

# Estimating the Economic Depreciation of Farm Assets

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Depreciation can often become an overlooked area for a farming operation. Yet, it plays a major role in both taxes and profitability. A possible reason could be that when most people hear depreciation, they jump directly to tax depreciation. Tax depreciation is defined by the IRS and uses IRS guidelines to expense the cost of a capital asset over time. Often, IRS guidelines will set a life (years) over which a capital item must be depreciated. There are also rules, such as IRS Section 179 (Additional First-Year Depreciation), which allows an operation to deduct the entire cost of an asset in the same year it was purchased. This will enable an operation to deduct farm assets in order to reduce before-tax income. Decisions about appropriate depreciation methods should be discussed with a tax professional.

Although tax depreciation is a useful tool for before-tax income, it does not accurately reflect the "real" annual loss of the asset from use, wear and tear, or technical obsolescence. If tax depreciation is used for financial statements (e.g. income statements), farm performance measurements, including profitability, will be inaccurate. Instead, economic depreciation should be used for farm financial statements and is the focus of this publication.

Economic depreciation estimates the value of an asset, such as farm machinery, that is used for a farming operation. An easy example of the difference between tax and economic depreciation is when looking at an operation's purchase of a brand new grain truck. For tax purposes the farmer can use Additional First-Year Depreciation (Section 179) which will allow them to deduct the entire cost of the truck within the year of purchase. However, if the farmer wanted to sell that truck after one year, it would still have considerable value. The difference between the purchase price and the resale price is the economic depreciation for that one year of use. This is the actual loss in value of the asset for that year.

Although that is a simple example, it illustrates that tax depreciation values can vastly differ from economic depreciation values. Economic depreciation should be used on income statements, enterprise budgets, and when calculating net farm income. The equation to estimate annual economic depreciation is:

$$\text{Annual Economic Depreciation} = \frac{(\text{Purchase Price} - \text{Salvage Value})}{\text{Economic Life}}$$

When calculating economic depreciation, the purchase price at the point of sale is used. The economic life of new machinery is equal to the length of time you plan to own that machine before selling or replacing. As a guideline, Kentucky Farm Business Management program uses a standard 10-year economic life on most farm machines, although, economic life varies drastically depending on the operation. Furthermore, the salvage value is what the machine will sell for at the end of its economic life. Estimating salvage values can be difficult, but Tables 1a and 1b can be used as a guideline. These tables provide an estimate of the salvage values for machinery based on a percentage of the purchase price. The estimated percentages are based on the type of equipment, years of use, and the intensity of use. An example of calculating the annual economic depreciation of new equipment can be found on page 4 along with a step-by-step guide.

Determining the economic depreciation for equipment purchased used is not as simple as when equipment is purchased new. The purchase price for calculating annual economic depreciation is the price paid for the used equipment. However, determining the salvage value for the used machine is more complex. Since tables 1a and 1b are based off of the new list price of machinery, the value, or current list price, of a new machine that is equivalent to the used machine being calculated must be determined. For example, if a used 2017 planter was bought at the beginning of 2020 for \$48,000, the equivalent price for a new 2020 planter is used for determining the salvage value. However, the age used for determining the correct percentage to estimate the salvage value should be the age of the machinery, plus the number of years that you expect to own the machinery. Using the planter example above, the used planter is already three years old when purchased. If you plan to keep the planter for an additional four years, the machine age used for referencing tables 1a and 1b would be seven years. An example of calculating annual depreciation for used machinery is provided on page 5.

The correct use of economic depreciation will allow operations to determine the appropriate cost for income statements, enterprise budgets, and for determining net farm income. Another key financial indicator that uses economic depreciation is the Depreciation Expense Ratio. This ratio is determined by dividing the total annual economic depreciation for all assets, including machinery, by the gross farm income for a particular year. If this ratio is great than 10%, this could indicate over capitalization which could signal financial stress and may require attention.

