

HAY OR PASTURE?

Making hay is costly, especially when we consider the risks of losses due to bad weather. Tractors and other equipment used to make hay, haul it, and feed it to cattle represent a sizeable investment. The labor requirements for making, hauling, storing, and feeding hay also are large. In many situations, it may be feasible and cheaper to buy hay rather than make it. Other options include stockpiling cool-season grasses such as fescue and planting winter annuals, such as rye or ryegrass, depending on a farm's location.

A producer should consider several factors when evaluating the profitability of these winter grazing choices. When grazing stockpiled fescue or winter annual pastures, the amount of material actually used by the cattle will depend on the grazing management strategy. There are several options. For example, tightly controlled grazing using a temporary electric fence and moving the cattle every day or two will reduce the amount of feed wasted by trampling and fouling compared to less frequent moves and larger grazing blocks. Less waste means a longer grazing period, which reduces the amount of hay feeding required. However, additional time is required to move the fence, fencing materials must be purchased, and there may be additional expenses, such as running a pickup or ATV.

Uncontrolled grazing reduces the amount of feed actually used by cattle, shortening the grazing period and increasing the amount of hay required. Hay is a more expensive feed, whether made on the farm or purchased. Hay costs include the cost of making or buying the hay, storage and feeding losses, and the labor and equipment costs associated with feeding the hay to the cattle. Hay feeding can cause significant pasture damage, which reduces pasture productivity during the next grazing season.

As farm and family situations vary widely, so the economics will differ. Producers should "push the pencil" and analyze the economics to determine which system suits their situation best. This involves five key steps:

1. Determine the appropriate feeding period and the desired level of animal performance in terms of livestock numbers, growth rates, and body condition. As discussed above, the management of stockpiled fescue affects the length of the feeding period. When all the fescue has

been grazed, some other feed must be used. The length of the feeding period should be the same for all the alternatives being considered, so total costs are comparable.

2. Identify alternative feeding strategies, including combinations of grazing, stockpiling, and hay.

3. Determine the forage availability and quality under the different alternatives and formulate a feeding program capable of meeting the livestock performance goals, including supplementary feeds if needed.

4. Estimate the costs of the different options, assuming they can all meet animal performance goals. Costs to consider include:

- The full economic cost of producing pasture, using the NC State enterprise budgets as a guide but using your own cost and production figures.
- The full economic cost of making hay, also using the NC State enterprise budgets as a guide but using your own cost and production figures.
- Out-of-pocket costs, such as purchased feed and fuel for equipment, for the different options.
- Annual ownership costs of investments in machinery and equipment for managing the grazing and feeding the livestock.
- Labor costs, including a charge for your own labor (unless you deliberately choose to work for the fun of it).

5. Summarize the total cost of each feeding strategy as the basis for selecting the least expensive (most profitable) option for feeding your cattle.

All of this takes work, but the highest financial returns can only be achieved through this kind of effort in making management decisions. The small group activities in this workshop illustrate how to evaluate the economics of alternative feeding programs.

GROUP 1

DECISION SCENARIO: INTENSIVELY MANAGED STOCKPILED FESCUE

The purpose of this exercise is to develop a feeding program for a group of heifers for a 120-day winter feeding period. After 120 days, you expect spring grazing to be available. Fescue is available in the fall, and you are thinking about an intensively managed grazing system based on stockpiling. You will feed hay if the stockpiled fescue runs out before the end of the feeding period. Other groups in the workshop will work on alternative feeding programs, including an extensively managed grazing system for the stockpiled fescue and a program that makes hay from the fescue in the fall for the 120-day feeding program.

In a real production situation, you would know how many animals you have, and you would begin by deciding what your animal performance goals were for a particular feeding period. Specifically, what are your targets for the end of the feeding program in terms of weight and body condition? This approach should be adopted whether we are talking about cows and calves on summer grazing, summer stockers, winter backgrounding, dry cows, or breeding heifers. Once these targets are set, you can calculate the desired average daily gain and change in body condition. Setting these targets for gain and body condition allows you to determine the nutritional needs of the animals.

The next step is to identify your feed resources and develop a feeding program capable of meeting the animals' needs. In many cases, there are alternative feeding programs that could meet the animals' needs. The final two steps are to evaluate the economics of the alternative feeding programs and select the most profitable one.

In this group activity, because we have a limited amount of time, we have specified the number of head to be fed, their nutritional needs and the feeding period. We have described the feed resources available and alternative ways of using these feed resources. Your job is to develop the feed budget for one of the systems and then "put the numbers to it" with the assistance of the other members of your group, the instructors, some NC State enterprise budgets, and

some other resources. Other groups will evaluate other options. When all the groups have finished their activities, we will compare results.

