for options)***
Flat Barn Parlor (per milking stall*)	
Walk in back-out	$1,350 to $3,750
Walk-through	$2,000 to $5,300

* Includes remodel milk area, stall and equipment, but note that cost will be highly variable depending on needed upgrades in building, milking system and milk cooling.

Herringbone Milking Center (per milking stall*)	Cost Range
Double-4	$10,000 to $14,000
Double-8	$10,000 to $17,000
Double-10	$13,000 to $18,500

* Includes building, milking equipment, detachers, power entry gates, crowd gate, bulk tank and milk room equipment. Expensive parlors - add 10 to 25%; low cost - subtract 10 to 15%.

Manure System

	Cost per 1,000 Gallons of Storage*
Earthen/storage	$36 to $88
Above ground	$141 to $198

* Based on 500,000 gallon capacity, costs will decrease with larger size.

Feed System	Cost Range
New commodity shed	$15,000 to $30,000
Bunker silo	$70 to $80 per ton DM
Tower silo with unloader	$190 to $230 per ton DM
Silo bags	$12 to $17 per ton DM (annual cost)
TMR mixer	$12,000 to $40,000

Appendix Table 1. Price estimates for free stall barns.*

Barn description	Price estimates (cost per stall) Uninsulated	Small amount of insulation (R-3 to R-6)	Heavily insulated (R-11 to R-19)
Three-row drive-by	$600 - $800	$650 - $880	not applicable
Three-row drive-through	$650 - $850	$700 - $950	$800 - $1,100
Two-row drive-by, stalls arranged tail-to-tail	$700 - $900	$750 - $1,000	not applicable
Two-row drive-through, stalls arranged tail-to-tail	$925 - $1,050	$975 - $1,180	$1,100 - $1,350
Four-row drive-through, stalls arranged tail-to-tail	$750- - $950	$800 - $1,050	$900 - $1,200
Four-row drive-through, stalls arranged head-to-head	$800 - $1,050	$850 - $1,100	$1,000 - $1,300
Six-row drive-through	$675 - $850	$710 - $940	$810 - $1,025

* Includes costs for: 1) structure, 2) concrete, 3) excavation, 4) gates and stalls, 5) stall mattresses, 6) curtains, 7) electrical work, 8) water and plumbing. Does not include price of lock-ups ($40 per lock-up) or waste management.

Chastain, J.P., The Chastain Collection, Univ. of MN, 1995.

Appendix Table 2. Price estimates of moderately priced new herringbone and parallel milking centers.*

	Stalls per side					
Herd size	4	6	8	9	10	12
50	78,000					
100	88,000	123,000	157,000			
150	98,000	133,000	167,000	184,000		
200	108,000	146,000	180,000	197,000	258,000	301,000
250		157,000	191,000	208,000	269,000	312,000
300		167,000	202,000	219,000	279,000	322,000
350		178,000	212,000	229,000	290,000	333,000
400		189,000	223,000	240,000	301,000	344,000
450		200,000	234,000	251,000	312,000	355,000
500		210,000	245,000	262,000	323,000	366,000
550			255,000	273,000	333,000	376,000
600			266,000	283,000	344,000	387,000
650				294,000	355,000	398,000
700					366,000	409,000
800						430,000

* Includes: milking equipment, automatic detachers, power entry gates, crowd gate, bulk tank and other milk room equipment. Milk meters cost an additional $700 to $1,000 per stall. Consult an equipment dealer for cost of computer equipment, automatic cow identification, sorting gates and other options. Parlors with many of these options, or more expensive buildings or stalls, can cost 1.1 to 1.25 as much as the values shown. Low-cost automated parlors with the most basic equipment can cost 10 to 15% less than the values shown.

Chastain, J.P., 1995.

Appendix Table 3. Comparison of costs for manure storages (MSCS, 1993).

Type of storage structure	Approximate cost per 1,000 gallons of storage capacity*
Unlined earthen basin	36
Clay-lined earthen basin using clay available on-site	70
Clay-lined earthen basin using clay from an off-farm borrow site (varies with haul distance)	88
Earthen basin lined with a plastic liner (geosynthetic membrane)	76
Earthen basin lined with concrete	88
Above ground tank constructed with precast concrete	141
Round, above ground tank constructed of poured in place concrete	163
Above ground, glass-lined tank	198

* Cost estimates based on 500,000 gallon storage capacity. Cost per 1,000 gallons will decrease significantly for larger storages. Manure volume to store can vary greatly depending on size of animals, bedding used, milking center waste water, precipitation, etc. Typical range will be 2 to 4 cubic feet or 14 to 30 gallons per cow per day. Investment to hold 1 year supply may range from $200 to over $800 per cow for earthen basins.

Chastain, J.P. and D. Schmidt, Univ. of MN, 1995.