

Your Dairy In Transition

Ag. Eng. 123SR942
A.R.M.E. E.B. 94-19
Animal Science Mimeo #177



A Planning Process for Considering Dairy Farm Expansion

**** Appendix ****

***Worksheets for Analyzing and Planning
Your Dairy Farm Expansion***




***Developed by
Faculty and Staff***



**Cornell
Cooperative
Extension**



Workbooks in this series include:

-  Your Farm and the Industry
-  A Planning Process for Considering Dairy Farm Expansion
-  Winding Down Your Farm Operation

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Your Dairy in Transition...

A Planning Process for Considering Dairy Farm Expansion

*** Appendix***

Worksheet for Analyzing and Planning Your Dairy Farm Expansion

**Developed by
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Your Dairy in Transition

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A Planning Process for Considering Dairy Farm Expansion

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Worksheet 1-2. Farm Business Performance Calculations

- 1) $\frac{\text{Average Number of cows from DHI records or Number of cows beginning of year + number of cows end of year}}{2} = \text{Avg. \# of cows}$
- 2) $\frac{\text{Number of heifers beginning of year + number of heifers end of year}}{2} = \text{Avg. \# of heifers}$
- 3) $\frac{\text{Total pounds of milk sold for the year}}{\text{Average number of cows in a year}} = \text{milk sold per cow, lbs}$
- 4) $\frac{\text{Average number of cows for the year}}{\text{* Number of full time workers}} = \text{cows per worker}$
- 5) $\frac{\text{Total pounds milk sold for the year}}{\text{* Number of full time workers}} = \text{milk sold per worker}$

* Number of full time workers - needs to be calculated for each worker

$$\frac{\text{No. of hours/week} \times 4.3 \text{ weeks/month}}{230 \text{ hours}}$$

$$\times \text{No. of months worked} = \text{Full time months}$$

$$\frac{\text{Total full time months}}{12}$$

$$= \text{No. of full time workers per year}$$

- 6) $\begin{array}{r} \text{Total accrual operating expenses} \\ + \text{Expansion livestock expense} \\ \hline \text{= Accrual operating expenses including exp. Livestock} \end{array} = \$ \text{_____}$
- 7) $\begin{array}{r} \text{Total accrual receipts} \\ - \text{Accrual milk sales} \\ \hline \text{= Accrual receipts less milk sales} \\ \text{= Operating cost of producing milk} \\ \text{(Operating exp. incl. exp. livestock - receipts less milk sales)} \end{array} = \$ \text{_____}$
- $\frac{\text{+ Hundredweights of milk sold}}{\text{= Operating cost per hundredweight of producing milk}} = \text{+ } \$ \text{_____}$
- 8) $\text{Grain and concentrate as a \% of milk sales} = \frac{\text{Total grain and concentrate expense}}{\text{Milk sales}} = \text{_____}\%$
- 9) $\begin{array}{r} \text{Total farm receipts} \\ - \text{Total farm operating expenses} \\ \hline \text{= Net farm income without appreciation} \end{array} = \$ \text{_____}$
- 10) $\text{Debt to asset ratio} = \frac{\text{Total farm liabilities}}{\text{Total farm assets}} = \text{_____}$
- 11) $\text{Farm debt per cow} = \frac{\text{Total farm liabilities}}{\text{Number of cows (end of year)}} = \text{_____}$

Worksheet 1-3. Farm Business Performance Trends Worksheet

| Business Factors | Year | | | | | Comments |
|---------------------------------------|------|------|------|------|------|----------|
| | 19__ | 19__ | 19__ | 19__ | 19__ | |
| Size of Business | | | | | | |
| Average No. of cows | | | | | | |
| Average No. of Heifers | | | | | | |
| Milk sold, lbs | | | | | | |
| Rates of Production | | | | | | |
| Milk sold per cow, lbs | | | | | | |
| Labor Efficiency | | | | | | |
| Cows per worker | | | | | | |
| Milk sold per workers, lbs | | | | | | |
| Cost Control | | | | | | |
| Operating cost of producing milk/cwt. | | | | | | |
| Grain and concentrate as a % of milk | | | | | | |
| Profitability | | | | | | |
| Net farm income without appreciation | | | | | | |
| Financial Stability | | | | | | |
| Debt to asset ratio | | | | | | |
| Farm debt per cow | | | | | | |