Your group's situation is as follows:

- You have 24 acres of stockpiled fescue with an estimated yield of 2,000 pounds of dry matter per acre.
- You have 32 heifers with a daily requirement of 15 pounds of dry matter to achieve your targets for growth rate and body condition.

Your group's task is to plan a feeding program for 120 days starting in the fall when other pastures stop growing:

- Estimate the cost of feeding these heifers under a pasture management system that rations the stockpiled fescue with a temporary electric fence and moves the cattle daily.
- There is a perimeter fence and water, and you have the temporary electric fence.
- You estimate that the heifers can actually utilize 85 percent of the available pasture dry matter under this system.
- You plan to purchase large-round-bale hay when the fescue is used up, at an estimated price of \$80 per ton, delivered.

Estimate the full cost of feeding these heifers for the 120-day period using the attached worksheets.

GROUP 1 PROCEDURES

1. Select a recorder and a reporter to present your results to the other groups.

2. Start with **Worksheet 1, Pasture Cost**, and complete the Option 1 column:

- Calculate the usable dry matter from the stockpiled fescue, lines 1-5.
- Calculate the daily dry matter needs of the cattle, lines 6-8.
- Calculate the number of days of grazing that will be needed, line 9. Transfer this number to **Worksheet 2, Grazing Management Costs**, line 1.
- Calculate the number of days of supplementary hay feeding that will be needed, lines 10-11. Transfer this number to **Worksheet 4, Hay Needs and Costs**, line 8, and **Worksheet 5, Supplementary Hay Feeding Costs**, line 1.
- Calculate the pro-rated share of the annual pasture cost to be allocated to the stockpiled fescue, lines 12 through 16, based on cost information from the NC State cool-season perennial grass budget (Budget 86-2) and the dry matter production estimates.
- Transfer the total cost of grazing, line 16, to **Worksheet 6, Grazing Summary**, line 5.

3. Go to **Worksheet 2, Grazing Management Costs**:

a. Use lines 1 through 12 to estimate the total operating cost:

- Estimate the labor cost (or charge, if it is your own labor) associated with tasks such as moving cattle and fences, lines 1-7.
- Estimate equipment operating costs (for example, pick-up), lines 8-11. For Option 1, use the information in the **Machinery Cost Table 2** for estimates of hourly operating costs for listed equipment items.
- Total the labor and equipment operating costs on line 12.

b. Use lines 13-16 to estimate the ownership costs of equipment, including depreciation, interest, taxes and insurance:

- Use information from the **Machinery Cost Table 1** for Option 1. These machinery ownership costs are shown as annual totals, so pro-rate these costs based on hours of use in managing the grazing relative to the annual total hours shown in the table.
- Note that if equipment ownership cost estimates are not available, you can use **Worksheet 3, Annual Ownership Costs**, to gener-

ate your own cost figures for line 13. You can also use **Worksheet 3** to estimate the annual ownership cost of other investments, such as additional fencing, lanes, and water supply. Note that you will not need to use **Worksheet 3** for this activity, but it illustrates the procedure for estimating annual ownership costs.

- Line 17 is the pro-rated share to this feeding period.
c. Total the operating and ownership costs on Line 18. Transfer this total to **Worksheet 6, Grazing Summary**, line 6.

4. If the feeding period is longer than the days of grazing available (**Worksheet 1, Pasture Cost**, line 11), use **Worksheet 4, Hay Needs and Costs**, to estimate the amount and cost of the hay you will need to buy and feed.

- Use Lines 1-9 to calculate the hay needed, based on animal needs, an allowance for waste (see Table 3), and the days in the hay feeding period.
- Lines 10-12 are not needed for this exercise, but can be used to include home-grown hay cost.
- Use Lines 13-17 to estimate the cost of purchased hay.
- Total the combined cost of home-grown and purchased hay on Line 18.
- Transfer this total to **Worksheet 6, Grazing Summary**, line 8.

5. Use **Worksheet 5, Hay Feeding Costs**, to estimate the cost of actually feeding the supplementary hay:

- Use **Machinery Cost Tables 1 and 2** for estimates of equipment operating and ownership costs.
- Total the cost of the supplementary hay feeding on line 17.
- Transfer this total to **Worksheet 6, Grazing Summary**, line 9.

6. Complete **Worksheet 6, Grazing Summary**:

- Estimate the cost of other feedstuffs and supplements, such as minerals fed during the grazing period, on line 7.
- Do the same for the hay feeding period on line 10.
- Calculate the total feed cost and the cost per head and per day, lines 11-13.

7. If your group disagrees with any of the assumptions listed above or in the budgets and if time permits, re-estimate the costs using your assumptions as Option 2.

