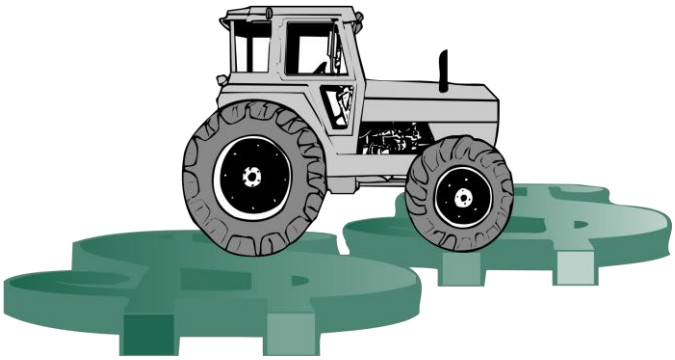
APPRECIATION AND DEPRECIATION OF FARM ARTICLES

Appreciation is a term used to indicate a value is increasing.

Depreciation is a term used to indicate a value is decreasing.



Formulas:

Value= $I_{initial}\left(1+\frac{\%}{100}\right)^{n}$ Appreciation

Value= $I_{initial}\left(1-\frac{\%}{100}\right)^{n}$ Depreciation

$I_{initial}$ = starting value

% = percentage increase/ decrease

n= term of calculation e.g. years, months, days.

Machinery costs enter farm management in three areas:

1) minimizing costs of production

2) selecting the profit-maximizing crop mix, and

3) considering structural or technological changes, such as farm expansion or contraction, or alternative tillage systems.

Minimizing the machinery portion of production costs requires routine assessment of the benefits and costs associated with owning, leasing, or renting machinery. These must regularly be compared with

hiring machinery operations (custom farming), which is often a plausible alternative. To assist farm managers in machinery decisions, this bulletin develops a framework for calculating and analyzing the various components of a machine's expected annual costs: repairs and maintenance; gas, fuel, and oil; operating labor; insurance and taxes; depreciation; and opportunity cost on funds used.

For crop enterprise selection, machinery costs must be assigned to specific crops or crop sequences. Actual historical machine costs can provide a basis for such assignments but may be difficult to obtain.

Annual Operating Costs

Field Efficiency

Although machine costs per acre are desired, some cost components are determined by hours of operation. The concept of field efficiency is used to help make the transition from hours of use to acres covered. If field efficiency were 100 percent, acres covered per hour would be only a function of operating speed and machine width. However, time spent moving machinery between fields (which may be large for producers with many small fields), overlapping, and backtracking on point rows all diminish field efficiency. Along with other machinery operation guidelines, Table 4 provides typical field efficiency percentage (FEP) values for selected field operations. Thus, acres per hour (APH) is a function of field speed (FS) in miles per hour, machine width (MW) in feet, and FEP in decimal form (Note: 5,280 feet per mile and 43,560 square feet per acre):

Equation 1

$$APH = \frac{FS \times MW \times 5{,}280}{43{,}560} \times FEP$$

$= 0.1212 \times FS \times MW \times FEP$

With a travel speed of 3 miles per hour, a field efficiency of 70 percent, and a 30-foot wide cutter platform, 7.6 acres are harvested per hour of combine operation according to Equation 1.

Labor

An hourly charge for labor needs to cover total operator costs. For example, it should include the employer's share of Social Security tax, as well as any other fringe benefits. The combine operation time of 100 hours for the wheat combining example accounts for field inefficiencies. However, the actual labor hours used in a field operation are regularly more than the machine hour meter suggests, due to the time spent checking on field conditions and driving to and from fields (as in when machinery is left in the field overnight). If we assume actual labor is 20 percent more than machine hours, annual labor charges (LAB) assigned to the 100 hours of combine operation is: LAB = hourly labor charge × machine hours × 1.20. If the per hour cost of labor (cost to employer) is expected to be $10 in 1997 then the wheat combining operation would be assigned a 1997 labor charge of LAB_{1997} = $1,200. Again, $LAB_{1996} = 0$.

Property Taxes, Insurance, and Shelter

Taxes (property taxes, not income taxes) insurance, and shelter (TIS) are typically considered a fixed machinery cost (usually a set percentage of market value). However, if market value depends on usage rate, as in Equation 4, then even TIS has variable cost components. Presently (1996) Kansas has no property tax on farm machinery, so only insurance and shelter must be considered. We assume TIS is 1.5 percent of market value. Because market value already accounts for inflation, no additional adjustment is required. The TIS_n formula (with n beginning in 1997, so $TIS_{1996} = 0$) is **Equation 2**

$TIS_n = M$

Cost of Capital

Machinery is purchased with debt funds, equity funds, or some combination of the two. When debt funds are used there is an explicit interest charge. The cost of debt funds is the rate at which machinery investment funds may be borrowed. $V_n \times 0.015$.

Income Tax and Finance

Marginal Tax Rates

In general, a marginal tax rate is the amount of income-related taxes that must be paid on the last dollar of taxable profit. Because machinery decisions affect several years in the future, an expected marginal rate should be used, rather than the specific rate applied to a single year

Income Tax Depreciation

Unlike many financing decisions, income tax decisions affect net present value analyses and the profitability of long-term investments. Consequently, analyzing machinery costs should always consider income taxes. Tax depreciation represents a method of allocating the cost of an asset as a business expense over the life of an asset.

LIVESTOCK

All entries in Section E should exclude any output from value-added activities, for example milk bottling and retailing, milk processing (including cheese, yoghurt and ice cream making) and meat processing and retailing. Depreciation and breeding livestock stock appreciation (BLSA) are elements in arriving at a calculated closing valuation for mature breeding animals. Only mature breeding

animals are assumed to depreciate, therefore the deduction of BLSA from the value of livestock output is relevant only to livestock.

Cows	Value	Total value per head
15	1,160	17,400
15	1,080	16,200
15	1,000	15,000
15	920	13,800
15	840	12,600
75	(1,000)	75,000

The method of constructing closing valuations requires an estimate to be made of the average depreciation per head for mature breeding animals purchased during the year. This is given by the difference between the average purchase/transfer price and the average disposal value, divided by the average number of years an animal is in the herd / flock.