Worksheet 1-4. Farm Business Performance Analysis Worksheet

| | Areas in the business that need improving before considering farm expansion | Farm expansion has potential but can be improved with better management | Excellent position to consider farm expansion |
|--|---|---|---|
| Size of Business | | | |
| Average No. of cows | decreasing | remaining the same | increasing |
| Average No. of heifers* | decreasing | remaining the same | increasing |
| Total Milk sold, lbs. | decreasing | remaining the same | increasing |
| Rates of Production | | | |
| Milk sold per cow, lbs** | < 17,000 | 17,000 - 20,000 | > 20,000 |
| Labor Efficiency | | | |
| Cows per worker | < 30 | 36 - 40 | > 40 |
| Milk sold per worker, lbs | decreasing | remaining the same | increasing |
| Cost Control | | | |
| Operating cost of producing milk/cwt. | > \$11.00/cwt | \$10.00 - 11.00/cwt | ≤ \$10.00/cwt |
| Grain and concentrate as a % of milk sales | > 32% | 28 - 32% | < 28% |
| Profitability | | | |
| Net farm income without appreciation | decreasing | remaining the same | increasing |
| Financial Summary | | | |
| Deb- to-asset ratio | > 40% | 30 - 40% | < 30% |
| Farm debt/cow | > \$2500 | \$1500 - 2500 | < \$1500 |

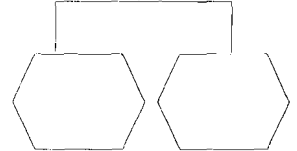
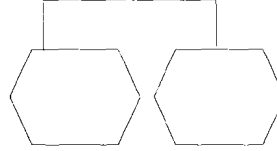
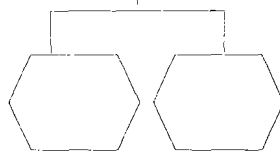
* Average number of heifers rating applies to farms who raise own replacements and do not continually purchase additional young stock

** Large breed

Vision & Mission

[illegible]

Worksheet 2-6. Organizational chart after expansion

Board of Directors**Chairman****General Manager****Operations
Manager****Operations
Manager****Operations
Manager****Operations
Manager**

Worksheet 3-1. Factors to consider in farmstead planning

Directions: Check when completed or evaluated.

- _____ Is an adequate supply of potable water available?
- _____ Does the proposed farm site contain adequate surface and subsurface drainage? Will substantial site work be required to provide adequate drainage?
- _____ Are off-farm factors present, such as rural housing or urban development, which may limit the site development?
- _____ Can the facilities be oriented to achieve maximum efficiency in animal traffic, manure management, and feed storage and delivery?
- _____ Is adequate room available for driveways, access roads, snow removal, and road right-of-ways?
- _____ Is three-phase electrical power available from your power supplier?
- _____ Do the proposed buildings and sites allow for major growth in the future of the farm?
- _____ Has an agricultural waste management plan been developed for the farm site by the Soil Conservation Service (SCS)?
- _____ Can livestock and other farm buildings be located downwind of farm houses, neighbors or adjacent?
- _____ Are local planning or zoning laws in effect that will impact upon the farm plan?
- _____ Will building permits need to be obtained prior to starting the project?
- _____ Have building plans been submitted to your milk inspector for approval?

Worksheet 3-2. Estimating costs for housing the milking herd

How many additional milking cows are you planning for? _____

What are the expected weights of cows? _____

minimum

maximum

Will stalls be tie stalls, free stalls, or other? _____

Why? _____

With additional housing, how many groups will there be? _____

How many stalls will there be in each group? _____

Cost Estimate*

| Housing type | Cost per stall | Number of stalls | Cost Estimate* | |
|-----------------|--------------------|------------------|----------------|---------|
| | | | Low | High |
| Tie stall barn | \$1,500 to \$2,500 | X _____ | = _____ | = _____ |
| Free stall barn | \$ 800 to \$1,200 | X _____ | = _____ | = _____ |

*Place the total cost here and on line 1 of Worksheet 3-12.

Worksheet 3-3. Estimating cost of dry cow facilities

How many dry cows will you have?
(you may assume 20% of the herd)

Will you need additional dry cow facilities?

If **NO** go to
next
worksheet

If **YES**
complete this
worksheet

How many dry cows will be housed in new facilities?

How many dry cow groups will you have?

