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Calculating the Annual Cost of Using Depreciable Assets

We frequently have applications which require calculating the annual cost of depreciable assets such as machinery, equipment, and buildings. These calculations may extent to purchased livestock, trees, and may other forms of assets. This note focuses primarily on machinery, equipment, and buildings.

A common approach is very straightforward and goes by the acronym DIRTI-5, standing for depreciation, and interest on average investment, repairs, property taxes (if applicable) and insurance. We will focus on depreciation and interest on average investment.

Annual depreciation, for our purpose, is typically calculated as straight line depreciation. That
is $$Annual\ depreciation = \frac{Purchase\ price - salvage\ (terminal)value}{Years\ asset\ is\ kept}$$

The purchase price is $100,000, its expected life in the farm business is 10 years, and it is expected to have 20% of its purchase price remaining (in current dollars) at the end out 10 years

$$Annual\ depreciation = \frac{(\$100,000 - \$20,000)}{10} = \$8,000\ per\ year.$$

If there has been a trade-in, the purchase price would be the "boot" plus amount paid.

The annual interest on average investment is

$$Interest\ on\ avg\ investment = Interest\ rate\ x\ \frac{Beginning\ asset\ value + Ending\ asset\ value}{2}$$

To continue with our example, if we assume a potential rate of return in other investments (or, cost of funds) of 5% per year, the annual interest on investment would be

$$Interest\ on\ average\ investment = 0.05\ x\ \frac{\$100,000 + \$20,000}{2} = \$3,600\ per\ year\ .$$

The annual depreciation plus interest for this case would be $11,000 / year, or 11% of purchase price.

The D+I approximation is consistent with how we calculate return on investment when we do coordinated financial statement. It is a good approximation to the true cost when the interest rate is modest and years held is not more than 15 -20 years. It is an underestimate of the true cost.