Worksheet 1. Pasture Cost

Use this worksheet to calculate the amount of feed the stockpiled fescue will provide, the amount the animals need, and the cost.

- Calculate the usable dry matter from the stockpiled fescue, lines 1-5.
- Calculate the daily dry matter needs of the cattle, lines 6-8.
- Calculate the number of days of grazing and days of supplementary hay feeding that will be needed, lines 9-11.
- Transfer the number of days the cattle graze to Worksheet 2, line 1. If supplementary hay feeding is required, transfer the number of days from line 11 to Worksheet 4, line 8, and Worksheet 5, line 1.
- Calculate the pro-rated share of the annual pasture cost allocated to the stockpiled fescue, lines 12-16.
- Transfer the total cost of grazing, line 16, to Worksheet 6, Grazing Summary, line 5.

| ITEM | OPTION 1 | OPTION 2 |
|--|----------|----------|
| 1. Acres of pasture available | | |
| 2. Estimated dry matter per acre, in pounds | | |
| 3. Total pounds of dry matter available: Multiply line 1 by line 2. | | |
| 4. Percent of available pasture actually eaten by livestock, as a decimal (to allow for wasted and spoiled pasture) | | |
| 5. Estimated total dry matter that will be eaten by livestock, in pounds: Multiply line 3 by line 4. | | |
| 6. Number of animals in group | | |
| 7. Animal dry matter needs: pounds eaten per head per day | | |
| 8. Total pasture dry matter needed, pounds per day: Multiply line 6 by line 7. | | |
| 9. Days of grazing available: Divide line 5 by line 8. | | |
| 10. Total number of days in the feeding period | | |
| 11. Days of supplementary hay feeding if feeding period exceeds days of grazing that are available: Subtract line 9 from line 10. | | |
| 12. Annual cost of pasture, from NC State budget 86-2, \$/acre | \$ | \$ |
| 13. Annual production of dry matter per acre per year, in pounds, from NC State budget 86-2. (Convert production from tons per acre in budget to pounds per acre.) | | |
| 14. Pro-rated share of annual production available, based on dry matter, as a decimal: Divide line 2 by line 13. | | |
| 15. Cost per acre of stockpiled pasture, \$: Multiply line 12 by line 14. | \$ | \$ |
| 16. Total cost of stockpiled pasture: Multiply line 1 by line 15. | \$ | \$ |
| NOTES: | | |

Worksheet 2. Grazing Management Costs

Use this worksheet to estimate the cost of grazing management:

- Estimate the labor cost (or charge, if it is your own labor) for tasks such as moving cattle and fences, lines 1-7.
- Estimate equipment operating costs (for example, a pick-up), lines 8-11, using the information in Machinery Cost Table 2. Total labor and equipment operating costs on line 12.
- Use lines 13-17 to estimate the share of the equipment ownership costs (depreciation, interest, taxes and insurance) allocated to grazing. Use the Machinery Cost Table 1. These costs are shown as annual totals, so calculate the average cost per hour.
- Total the costs of managing the grazing on line 18.
- Transfer this total to Worksheet 6, Grazing Summary, line 6.

| ITEM | OPTION 1 | OPTION 2 |
|--|----------|----------|
| 1. Days of grazing available, from Worksheet 1, line 9 | | |
| 2. How often are cattle moved to fresh grazing? Example: Daily=1, twice daily = 2 | | |
| 3. Number of moves in feeding period. Round off to the nearest whole number: Divide line 1 by line 2. | | |
| 4. Average time spent moving cattle, including travel to the pasture, moving fences and waterers, etc., minutes per move | | |
| 5. Total hours spent moving cattle: Divide line 4 by 60, and multiply the result by line 3. | | |
| 6. Labor cost or charge, \$ per hour | \$ | \$ |
| 7. Total labor cost: Multiply line 5 by line 6. | \$ | \$ |
| 8. Average time equipment is operating per move, minutes | | |
| 9. Total hours of equipment use: Divide line 8 by 60 and multiply the result by line 3. | | |
| 10. Equipment operating cost (fuel, repairs, maintenance), per hour, from Machinery Cost Table 2. | \$ | \$ |
| 11. Equipment operating cost: Multiply line 9 by line 10. | \$ | \$ |
| 12. Total labor and equipment operating cost: Add lines 7 and 11. | \$ | \$ |
| 13. Annual equipment ownership cost (DITI) from Machinery Cost Table 1 or from Worksheet 3, line 13*. | \$ | \$ |
| 14. Total hours of use per year, from Machinery Cost Table 1. | | |
| 15. Share of annual ownership cost, decimal: Divide line 13 by line 14. Or divide by line 14 in Worksheet 3*. | | |
| 16. Share of annual ownership cost, \$: Multiply line 13 by line 15. Or multiply by line 15 in Worksheet 3*. | \$ | \$ |
| 17. Annual ownership cost for any additional fencing, lanes, water supply, etc.: (Not needed for this activity. Use the figure from Worksheet 3, line 15, if necessary.) | \$0 | \$ |
| 18. Total cost of managing the pasture for grazing, Add lines 12, 16, and 17. | \$ | \$ |
| NOTES: *Use Worksheet 3 only if the item(s) you need are not shown in the machinery cost handout. | | |