Cost estimate

| Housing type | Cost per cow | Number of cows | Low | High |
|---------------------------|------------------|----------------|----------|----------|
| Free stall and feed area | \$600 to \$1,100 | _____ | \$ _____ | \$ _____ |
| Bedded pack and feed area | \$500 to \$ 900 | _____ | _____ | _____ |
| Total cost* | | | \$ _____ | \$ _____ |

* Place here and on line 2 Worksheet 3-12

Worksheet 3-4. Estimating cost of heifer facilities

What is the total number of heifers needed to provide replacements for this herd? (Actual number or estimate from Table 3-1 on the next page) _____

Will you need additional facilities for heifers? If **NO** go to next worksheet If **YES** complete this worksheet

How many heifers will be housed in the new facility? _____

Number of calves on milk _____

Number of weaned calves up to one year of age _____

Number of yearlings and bred heifers _____

Cost estimate

| Animal type | Cost per animal | Number of animals | Cost estimate | |
|--------------------------|-----------------|-------------------|---------------|------------|
| | | | Low | High |
| Calves on milk | \$100 to \$300 | X _____ | = \$ _____ | = \$ _____ |
| Calves to 1 year of age | \$300 to \$600 | X _____ | = _____ | = _____ |
| Yearlings & bred heifers | \$400 to \$800 | X _____ | = _____ | = _____ |
| Total cost* | | | = \$ _____ | = \$ _____ |

*Place here and on line 3 of worksheet 3-12

Worksheet 3-5. Estimating cost for milking center

Do you need to consider
a different milking system?

If **NO** go to next
worksheet

If **YES** complete
this worksheet

What type of milking system are you planning?

Complete the appropriate section below
depending upon whether you plan to renovate
or build new.

Cost estimate

| Cost per Stall | | Number of stalls | Cost estimate | |
|---------------------------------|---------------|------------------|---------------|------------|
| | | | Low | High |
| Renovating facilities | | | | |
| Building | Low \$ _____ | X _____ | = \$ _____ | = \$ _____ |
| | High \$ _____ | | | |
| Equipment | Low \$ _____ | X _____ | = \$ _____ | = \$ _____ |
| | High \$ _____ | | | |
| Total Cost* | | | = \$ _____ | = \$ _____ |
| New facilities (from Table 3-3) | | | | |
| Building | Low \$ _____ | X _____ | = \$ _____ | = \$ _____ |
| | High \$ _____ | | | |
| Equipment | Low \$ _____ | X _____ | = \$ _____ | = \$ _____ |
| | High \$ _____ | | | |
| Total Cost* | | | = \$ _____ | = \$ _____ |

*Place here and on line 4 of Worksheet 3-12

Note: Table 3-2 provides cow throughput information for different sizes and types of parlors and Table 3-3 provides capital cost for new construction by parlor type.

Worksheet 3-6. Amount of forage to be stored

Determine the forage dry matter requirement of animals to be fed (milking cows, dry cows and replacements) by using the tables found in the Pro-DAIRY Feeding or Forage management Manuals.

OR

Figure 6 to 8 tons of total forage dry matter is required per milk cow.

Estimate the ensiling dry matter losses:

Good management--5 to 20% per year

Average management--20 to 30% per year

Poor management--30 to 50% per year

(Forage required X Percent loss)

_____ + _____ tons DM

Estimate forage dry matter losses during harvesting and feeding processes

Guide: 5 to 15%

(Forage required X Percent loss)

_____ + _____ tons DM

Total Forage Needed

_____ = _____ tons DM

Worksheet 3-7. Bunker silo dimensions

| | Corn Silage | Hay Crop Silage |
|--------------------------------|-------------------|-------------------|
| Forage Dry Matter to be Stored | tons | tons |
| Pounds per ton | X 2,000 lbs. | X 2,000 lbs. |
| Density factor | ÷ 18 lbs./cu. ft. | ÷ 15 lbs./cu. ft. |
| Bunker Silo Space Required * | = cu. ft. | = cu. ft. |

Guidelines for Wall Heights **

| Cows | Wall Height | Avg. Crowned Height |
|------------|-------------|---------------------|
| 100 to 200 | 8 feet | 10 feet |
| 200 to 300 | 10 feet | 12 feet |
| 300 to 400 | 12 feet | 14 feet |
| > 400 | 16 feet | 18 feet |

Width of Bunker Silo ***

| Cows | Width |
|------------|---------------|
| 100 to 200 | 25 to 30 feet |
| 200 to 300 | 30 to 40 feet |
| > 300 | 40 to 60 feet |

| Length of Bunker Silo | Corn Silage | Hay Crop Silage |
|-----------------------|-------------|-----------------|
| Space required | cu.ft. | cu. ft. |
| Avg crowned height | ÷ ft. | ÷ ft. |
| Width | ÷ ft. | ÷ ft. |
| Length | = ft. | = ft. |