## Depreciation Tables

**Table 1a. Remaining salvage value as percent of new list price.**

Annual Hours	30-79 hp Tractor			80-149 hp Tractor			150+ hp Tractor			Combine, Forage Harvester		
	200	400	600	200	400	600	200	400	600	100	300	500
Age												
1	65%	60%	56%	69%	68%	68%	69%	67%	66%	79%	69%	63%
2	59%	54%	50%	62%	62%	61%	61%	59%	58%	67%	58%	52%
3	54%	49%	46%	57%	57%	56%	55%	54%	52%	59%	50%	45%
4	51%	46%	43%	53%	53%	52%	51%	49%	48%	52%	44%	39%
5	48%	43%	40%	50%	49%	49%	47%	45%	44%	47%	39%	34%
6	45%	40%	37%	47%	46%	46%	43%	42%	41%	42%	35%	30%
7	42%	38%	35%	44%	44%	43%	40%	39%	38%	38%	31%	27%
8	40%	36%	33%	42%	41%	41%	38%	36%	35%	35%	28%	24%
9	38%	34%	31%	40%	39%	39%	35%	34%	33%	31%	25%	21%
10	36%	32%	30%	38%	37%	37%	33%	32%	31%	28%	23%	19%
11	35%	31%	28%	36%	35%	35%	31%	30%	29%	26%	20%	17%
12	33%	29%	27%	34%	34%	33%	29%	28%	27%	23%	18%	15%
13	32%	28%	25%	33%	32%	32%	27%	26%	25%	21%	16%	13%
14	30%	27%	24%	31%	31%	30%	25%	24%	24%	19%	14%	12%
15	29%	25%	23%	30%	29%	29%	24%	23%	22%	17%	13%	10%
16	28%	24%	22%	28%	28%	27%	22%	21%	21%	16%	11%	9%
17	26%	23%	21%	27%	27%	26%	21%	20%	19%	14%	10%	8%
18	25%	22%	20%	26%	25%	25%	20%	19%	18%	13%	9%	7%
19	24%	21%	19%	25%	24%	24%	19%	18%	17%	11%	8%	6%
20	23%	20%	18%	24%	23%	23%	17%	17%	16%	10%	7%	5%

**Table 1b. Remaining salvage value as percent of new list price.**

Machine Age	Plows	Other Tillage	Planter, Drill, Sprayer	Mower, Chopper	Baler	Swather, Rake	Vehicle	Other
1	47%	61%	65%	47%	56%	49%	42%	69%
2	44%	54%	60%	44%	50%	44%	39%	62%
3	42%	49%	56%	41%	46%	40%	36%	56%
4	40%	45%	53%	39%	42%	37%	34%	52%
5	39%	42%	50%	37%	39%	35%	33%	48%
6	38%	39%	48%	35%	37%	32%	31%	45%
7	36%	36%	46%	33%	34%	30%	30%	42%
8	35%	34%	44%	32%	32%	28%	29%	40%
9	34%	31%	42%	31%	30%	27%	27%	37%
10	33%	30%	40%	30%	28%	25%	26%	35%
11	32%	28%	39%	28%	27%	24%	25%	33%
12	32%	26%	38%	27%	25%	23%	24%	31%
13	31%	24%	36%	26%	24%	21%	24%	29%
14	30%	23%	35%	26%	22%	20%	23%	28%
15	29%	22%	34%	25%	21%	19%	22%	26%
16	29%	20%	33%	24%	20%	18%	21%	25%
17	28%	19%	32%	23%	19%	17%	20%	24%
18	27%	18%	30%	22%	18%	16%	20%	22%
19	27%	17%	29%	22%	17%	16%	19%	21%
20	26%	16%	29%	21%	16%	15%	19%	20%

Source: American Society of Agricultural and Biological Engineers  
Iowa State Extension

## New Equipment Example

- A new 2020 Case IH 1235 12 Row-30 in. Spacing Planter, priced at \$80,000, expected useful life of 8 years.
- A new 2020 John Deere S770 Combine, priced at \$430,000, expected useful life of 10 years.