Worksheet 3. Annual Ownership Costs

Use this worksheet for machinery and equipment items not listed in Machinery Cost Table 1. It is not needed for this activity, but you might need it when evaluating other feeding alternatives.

| NAME OF ITEM (e.g. hay baler) | ITEM 1 | ITEM 2 | ITEM 3 |
|--|--------|--------|--------|
| 1. Investment cost, \$ | \$ | \$ | \$ |
| 2. Salvage value, \$ | \$ | \$ | \$ |
| 3. Subtract line 2 from line 1, \$ | \$ | \$ | \$ |
| 4. Useful life, in years | | | |
| 5. Annual depreciation charge, \$: Divide line 3 by line 4. | \$ | \$ | \$ |
| 6. Average investment, \$: Add lines 1 and 2, and divide the result by 2. | \$ | \$ | \$ |
| 7. Interest rate or charge, as decimal | | | |
| 8. Annual interest cost or charge, \$: Multiply line 6 by line 7. | \$ | \$ | \$ |
| 9. Property tax rate, per \$1,000 of value, as decimal | | | |
| 10. Annual property tax, \$: Divide line 6 by 1,000; multiply the result by line 9. | \$ | \$ | \$ |
| 11. Insurance premium rate per \$100, as decimal | | | |
| 12. Annual insurance cost, \$: Divide line 6 by 100, and multiply the result by line 11. | \$ | \$ | \$ |
| 13. Total annual ownership cost: Add lines 5,8,10, and 12. | \$ | \$ | \$ |
| 14. Pro rated share to this activity, decimal | | | |
| 15. Prorated share of cost, \$: Multiply line 13 by line 14. | \$ | \$ | \$ |
| NOTES: | | | |

Worksheet 4. Hay Needs and Costs

If the feeding period is longer than the days of grazing available (Worksheet 1, Grazing Budget, line 11), use this worksheet to estimate the amount and cost of the hay you need to buy and feed.

- Calculate the hay needed, lines 1-9, based on animal needs, an allowance for waste and the number of days in the hay feeding period.
- *Lines 10-12 are not needed for this exercise but can be used to include home-grown hay cost.*
- Estimate the cost of purchased hay, lines 13-17.
- Total the costs of home grown and purchased hay on line 18.
- Transfer this total to Worksheet 6, Grazing Summary, line 8.

| ITEM | OPTION 1 | OPTION 2 |
|---|----------|----------|
| 1. Number of animals | | |
| 2. Hay dry matter intake needed (eaten), pounds/head/day | | |
| 3. Total pounds of hay dry matter intake needed (eaten) by the group, per day: Multiply line 1 by line 2. | | |
| 4. Dry matter percentage of hay as fed, decimal | | |
| 5. Total pounds of hay the group needs to eat per day, on an as-fed basis: Divide line 3 by line 4. | | |
| 6. Additional hay to be offered to cover waste, lb/day* | | |
| 7. Total hay to be offered, lb/day: Add lines 5 and 6. | | |
| 8. Number of days in the hay feeding period, Worksheet 1, line 11 | | |
| 9. Total hay needed for hay feeding period, in tons: Multiply line 7 by line 8. Divide the result by 2,000. | | |
| 10. Tons of home grown hay available, if any, from Group 3, Worksheet 1, Hay Production, line 16 | | |
| 11. Total cost of producing own hay to feed, Group 3, Worksheet 1, Hay Production, line 17, \$ per ton fed | \$ | \$ |
| 12. Cost of own hay fed during feeding period. Multiply SMALLER of line 9 OR line 10 by line 11. | \$ | \$ |
| 13. Purchased hay needed, in tons, if line 9 is larger than line 10: Subtract line 10 from line 9. | | |
| 14. Allowance for bought hay storage losses, tons* | | |
| 15. Total hay to be purchased, tons: Add lines 13 and 14. | | |
| 16. Cost of purchased hay, \$ per ton | \$ | \$ |
| 17. Total cost of bought hay, \$: Multiply line 15 by line 16. | \$ | \$ |
| 18. Total cost of hay for the hay feeding period: Add lines 12 and 17. | \$ | \$ |
| NOTES: *See Table 3. | | |