- * Dimensions can be calculated for separate corn silage and hay crop silage storage or the total space required can be added together to calculate the size of a single storage for both forages
- ** Minimum silage depth to control spoilage is 8 ft. Maximum average crowned height may be 2 ft. greater than wall
- *** Narrower than 25 feet causes problems with equipment maneuverability; wider than 60 feet makes it difficult maintain a fresh face

Worksheet 3-8. Bunker silo feedout rate*

| | Corn Silage | | Haylage | |
|--|-------------|-------------------|---------|-------------------|
| Avg crowned height | | ft. | | ft. |
| Width | X | ft. | X | ft. |
| Density Factor | X | 18 lbs. DM/cu.ft. | X | 15 lbs. DM/cu.ft. |
| Inches per foot | ÷ | 12 in./ft. | ÷ | 12 in./ft. |
| Dry matter per linear inch of silo | = | lbs. DM in. | = | lbs. DM in. |
| Forage required annually (from Worksheet 3-6) | | tons DM | | tons DM |
| Pounds per ton | X | 2000 lbs. | X | 2000 lbs. |
| Days per year | ÷ | days | ÷ | days |
| Dry matter per linear inch of silo | ÷ | lbs. DM | ÷ | lbs. DM |
| Daily feedout rate | = | in./day | = | in./day |

* If less than 5 inches per day, decrease the height and or width
 If greater than 7 inches per day, increase the height or width

Worksheet 3-9. Cost of forage storage

| | |
|--|--------------|
| Walls | |
| Height | ft. |
| Length | X ft. |
| | X 2 |
| Cost per square foot of wall; estimate = \$7.35 | X \$ /sq.ft. |
| Cost of Walls | = \$ |
| Floor | |
| Width | ft. |
| Length | X ft. |
| Cost per square foot of floor; estimate = \$1.35 | X \$ /sq.ft. |
| Cost of Floor | = \$ |
| Cost of Walls | + \$ |
| Total Cost of Bunker Silo* | |
| Height x width x length | = \$ |
| * Place here and on line 5 of Worksheet 3-12. | |

Worksheet 3-10. Sizing mixer for total mixed ration

| | |
|--|--------|
| Maximum number of cows in one group to be fed | |
| Minimum number of feedings per day | ÷ |
| Maximum dry matter intake per cow per day for this group (guideline -- 40 to 55 lbs.) | X lbs. |
| Minimum percent dry matter of total mixed ration (guideline -- 55% to 40%) | ÷ % |
| Pounds of total mixed ration per bushel (guideline -- 25 lbs.) | ÷ lbs. |
| Mixer capacity needed | = bu. |

Use quotes from local equipment dealers for the mixer size calculated for your cost estimate. Put the cost on line 6 of Worksheet 3-12. TMR mixers with scales, chassis and tires generally cost from \$15,000 to \$25,000.

Worksheet 3-11. Estimated size and cost of commodity storage

| | | | |
|--|---|------|-------------|
| Bay Size | The size of front end loader planned for the farm must be considered when establishing bay dimensions | | |
| Average size load of concentrate delivered | | | tons |
| Pounds per ton | X | 2000 | lbs. |
| | X | 1.5 | |
| Height (6 to 10 feet) | ÷ | | ft. |
| Width (8 to 12 feet) | ÷ | | ft. |
| Density factor (commodity densities range from 20 to 40 lbs./cu.ft.; 30 lbs./cu.ft. can be used as an average) | ÷ | | lbs./cu.ft. |
| Length of bay | = | | ft. |
| Number of bays -- Consider number of commodities to be used in TMR rations plus bedding and fertilizer needs | | | |
| Additional bays for rotation of feeds | + | 2 | |
| Total number of bays | = | | |
| Cost per bay (range \$1,000 to \$5,000 per bay) | X \$ | | |