	Planter Example	Combine Example	Your Farm
A. Equipment	Case IH 1235 12 Row	John Deere S770 Combine	
B. Year (Buying new)	2020	2020	
C. Purchase Price	80,000	430,000	
D. Salvage Value % (from table)	44%	23%	
E. Economic Life	8	10	
F. Estimated Salvage Value	$(80,000 * 0.44) = 35,200$	$(430,000 * 0.23) = 98,900$	
G. Annual Economic Depreciation	$\frac{(80,000 - 35,200)}{8}$	$\frac{(430,000 - 98,900)}{10}$	
H. Total	<b>\$5,600.00</b>	<b>\$33,110.00</b>	

### New Equipment Example Steps

- 1) Line C – Purchase Price – The amount the operation paid for the brand new machine
- 2) Line D – Salvage value – Using tables 1a and 1b on page 2, find the percentage that corresponds to the appropriate machine age at the end of the machine’s economic life (how long you plan to keep the new machine) and annual usage or implement type.

In the implement example, locate the column titled Planter, Drill, Sprayer. Since the economic life is 8 years, go down to row 8 to indicate the machine’s age will be 8 years old at the end of the machine’s economic life. Thus, the salvage value percent is 44% for a new planter.

In the combine example, locate the column titled Combine, Forage, Harvester. Since the combine used in this example is expected to have annual hours of 300, the sub-column titled 300 is used. The economic life is 10 years; go down to row 10 to indicate the machine’s age will be 10 years old at the end of the machine’s economic life. Thus, the salvage value for the combine is 23% of the purchase price.

- 3) Line E – Economic Life – The number of years the operation expects to use the machine
- 4) Line F – Estimated Salvage Value – Estimated value at the end of equipment useful life  
 $Line C * Line D$
- 5) Line G – Annual Economic Depreciation – Input the values into the annual economic depreciation equation  
 $\frac{(Purchase Price - (Purchase Price * Salvage Value \%))}{Economic Life}$  or  $\frac{(Line C - (Line F))}{Line E}$
- 6) Line H – Total Annual Economic Depreciation– Resulting number from the calculation on Line G

## Used Equipment Example

- A used 2017 (three years old) Case IH 1235 12 Row-30 In. spacing Planter was purchased at \$48,000 and is planned to be used for an additional 4 years.
- A used 2015 (five years old) John Deere S670 Combine was purchased at \$230,000 and is planned to be used for an additional 3 years. (The S770 is the equivalent since John Deere changed series numbers in the last 5 five years.)

	Planter Example	Combine Example	Your Farm
A. Equipment	Case IH 1235 12 Row	John Deere S670 Combine	
B. Year (Buying Used)	2017	2015	
C. Purchase Price	48,000	230,000	
D. Price of New Equivalent Machine	80,000	430,000	
E. Total Years of Useful Life ( <i>machine's age + Intended use on farm</i> )	7	8	
F. Salvage Value % ( <i>from table</i> )	46%	28%	
G. Economic Life ( <i>Intended use on farm</i> )	4	3	
H. Estimated Salvage Value	$(80,000 * 0.46) = 36,800$	$(430,000 * 0.28) = 120,400$	
I. Annual Economic Depreciation	$\frac{(48,000 - 36,800)}{4}$	$\frac{(230,000 - 120,400)}{3}$	
J. Total	<b>\$2,800.00</b>	<b>\$36,533.33</b>	

### Used Equipment Example Steps

- 1) Line C – Purchase Price – The amount the operation paid for the used machine
- 2) Line D – Price of New Equivalent Machine – The price of a new machine equivalent to the used machine purchase.
- 3) Line E – Total Years of Useful Life – The expected total number of years the machine was operated at the end of the useful life. For used equipment, the total will be the age of the machine at purchase plus the expected number of years the operation is planning to use the machine
- 4) Line F – Salvage value % – Using tables 1a and 1b on page 2, find the percentage that corresponds to the appropriate machine age at the end of the machine's economic life and usage or implement type.
- 5) Line G – Economic Life – The number of years the operation expects to use the machine
- 7) Line H – Estimated Salvage Value – Estimated value at the end of equipment useful life  
*Line D \* Line F*
- 6) Line I – Annual Economic Depreciation – Input the values into the annual economic depreciation equation  
 $\frac{\text{Purchase Price} - (\text{Price of New Equivalent Machine} * \text{Salvage Value \%})}{\text{Economic Life}}$  *or*  $\frac{(\text{Line C} - (\text{Line H}))}{\text{Line G}}$
- 7) Line J – Total Annual Economic Depreciation – Resulting number from the calculation on Line H