Worksheet 5. Supplementary Hay Feeding Costs

Use this worksheet to estimate the cost of actually feeding the supplementary hay:

- Estimate how many times hay will be put out, lines 1-3.
- Estimate labor costs, lines 4-7, and equipment operating costs, lines 8-11, using the information in Machinery Cost Table 2. Total the labor and operating costs on line 12.
- Use information from Machinery Cost Table 1 to estimate a share of equipment ownership costs (depreciation, interest, taxes and insurance) to hay feeding, lines 13-16. Costs are shown as annual totals, so calculate the average cost per hour.
- Total the costs of the supplementary hay feeding on line 17.
- Transfer this total to Worksheet 6, Grazing Summary, line 9.

| ITEM | OPTION 1 | OPTION 2 |
|--|----------|----------|
| 1. Days in hay feeding period, from Worksheet 1, line 11 | | |
| 2. How often is hay put out? Example: Daily=1, Every other day=2 | | |
| 3. Number of times hay is put out during feeding period, rounded to a whole number: Divide line 1 by line 2. | | |
| 4. Average time spent putting hay out, including loading, moving, etc., in minutes per feeding | | |
| 5. Total labor used, hours: Divide line 4 by 60. Multiply the result by line 3. | | |
| 6. Labor cost or charge, \$ per hour | \$ | \$ |
| 7. Total labor cost feeding hay: Multiply line 5 by line 6. | \$ | \$ |
| 8. Average time equipment is used per move, minutes | | |
| 9. Total hours of equipment use in hay feeding period: Divide line 8 by 60. Multiply the result by line 3. | | |
| 10. Equipment operating cost per hour, from Machinery Cost Table 2. | \$ | \$ |
| 11. Total equipment operating cost, \$: Multiply line 9 by line 10. | \$ | \$ |
| 12. Total labor and equipment operating cost, \$: Add lines 7 and 11. | \$ | \$ |
| 13. Annual equipment ownership cost, from Machinery Cost Table 1. Or use Worksheet 3, line 13*. | \$ | \$ |
| 14. Total hours of use per year, from Machinery Cost Table 1. | | |
| 15. Share of annual ownership cost, decimal: Line 9 divided by line 14. Or divided by line 14 in Worksheet 3*. | | |
| 16. Share of annual equipment ownership cost, \$: Multiply line 13 by line 15. Or multiply by line 15 in Worksheet 3*. | \$ | \$ |
| 17. Total cost of feeding hay, \$: Add lines 12 and 16. | \$ | \$ |
| NOTES: *Use Worksheet 3 only if the item(s) you need are not shown in Machinery Cost Table 1. | | |

Worksheet 6. Grazing Summary

Use this worksheet to summarize important information from the other worksheets and calculate the total costs of the grazing option.

- Report information from the other worksheets on lines 1-6, 8, and 9.
- Estimate the cost of other feedstuffs and supplements, such as minerals fed during the grazing period on line 7.
- Do the same for the hay feeding period on line 10.
- Calculate the total feed cost and the cost per head and per day, lines 11-13.

| ITEM | OPTION 1 | OPTION 2 |
|---|----------|----------|
| 1. Days in feeding period | | |
| 2. Number of animals in the group | | |
| 3. How often cattle are moved to fresh grazing. Daily = 1, etc. | | |
| 4. How often hay is put out, if fed. Example: Daily =1, Every other day =2 | | |
| 5. Total cost of stockpiled pasture, from Worksheet 1, Pasture Cost, line 16 | \$ | \$ |
| 6. Cost of managing the grazing, from Worksheet 2, Grazing Management Costs, line 18 | \$ | \$ |
| 7. Additional cost of other feed and supplements while on pasture, if any | \$ | \$ |
| 8. Cost of supplementary hay for hay feeding period, from Worksheet 4, Hay Needs and Costs, line 18 | \$ | \$ |
| 9. Total cost of feeding hay, from Worksheet 5, Supplementary Hay Feeding Costs, line 17 | \$ | \$ |
| 10. Additional cost of other feeds and supplements while on hay, if any | \$ | \$ |
| 11. Total feed cost for period: Add lines 5 through 10. | \$ | \$ |
| 12. Cost per head for period: Divide line 11 by line 2. | \$ | \$ |
| 13. Cost per head per day. Divide line 12 by line 1. | \$ | \$ |
| NOTES: | | |

Grazing Summary Report

Use this sheet to summarize the information your group collects and calculates during the work group activity. You can use it as the basis for your group’s report to the other workshop participants.