Worksheet 3-12. Estimated costs for manure handling components

| Manure Storage | Unit Costs ¹ | X No. ² = | Your Estimate | |
|----------------------------------|-------------------------|----------------------|---------------|-------|
| | \$ | | Low | High |
| Paved Bunker partial walls | 25 to 40 | X _____ = | _____ | _____ |
| Concrete Tank - no top | 33 to 67 | X _____ = | _____ | _____ |
| with heavy top | 40 to 160 | X _____ = | _____ | _____ |
| Earthen Basin | 17 to 33 | X _____ = | _____ | _____ |
| Equipment | X \$1000 | X% Use ³ | Low | High |
| Tractor and Spreader | 30 to 80 | X _____ = | _____ | _____ |
| Tractor, Scraper and Bucket | 12 to 30 | X _____ = | _____ | _____ |
| Skidsteer Loader | 20 to 42 | X _____ = | _____ | _____ |
| Gutter Cleaner only ⁴ | 8 to 14 | | _____ | _____ |
| Alley Scraper ⁴ | 20 to 42 | | _____ | _____ |
| Manure Flow system ⁴ | 25 to 40 | | _____ | _____ |
| Gravity Flow system ⁴ | 40 to 90 | | _____ | _____ |
| Stacker - | 8 to 10 | | _____ | _____ |
| Large Piston Transfer | 10 to 16 | | _____ | _____ |
| Chopper Pump Transfer | 12 to 20 | | _____ | _____ |
| Pneumatic Transfer | 15 to 24 | | _____ | _____ |
| Total Cost | | | _____ | _____ |

(Place here and on line 9 of Worksheet 3-12)

¹ Unit Costs are not verified.

² Each 70 cubic feet of storage for one cow-month.

³ Choose a percentage for equipment charge for handling manure.

⁴ Each 200 stalls to spreader loading, or with pipes to storage.

Reference: Holmes and Klemme, '88 U Wisc.; Holmes, '91, U Wisc.; Barrington and Cap, '91, McGill U. (Canadian Agric. Eng'ng. 381-386).

Worksheet 3-13. Summary of facilities costs

| | | Cost Estimate | |
|--|----------------|---------------|----------|
| | | Low | High |
| 1). Housing for Additional Milking Cows | Worksheet 3-2 | \$ _____ | \$ _____ |
| 2). Housing for Additional Dry Cows | Worksheet 3-3 | \$ _____ | \$ _____ |
| 3). Housing for Additional Heifers | Worksheet 3-4 | \$ _____ | \$ _____ |
| 4). Cost of Milking Center or Additional Milking Equipment | Worksheet 3-5 | \$ _____ | \$ _____ |
| 5). Cost of Additional Forage Storage | Worksheet 3-9 | \$ _____ | \$ _____ |
| 6). Cost of Feed Delivery Equipment | Worksheet 3-10 | \$ _____ | \$ _____ |
| 7). Cost of Commodity Storage | Worksheet 3-11 | \$ _____ | \$ _____ |
| 8). Cost of Manure Storage Structure and Equipment | Worksheet 3-12 | \$ _____ | \$ _____ |
| Total Cost of Facility | | \$ _____ | \$ _____ |

Worksheet 4-1. Summary of proposed change

Name: _____

Date: _____

Proposed change: _____

Average Future Year

| | Base Year | Without Major Change | With Major Change |
|---------------------------------------|---------------|-------------------------|----------------------|
| Number of milk cows, milking and dry | | | |
| Number of heifers and calves | | | |
| Pounds of milk sold per cow | | | |
| Number of crop acres | | | |
| Milk price per cwt. | | | |
| Total cwt of milk sold | | | |
| | | | |
| Capital purchases to be made | Year 1 | Year 2 | Year 3 |
| Machinery and equipment | | | |
| Milking equipment | | | |
| Feeding equipment | | | |
| Manure storage and handling equip. | | | |
| Other | | | |
| Animals- cows | | | |
| - Heifers | | | |
| Structures | | | |
| Barn | | | |
| Feed storage | | | |
| Other | | | |
| Land | | | |
| Total Capital Needed | | | |

Worksheet 4-2. Current balance sheet and net worth analysis

Name: _____

Date: _____

Assets**Debt**

Current

Current

Cash, checking and saving _____

Accounts payable _____

Account receivable _____

Operating debt _____

Prepaid expenses _____

Short term debt _____

Feed and supplies _____

Advanced govt. receipts _____

Total _____

Total _____

Intermediate:

Intermediate:

Dairy cows

Secured debt:

owned _____

Int. Loan #1 _____

leased _____

Int. Loan #2 _____

Heifers _____

Int. Loan #3 _____

Bulls/other livestock _____

Int. Loan #4 _____

Machinery/eq. owned _____

Financial lease _____

Machinery/eq. leased _____

Machinery _____

Farm stocks or certificates _____

Cattle _____

Total _____

Total _____

Long-Term:

Long Term:

Land and buildings:

Secured debt:

owned _____

LT Loan #1 _____

Financial lease (structures) _____

LT Loan #2 _____

Total _____

Financial lease (structures) _____

Total Assets = _____

Total _____

Total Debts = _____

Net Worth (A)* _____

Total Debt and Net Worth _____

Net Worth _____

Total Debt _____

Total Assets ÷ _____

Total Assets ÷ _____

Percent Net Worth = _____

Debt: Asset Ratio = _____

* Net worth = Total Assets - Total Debts

Worksheet 4-3. Projected balance sheet and net worth analysis after proposed change

Name: _____ Date: _____

Assets

Current:

Cash, checking and savings _____
 Accounts receivable _____
 Prepaid expenses _____
 Feed and supplies _____
 Total _____

Intermediate:

Dairy cows:
 owned _____
 leased _____
 Heifers _____
 Bulls/other livestock _____
 Machinery/eq. owned _____
 Machinery/eq. lease _____
 Farm stocks or certificates _____
 Total _____

Long-Term:

Land and buildings:
 owned _____
 Financial lease (structures) _____
 Total _____

Total Assets = _____**Debt**

Current:

Accounts payable _____
 Operating debt _____
 Short term debt _____
 Advanced govt. receipts _____
 Total _____

Intermediate:

Secured debt:
 Int. Loan #1 _____
 Int. Loan #2 _____
 Int. Loan #3 _____
 Int. Loan #4 _____
 Financial lease _____
 Machinery _____
 Cattle _____
 Total _____

Long-Term:

Secured debt:
 LT Loan #1 _____
 LT Loan #2 _____
 Total _____

Total Debts = _____Net Worth (B)^a _____

Total Debt and Net Worth _____

Net Worth _____ Total Debt _____

Total Assets + _____ Total Asset + _____

Percent Net Worth = _____ % Debt:Asset Ratio = _____

Change In Net Worth (1) =

Projected Net Worth (B) - Current Net Worth (A) (from Worksheet 4-2) = _____

^a Net Worth = Total Assets - Total Debts

Worksheet 4-4. Estimating expenses

Name: _____

Date: _____

Average Future Year

| Expenses | Base Year ^a | Without Major Changes | With Proposed Changes |
|-------------------------------------|------------------------|-----------------------|-----------------------|
| Hired Labor | + | + | + |
| Purchased concentrates | + | + | + |
| Purchased forages | + | + | + |
| Non-dairy feed | + | + | + |
| Custom work | + | + | + |
| Machinery repairs | + | + | + |
| Auto expense (farm share) | + | + | + |
| Fuels, oil and grease | + | + | + |
| Purchased livestock | + | + | + |
| Breeding fees | + | + | + |
| Veterinary and medicine | + | + | + |
| Milk marketing | + | + | + |
| Other dairy expense | + | + | + |
| Lime and fertilizer | + | + | + |
| Seeds and plants | + | + | + |
| Spray, and other crop expense | + | + | + |
| Land, building, and fence repair | + | + | + |
| Taxes | + | + | + |
| Insurance | + | + | + |
| Rent | + | + | + |
| Telephone (farm share) | + | + | + |
| Electricity (farm share) | + | + | + |
| Interest paid ^b | + | + | + |
| Miscellaneous expenses | + | + | + |
| Cash farm operating expenses | = | = | = |
| Depreciation of machinery | + | + | + |
| Depreciation of buildings | + | + | + |
| Expansion livestock | + | + | + |
| Total farm expenses | = | = | = |

a Adjust all expenses to an accrual basis

b Interest paid is interest on average debt outstanding over the life of the investment

Worksheet 4-5. Estimating receipts and profitability factors calculation

Name: _____

Date _____

Average Future Year

| Receipts | Base Year ^d | Without Change | With Change |
|----------------------------|------------------------|----------------|-------------|
| Milk sales | | | |
| Calf sales | + | + | + |
| Cattle sales | + | + | + |
| Crop sales | + | + | + |
| Custom work | + | + | + |
| Government payments | + | + | + |
| Gas tax refund | + | + | + |
| Other receipts | + | + | + |
| Total farm receipts | = | = | = |

Profitability Factors Calculation

| | | | |
|---|---|---|---|
| Total farm receipts | | | |
| Total farm expenses | - | - | - |
| Net farm income (2) | = | = | = |
| Interest on equity capital ^d @ _____ % | - | - | - |
| Value of unpaid family labor ^e | - | - | - |
| Labor and management income (3) | = | = | = |
| Net farm income | | | |
| Interest paid on debt | + | + | + |
| Unpaid family labor | - | - | - |
| Value operator management and labor | - | - | - |
| Return to total farm asset (4) | = | = | = |
| Total farm asset | ÷ | ÷ | ÷ |
| Rate of return on assets% (5) | = | = | = |

^aAdjust all receipts to an accrual basis^dA percent of the average equity for the year. A typical value is 5%^eValue of unpaid family labor = number full time months worked x \$ per month.

