

Fight new paint disease with careful analysis

Annual equipment investment and expense can surpass the investment many dairies make in cows or labor. So invest wisely.

By Wayne Knoblauch and Jason Karszes

Dairy businesses tie up a lot of money in equipment. On dairies that raise crops, the capital investment in machinery and equipment equals the investment in cattle. On small-herd dairies that investment ranges from \$75,000 to \$200,000; large-herd dairies can invest from \$750,000 to more than \$1 million in machinery.

The average annual machinery expense, which includes depreciation, repairs, fuel and lubricants; machine hire; rent and lease costs; and 5% interest, tops \$500 per cow per

year. That's greater than hired labor expense per cow.

With so much money at stake, a dairy's profitability depends on producers' making accurate decisions on the size, type of technology and number of machines to invest in.

Do the math

Here's the basic economic principle that should guide machinery investment: Buy a machine only when it will reduce total pro-

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How much machinery do you need to operate your dairy business? "As little as possible," said Stan Warren, the noted former Cornell University agricultural economist.

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The Manager, a special section prepared by PRO-DAIRY specialists, appears in *Northeast DairyBusiness* six times a year. In keeping with the PRO-DAIRY mission, *The Manager* helps strengthen the management skills of Northeast dairy producers and increase the profitability of the Northeast dairy industry. PRO-DAIRY, an educational program begun in 1988, is a joint venture of the New York State Department of Agriculture and Markets, Cornell University's College of Agriculture and Life Sciences, and Northeast agriservice organizations. For reprints of PRO-DAIRY's *The Manager*, contact Robin Huzinga, 272 Morrison Hall, Cornell University, Ithaca, NY 14853. Phone: (607) 255-4478. E-mail: rmh14@cornell.edu

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duction costs and/or increase income by an amount greater than the added costs of the machine.

That means first estimating the annual cost – both fixed and variable – of using the machine. Then determine if a combination of the following outcomes justifies the cost:

- An increase in income.
- A decrease in other expenses.
- Reduced operator labor, increased operator comfort or safety, and other returns.
- Income tax advantages.

Fixed costs, which are the same whether you use a machine one hour or 100, include depreciation, interest on the capital invested, insurance and storage. Variable costs change depending upon the machine or equipment. They include repairs and maintenance, labor, and fuel and lubricants. If the machine is leased, substitute the lease payments for depreciation and interest.

To calculate fixed costs

Depreciation: The amount of capital that is used up during the year due to wear, decay, obsolescence or loss in value from age.

$$\frac{\text{Cost} - \text{Salvage Value}}{\text{Years of Useful Life}} = \text{Depreciation}$$

The annual depreciation for a \$40,000 mower conditioner with a \$4,000 salvage value at the end of nine years of useful life is:

$$\frac{\$40,000 - \$4,000}{9 \text{ Years}} = \$4,000$$

Interest on Investment: The charge for the use of capital invested in the machine. In a cost analysis, it represents the opportunity cost of the capital invested in the machine rather than in the next best alternative.

$$\frac{\text{Cost} + \text{Salv Value}}{2} \times \text{Int rate} = \text{Int on invmt}$$

Using an interest rate of 6%, the annual interest cost on our mower conditioner is:

$$\frac{\$40,000 + \$4,000}{2} \times .06 = \$1,320$$

Insurance Rates: Use 0.5% of the machine’s value as a rule of thumb to determine insurance costs.

Using the rule of thumb, the annual insurance cost for our machine is:

$$\$40,000 \times .005 = \$200$$

Storage: A rule of thumb for storage is 1.5% of the value of the machine.

$$\text{Annual storage cost: } \$40,000 \times .015 = \$600$$

Total annual fixed cost = \$6,120

To calculate variable costs

Repairs and Maintenance: Because these costs depend upon such factors as the level of preventive maintenance, who performs repairs – the dairy producer or the dealer – and how the machine is operated, they’re difficult to predict.

If our \$40,000 mower conditioner is used 225 hours each year, the American Society of Agricultural Engineers estimates that the accumulated repair costs is 60% of the cost of the machine new.

That’s \$2,667 annually for repairs and maintenance. (Or \$24,000 over the life of the machine.) Use your dairy’s repair costs on similar machines as a guide to these costs.

Fuel and Lubricants: Use your experience and manufacturer’s data to predict these costs. This formula is commonly used to estimate the cost of diesel fuel and lubricants:

Maximum PTO horsepower x 0.0504 x fuel cost per gallon. For heavy tillage operations, increase the results of the equation by up to 30%. Decrease it by 20% for light tasks such as hauling empty wagons.

The cost to operate the mower conditioner with a 100-hp engine at a fuel price of \$1.25 per gallon is:

$$100 \times 0.0504 \times \$1.25 = \$6.30 \text{ per hour of operation} \times 225 \text{ hours per year} = \$1,417.50 \text{ annually for fuel and lubricants.}$$

Labor: To estimate this, multiply the actual wage and fringe benefits paid per hour to the employee operating the machine by the number of hours the machine will operate per year. For the mower conditioner, the number of hours operated per year can be estimated by dividing the total number of acres of hay mowed in all cuttings by the acres per hour that the machine can mow. For this example, the mower will handle seven acres per hour and a total of 1,575 acres will be cut over four cuttings. If labor costs \$15 per hour and the person mows for 225 hours for all cuttings, the annual labor cost = \$3,375.

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How much machinery?

As little as possible.

What if the cost and return analysis indicates it’s not a good idea to own a piece of machinery or equipment? Consider these options:

1. Justify owning a machine by doing custom work.
2. Go in with others on joint ownership.
3. Hire someone with the equipment.
4. Enlarge your business to a size where the machine is justified.
5. Buy used equipment.

Machinery is necessary to operate a dairy. But you’d be wise to take the advice of Stan Warren, the noted former Cornell University economics professor.

When asked how much machinery is required on a farm, he replied, “As little as possible!”

FYI

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■ For more information on equipment costs, see [www.ae.iastate.edu/extension.outreach](http://www.ae.iastate.edu/extension/outreach). Click on the Agricultural Machinery button. Or call the Midwest Plan Service at (515) 294-5247 and request Publication PM-710, “Estimating Farm Machinery Costs.” Cost: 75 cents per copy.