| ITEM | |
|---|----|
| 1. Days in feeding period | |
| 2. Number of animals in the group | |
| 3. How often cattle are moved to fresh grazing, in days. Example: Daily = 1, every two weeks = 14 | |
| 4. Time taken to move cattle, minutes per trip | |
| 5. Time equipment is used to move cattle, min. per trip | |
| 6. How often hay is put out, if fed. Example: Daily=1, every other day=2 | |
| 7. Time taken to put out hay, min. per trip | |
| 8. Time equipment is used to put out hay, min. per trip | |
| 9. Labor charge, \$ per hour | \$ |
| 10. Total cost of stockpiled pasture, Worksheet 6, line 5 | \$ |
| 11. Cost of managing the grazing, Worksheet 6, line 6 | \$ |
| 12. Cost of other feed and supplements while on pasture, if any, Worksheet 6, line 7 | \$ |
| 13. Cost of supplementary hay for hay feeding period, Worksheet 6, line 8 | \$ |
| 14. Total cost of feeding hay, Worksheet 6, line 9 | \$ |
| 15. Cost of other feeds & supplements while on hay, if any, Worksheet 6, line 10 | \$ |
| 16. Total feed cost for period, Worksheet 6, line 11 | \$ |
| 17. Cost per head for period, Worksheet 6, line 12 | \$ |
| 18. Cost per head per day, Worksheet 6, line 13 | \$ |

NC State Budget 86-2. Cool-season perennial grass for pasture: Estimated annual revenue, operating cost, fixed cost and net returns per acre (July 2006)

| Description | | | | | |
|---|-------|--------------------|---------------|-----------------|------------|
| Operating inputs | Unit | Price | Quantity | Value | Your Value |
| • Lime, applied, pro-rated share | Ton | \$33.00 | 0.33 | \$10.99 | |
| • 0-10-20, dry bulk | Cwt. | \$10.35 | 4.00 | 41.40 | |
| • 30% nitrogen solution | Cwt. | \$12.20 | 3.33 | 40.63 | |
| • Fert. spread, custom | Ton | \$1.30 | 7.33 | 9.53 | |
| • Other: | | | | 0.00 | |
| • Other: | | | | 0.00 | |
| • Other: | | | | 0.00 | |
| • Machinery labor (From Table 2) | | | | 9.73 | |
| • Other labor | Hours | \$8.50 | 0.00 | 0.00 | |
| • Machinery fuel, maint, repairs (Table 2) | Acre | | | 8.69 | |
| • Annual operating capital ^a | \$ | 7.5% | 50.40 | 3.78 | |
| Total operating costs | | | | \$124.74 | |
| Fixed costs | | | Amount | Value | |
| • Machinery depreciation, taxes, insurance, and interest (from Table 1) | | | | 7.77 | |
| • Pasture Establishment depreciation and interest (from Table 1) | | | | 46.40 | |
| Total fixed costs | | | | \$54.17 | |
| Total cost | | | | \$178.91 | |
| Production | Unit | Price ^b | Quantity | Value | |
| • Harvested as pasture, dry matter | Ton | \$0.00 | 3.00 | 0.00 | |
| Total Receipts | | | | \$0.00 | |
| RETURNS ABOVE TOTAL OPERATING COST | | | | -\$124.74 | |
| RETURNS ABOVE ALL SPECIFIED COSTS ^c | | | | -\$178.91 | |
| AVERAGE COST PER TON OF DRY MATTER ^d | | | | \$59.64 | |

^a Interest on operating expenses for an average of 5 months.

^b Only place a value on pasture if it is rented out.

^c This is the owners cost of grazing per acre = Total annual cost LESS the value of any pasture rented out.

^d Total cost divided by total dry matter produced

NOTES

Pasture typically is 20 to 25% dry matter, 65% digestible and provides 1,300 pounds of TDN per ton of dry matter.

Each ton of pasture dry matter typically provides 86 animal unit days of grazing. A beef cow = 1 AU.

Budget does not include the cost of managing grazing livestock.