Example: value unpaid family labor = 3 months x \$1200/mo. = \$3600.

^fValue operator labor and management is an estimate what value you place on managing and operating your farm.

Worksheet 4-6. Farm repayment ability.

Name: _____

Date: _____

| | Base Year | Average Future Year | |
|---|-----------|-----------------------------|-----------------------|
| | | Without Major Changes | With Major Changes |
| Total farm receipts | | | |
| Capital sales | + | + | + |
| Non-farm income | + | + | + |
| Total cash inflow | = | = | = |
| Interest paid | + | + | + |
| Cash farm expenses | - | - | - |
| Cash available for family living, debt repayment, and investment | = | = | = |
| Family living expense ⁹ | - | - | - |
| Cash for asset replacement | - | - | - |
| Cash available for debt payments (C) | = | = | = |
| Subtract: planned debt payments (D) | - | - | - |
| Cash excess/deficit (6) | = | = | = |

⁹ Along with regular living expenses, includes income and self employment taxes, health insurance, medical expenses, savings, etc.

Worksheet 4-7. Summary of financial worksheets.

Name: _____ Date: _____

| | Average Future Year | | |
|--|---------------------|-------------------------------|-----------------------------|
| | Base Year | Without Proposed Change | With Proposed Changes |
| Annual change in net worth ^a | | | |
| Net farm income (2) Worksheet 4-5 | | | |
| Labor and management income (3) Worksheet 4-5 | | | |
| Return to total farm assets (4) Worksheet 4-5 | | | |
| Rate of return on assets (5) Worksheet 4-5 | | | |
| Able to service debt? Y/N (6) Worksheet 4-5 | | | |

^a Annual change in net worth = Net worth year end - Net worth beginning of year

Worksheet 4-8. Planning the transition achieve to proposed change

Name: _____

Date: _____

Scenario for year 1:

Scenario for year 2:

Scenario for year 3:

Scenario for year 4:

Scenario for year 5:

| Farm Expenses | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|--|--------|--------|--------|--------|--------|
| Hired labor | + | + | + | + | + |
| Purchased concentrates | + | + | + | + | + |
| Purchased forages | + | + | + | + | + |
| Custom work | + | + | + | + | + |
| Machinery repairs and Auto | + | + | + | + | + |
| Fuels, oil, and grease | + | + | + | + | + |
| Purchased livestock | + | + | + | + | + |
| Breeding fees | + | + | + | + | + |
| Veterinary and medicine | + | + | + | + | + |
| Milk marketing expense | + | + | + | + | + |
| Other dairy expense | + | + | + | + | + |
| Lime and fertilizer | + | + | + | + | + |
| Seeds and plants | + | + | + | + | + |
| Spray and other crop exp. | + | + | + | + | + |
| Real estate repair | + | + | + | + | + |
| Taxes | + | + | + | + | + |
| Insurance | + | + | + | + | + |
| Rent | + | + | + | + | + |
| Telephone (farm share) | + | + | + | + | + |
| Electricity (farm share) | + | + | + | + | + |
| Miscellaneous expenses | + | + | + | + | + |
| Total Farm Expenses (less interest) | = | = | = | = | = |

Worksheet 4-8. Planning the transition to achieve the proposed change

Name: _____

Date: _____

| Farm Receipts | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|-----------------------|--------|--------|--------|--------|--------|
| Number cows | | | | | |
| Production/cow (cwt) | x | x | x | x | x |
| Price milk/cwt | x | x | x | x | x |
| Milk income | = | = | = | = | = |
| Cull cow sales | + | + | + | + | + |
| Calf sales | + | + | + | + | + |
| Other business income | + | + | + | + | + |
| Total receipts | = | = | = | = | = |

Repayment Analysis

| | | | | | |
|---|---|---|---|---|---|
| Total farm receipts | | | | | |
| Farm expense without interest | - | - | - | - | - |
| Net cash inflow | = | = | = | = | = |
| Non-farm income | + | + | + | + | + |
| Cash avail. for family living, debt payment, and investment | = | = | = | = | = |
| Family living expense | - | - | - | - | - |
| Cash for asset replacement | - | - | - | - | - |
| Cash available for debt payment (A) | = | = | = | = | = |
| Planned debt payments (B) | - | - | - | - | - |
| Cash excess/deficit | = | = | = | = | = |

Worksheet 5-1. Estimated yearly feed needs vs. feed produced.

YEARLY FEED NEEDS (Dry Matter)

$$\begin{array}{rcl}
 (\text{ } \# \text{ cows}) \times (6.5 \text{ tons DM/cow}^*) & = & \text{ } \text{Tons DM for cows} \\
 (\text{ } \# \text{ heifers}) \times (2.75 \text{ tons DM/heifer}^{**}) & = & \text{ } \text{Tons DM for heifers} \\
 & + & \\
 & = & \text{ } \text{Total tons needed}
 \end{array}$$

YEARLY FEED PRODUCED (Dry Matter)

$$\begin{array}{rcl}
 (\text{ } \text{acres corn silage}) \times (\text{ } \text{tons/acre}) \times (.35) & = & \text{ } \text{Total tons DM corn silage} \\
 (\text{ } \text{acres hay crop}) \times (\text{ } \text{tons/acre}) \times (.90) & = & \text{ } \text{Total tons DM hay} \\
 & + & \\
 & = & \text{ } \text{Total tons supplied}
 \end{array}$$

Do total tons needed = total tons supplied?

* = 6.5 tons of Dry Matter/year is based on a 5.5 tons consumption plus 18% loss from fermentation and harvesting losses.

** = 2.75 tons of Dry Matter/year is based on a 2.25 tons consumption plus 22% loss from harvesting and fermentation. This is a higher loss than for the cows to reflect the higher % hay often fed.

This is based on average quality feed, remember as quality increases, dry matter intake increases, which increases the amount of feed needed.

Worksheet 5-2. Calculate the Ratios of Corn Silage and Haycrop Dry Matter Consumed to Total Forage Dry Matter Consumed for all Cattle on a Dairy Farm.

| Milk Cows | Dry Cows | Heifers | Herd | DM Fed |
|----------------------|----------|-----------------------------|------|---|
| (lbs corn s.) | + | (lbs corn s.) | + | (lbs corn s.) = corns s. lbs x % DM =DM lbs corn silage |
| (_____ lbs) | + | (_____ lbs) | + | (_____ lbs) = _____ lbs x _____ % DM = _____ DM lbs corn silage |
| (lbs haylage) | + | (lbs haylage) | + | (lbs haylage) = haylage lbs x DM % = DM lbs haylage |
| (_____ lbs) | + | (_____ lbs) | + | (_____ lbs) = _____ lbsx _____ % DM = _____ DM lbs haylage |
| (lbs hay fed) | + | (lbs hay fed) | + | (lbs hay fed) = hay lbs x % DM = DM lbs hay fed |
| (_____ lbs) | + | (_____ lbs) | + | (_____ lbs) = _____ lbs x .90 = _____ DM lbs hay fed |
| | | | | Total = _____ DM lbs forage needed |
| (DM lbs corn silage) | + | (DM lbs haylage) | + | DM lbs hay = DM lbs forage needed |
| (_____ lbs) | + | (_____ lbs) | + | _____ lbs = _____ DM lbs forage needed |
| (DM lbs haycrop) | ÷ | total DM lbs forage needed) | x | 100 = % total DM from hay crop |
| (_____ lbs) | ÷ | (_____ lbs) | x | 100 = _____ % |
| (DM lbs corn s.) | ÷ | total DM lbs forage needed) | x | 100 = % total DM from corn silage |
| (_____ lbs) | ÷ | (_____ lbs) | x | 100 = _____ % |

Worksheet 5-4. Water Worksheet

| | | |
|----|---|----------|
| A) | Number of cows per herd or group | |
| B) | Average milk production per herd or group | gal/cow |
| C) | Season of the year | |
| D) | Daily water needs per cow from table | gal/cow |
| E) | Water required by herd or group (D X A) | gal/day |
| F) | Number of water trough or tanks | |
| G) | Capacity of water trough or tanks | gal/tank |
| H) | Maximum available water (F X G) | gal |
| I) | Flow rate per tank or water bowl | gal/min |