Budget prepared by:

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Forage machinery costs

Table 1. Initial investment in specialized forage equipment and annual ownership expenses

| Operation and Item | Life Years | Initial Cost \$ | Salvage Value \$ | Depreciation ^a \$ | Interest ^b \$ | Tax & Ins. ^c \$ | Annual D.I.T.I. \$ | Annual Use Hours | D.I.T.I. per Hour \$ | Acres per Hour No. | Expense per Acre ^d \$ | Times Over ^e No. | Total Expense \$/Acre |
|-------------------------------------|------------|-----------------|------------------|------------------------------|--------------------------|----------------------------|--------------------|------------------|----------------------|--------------------|----------------------------------|-----------------------------|-----------------------|
| Rate Charged, percent ==> | | | | | | | | | | | | | |
| Mowing | | | | | | | | | | | | | |
| Tractor, HP=55 | 10 | 19,700 | 6,107 | 1,359 | 968 | 18 | 2,345 | 500 | 4.69 | 3.7 | 1.27 | 1 | 1.27 |
| + Mower-Cond. | 10 | 15,720 | 4,716 | 1,100 | 766 | 14 | 1,881 | 100 | 18.81 | 3.7 | 5.08 | 1 | 5.08 |
| Raking | | | | | | | | | | | | | |
| Tractor, HP=55 | 10 | 19,700 | 6,107 | 1,359 | 968 | 18 | 2,345 | 500 | 6.00 | 3.7 | 1.62 | 2 | 3.24 |
| + Spider Rake | 10 | 2,650 | 663 | 199 | 124 | 2 | 325 | 75 | 4.34 | 3.7 | 1.17 | 2 | 2.34 |
| Baling | | | | | | | | | | | | | |
| Tractor, HP=75 | 10 | 25,420 | 7,880 | 1,754 | 1,249 | 23 | 3,026 | 500 | 6.05 | 2.1 | 2.88 | 1 | 2.88 |
| + 1/2 Ton Baler | 8 | 11,310 | 3,167 | 1,018 | 543 | 10 | 1,571 | 125 | 12.57 | 2.1 | 5.98 | 1 | 5.98 |
| Move & Stack | | | | | | | | | | | | | |
| Tractor, HP=55 | 10 | 19,700 | 6,107 | 1,359 | 968 | 18 | 2,345 | 500 | 4.69 | 3.3 | 1.42 | 1 | 1.42 |
| + Bale Fork | 10 | 500 | 175 | 33 | 25 | 0 | 58 | 100 | 0.58 | 3.3 | 0.18 | 1 | 0.18 |
| Pasture Clipping | | | | | | | | | | | | | |
| Tractor, HP=55 | 10 | 19,700 | 6,107 | 1,359 | 968 | 18 | 2,345 | 500 | 4.69 | 3.7 | 1.27 | 0 | 0.00 |
| + Bushhog | 10 | 4,250 | 1,275 | 298 | 207 | 4 | 509 | 100 | 5.09 | 3.7 | 1.37 | 0 | 0.00 |
| Other | | | | | | | | | | | | | |
| Pickup Truck, 3/4 Ton | 10 | 25,000 | 6,500 | 1,850 | 1,181 | 22 | 3,053 | 500 | 6.11 | 10 | 0.61 | 0 | 0.00 |
| Pickup Truck, 1/2 Ton | 10 | 11,800 | 3,068 | 873 | 558 | 10 | 1,441 | 500 | 2.88 | 10 | 0.29 | 1 | 0.29 |
| ATV | 10 | 6,000 | 1,560 | 444 | 284 | 5 | 733 | 500 | 1.47 | 10 | 0.15 | 0 | 0.00 |
| TOTAL | | | | | | | | | | | | | 22.69 |

^aDepreciation = (Initial cost - Salvage value) / years of life

^bInterest on investment = ((Initial cost + Salvage value) / 2) X interest rate

^cCombined rate of property taxes and insurance premiums as a percentage of the average investment

^dPer acre costs for self-propelled vehicles include an additional 10% allowance for travel time from farm to field

^eTotal number of trips across the field per year for this operation

Forage machinery costs
Table 2. Operating expense for forage machinery and equipment per hour and per acre

| Operation and Item | Repairs & Maint. ^a | | Repairs & Maint. ^b | | Fuel Use Gals/hr | Cost per Gal \$ | Fuel & Lube ^c \$/Hour | Total Cost \$/Hour | Acres per Hour No. | Times Over No. | Equip. Op. Cost ^d \$/Acre | Labor Cost \$/Hour | Labor Cost ^e \$/Acre | Total Expense \$/Acre |
|---|-------------------------------|---------|-------------------------------|---------|------------------|-----------------|----------------------------------|--------------------|--------------------|----------------|--------------------------------------|--------------------|---------------------------------|-----------------------|
| | % | \$/Year | \$/Hour | \$/Year | | | | | | | | | | |
| Fuel cost per gallon & labor cost per hour =====> | | | | | | | | | | | | | | |
| Tractor, HP=55 | 2% | 394 | 0.79 | 2.42 | 2.42 | 2.50 | 6.96 | 7.75 | 3.7 | 1 | 2.30 | 9.00 | 2.80 | 5.10 |
| + Mower-Cond. | 4% | 629 | 6.29 | 0 | 0.00 | 0.00 | 0.00 | 6.29 | 3.7 | 1 | 1.87 | | | 1.87 |
| Raking | 2% | 394 | 0.79 | 2.42 | 2.42 | 2.50 | 6.96 | 7.75 | 3.7 | 2 | 4.61 | 9.00 | 5.59 | 10.20 |
| Tractor, HP=55 | 2% | 53 | 0.71 | 0 | 0.00 | 0.00 | 0.00 | 0.71 | 3.7 | 2 | 0.42 | | | 0.42 |
| + Spider Rake | 2% | 508 | 1.02 | 3.3 | 3.3 | 2.50 | 9.49 | 10.50 | 2.1 | 1 | 5.50 | 9.00 | 4.93 | 10.43 |
| Baling | 1% | 113 | 0.90 | 0 | 0.00 | 0.00 | 0.00 | 0.90 | 2.1 | 1 | 0.47 | | | 0.47 |
| Tractor, HP = 75 | 2% | 394 | 0.79 | 2.42 | 2.42 | 2.50 | 6.96 | 7.75 | 3.3 | 1 | 2.58 | 9.00 | 3.14 | 5.72 |
| + 1/2 Ton Baler | 1% | 5 | 0.05 | 0 | 0.00 | 0.00 | 0.00 | 0.05 | 3.3 | 1 | 0.02 | | | 0.02 |
| Move & Stack | 2% | 394 | 0.79 | 2.42 | 2.42 | 2.50 | 6.96 | 7.75 | 3.7 | 0 | 0.00 | 9.00 | 0.00 | 0.00 |
| Tractor, HP=55 | 1% | 43 | 0.43 | 0 | 0.00 | 0.00 | 0.00 | 0.43 | 3.7 | 0 | 0.00 | | | 0.00 |
| + Bale Fork | 2% | 500 | 1.00 | 3.00 | 3.00 | 2.50 | 8.63 | 9.63 | 10.0 | 0 | 0.00 | 9.00 | 0.00 | 0.00 |
| Pasture Clipping | 2% | 236 | 0.47 | 2.25 | 2.25 | 2.50 | 6.47 | 6.94 | 10.0 | 1 | 0.76 | 9.00 | 1.04 | 1/80 |
| Tractor, HP = 55 | 2% | 120 | 0.24 | 1.80 | 1.80 | 2.50 | 5.18 | 5.42 | 10.0 | 0 | 0.00 | 9.00 | 0.00 | 0.00 |
| TOTALS | | | | | | | | | | | 17.77 | | 16.46 | 34.23 |

^aRepairs and maintenance costs are calculated as a % of the initial cost in Table 1. Percentages are higher for equipment bought used.

^bRepairs and maintenance costs per hour based on annual use shown in Table 1.

^cTotal fuel cost plus lube costs estimated as 15% of the fuel cost.

^dPer acre costs for tractors and other self-propelled equipment includes an additional 10% allowance for travel time from farm to field.

^eLabor cost per acre includes an additional 15% allowance for travel time, setting up and finishing up.

Table 3. Forage Crop Harvest, Storage and Feeding Losses

Refer to this table to determine any forage losses for the grazing option. Harvest losses are based on the quantity of standing forage in the field at the time harvest begins. Concentrate losses are based on quantities purchased. Source: Sustainable Dairy Farming Systems Manual, Universities of Kentucky and Tennessee, 1998

| Crop | Harvest & Storage System | Harvest Losses % | Storage Losses % | Feeding Losses % | Total Losses % |
|---------------------|--------------------------------------|------------------|------------------|------------------|----------------|
| Cool-season Grasses | Grazed extensively | 50 | — | — | 50 |
| | Grazed intensively | 15 | — | — | 15 |
| | Hay; square bales, in a shed | 10 | 3 | 5 | 18 |
| | Hay; square bales, outside, covered | 10 | 5 | 5 | 20 |
| | Hay; round bales, shed | 10 | 3 | 15 | 28 |
| | Hay; round bales, outside, covered | 10 | 5 | 15 | 30 |
| | Hay; round bales, outside, uncovered | 10 | 15-20 | 15 | 40-45 |
| Corn | Silage, metal upright | 5 | 5 | 5 | 15 |
| | Silage, concrete upright | 5 | 10 | 5 | 20 |
| | Silage, bunker, covered | 5 | 12 | 5 | 22 |
| | Silage, trench, covered | 5 | 15 | 5 | 25 |
| | Silage, bags | 5 | 5 | 5 | 15 |
| Grasses/mixes | Haylage | 13 | 5-15 | 5 | 23-33 |
| Concentrates | Bin | n/a | minimal | 5 | 5 |

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