



Machinery Cost Estimator

The Machinery Cost Estimator is divided into five primary spreadsheet pages. The first three collect and organize the information necessary to calculate the results. The next two show the results. Other pages contain necessary calculations and data organization that may not be of interest.

Machinery Assets (Input Page).

This is the yellow tab in the workbook. On this page an agricultural producer would list his equipment inventory. The page is divided into two sections. The first section is for power units such as tractors, combines, self-propelled sprayers, and other self-propelled equipment. The second section is for implements and attachments propelled by a power unit. The light blue cells are for data entry. The white protected cells are calculations.

Table Columns

Unit Name or Identification (Column A). This should be the name or identification the producer commonly uses to identify this piece of equipment. The name entered here will appear on the Machinery Operations page as an option that can be selected from a pull down list.

Additional Description (Column B). This column is optional to add other information about this piece of equipment if needed.

Original Purchase Price Plus Value of Any Equipment Traded-in (Column C). In this column enter the cost of this piece of equipment that includes the cash purchase price, any trade-in value, and any delivery or set-up costs. While exact numbers are always best, round numbers (to hundreds) from memory should not materially distort the results.

Estimated Useful Life at Purchase (Column D). In this column enter the number of years the equipment is intended to be used. If this estimate of years of use has changed since purchase, enter the new estimate of total life of use.

Remaining Useful Life (Column E). In this column enter the remaining useful life of the equipment in years.

Salvage Value as Percent of Purchase Price (Column F). In this column enter the salvage value as a percent of the purchase price. If a tractor was purchased for \$100,000, is planned to be replaced after 5

years, and would be worth \$25,000 at that time, the salvage value as a percent would be 25% ($25,000/100,000*100$). If a piece of equipment will have no salvage value, enter 0.

Repair & Maintenance Reference Amount (Column G). This column contains a beginning estimate of the annual repair and maintenance cost for this piece of equipment. It is estimated by dividing the purchase price by the useful life.

Repair & Maintenance as Percent of Reference Amount (Column H). In this column enter a percentage to adjust the Repair & Maintenance Reference Amount in the column to the left up or down to reflect the repair and maintenance cost for this piece of equipment that you experience. The actual repair and maintenance cost used for calculations is listed in Column L to the right. If a producer's complete equipment inventory is listed on this page, cell L73 will contain an estimate of his annual repair and maintenance expenses. This estimate can be compared to actual experience and further adjustments can be made to the percentages entered in this column if necessary.

Annual Hours of Use (Column I). In this column enter the hours of annual planned use. Annual planned use is related to useful life. If a piece of equipment will only be used 20 hours a year, then its useful life may be very long (20 or 30 years). On the other hand, if a piece of equipment is planned to be used 1000 hours a year its useful life may be much shorter. To estimate annual hours of use, it may be useful to view 1000 hours as 100 days of ten hour days or 20 hours as 4 days of 5 hour days.

Combine or Sprayer/Implement Working Width in Feet (Column J). In this column enter the working width of the implement or power unit. Tractors do not have a working width. The width is determined by the implement or attachment attached. A combine that uses the same head all the time would have a width as would a self-propelled sprayer. If a combine uses different heads during the year, enter it as a power unit with no width and enter each head in the Implements and Attachments Table.

Fuel Type (Column K). In this column select Diesel or Gasoline from the pull down list.

Repair & Maintenance Cost Per Year (Column L). In this column is the calculated annual repair and maintenance cost of each piece of equipment based on information entered in columns in the left part of the table.

Accumulated Economic Depreciation (Column M). This analysis use economic depreciation, not income tax depreciation. While income tax depreciation is an element of income tax management strategies and can have an effect on annual cash flow, its typical accelerated nature distorts equipment ownership costs if used in this analysis. Total economic depreciation for a piece of equipment is the purchase price minus any salvage value. The portion of this total depreciation that has been used up based on the useful life and the remaining useful life is listed in this column for informational purposes.

Remaining Economic Basis (Column N). The portion of total depreciation that has not been used up based on the useful life and the remaining useful life is listed in this column for informational purposes.

Total Annual Economic Depreciation (Column O). In this column is the annual economic depreciation for each piece of equipment. It is determined by dividing total economic depreciation for a piece of equipment by the useful life of the equipment.

Annual Hours Used (Column P). This column is an estimate of the annual hours of actual use based on the information entered on the Machinery Operations and Acres pages. If the information on the Acres page describes an agricultural operation, then this column shows the planned equipment use for the producer's production plan.

Number of Units (Column Q). Based on the annual hours of use and annual hours used, the number of units of each piece of equipment is determined. If the information on the Acres page describes an agricultural operation, then this column shows the number of pieces equipment needed by the producer to conduct his production plan.

Machinery Operations (Input Page).

This is the green tab in the workbook. On this page an agricultural producer would list the machinery operations he uses in his operation. The page has entry cells at the top followed by a table where machinery operations are defined. The light blue cells are for data entry. The white protected cells are calculations. Cells with other colors in the right part of the table are calculated results.

Entry Cells

Diesel Fuel (Cell B8). Enter the average or common price for diesel fuel that will be used in the operations listed below.

Gasoline (Cell B9). Enter the average or common price for gasoline that will be used in the operations listed below.

Interest-Operating Capital (Cell B10). Enter the annual interest rate for the operating note that finances the on-going expenses of the operation. Operating interest will be calculated for six month to match the interest calculation in the Spreadsheet Budgets Workbook.

Interest-Investment (Cell B11). Enter the annual interest rate that would be earned if the money to buy the equipment were invested elsewhere. This rate could be the rate earned in a CD or other investment, or, the rate earned if the money were used in a different business.

Labor-Power Unit Operator (Cell B12). Enter the hourly rate paid for a tractor or other power unit operator. This rate should include any paid benefits and required payroll matching.

Labor-Extra (Cell B13). Enter the hourly rate paid for labor necessary to complete the machinery operation in addition to the labor for the tractor or other power unit operation. This rate should include any paid benefits and required payroll matching.

Table Columns

Machinery Operation Name (Column A). In this column enter a name used to identify this machinery operation. The name can be as simple or as complicated as desired. However, each name should be unique. The same operation can be entered more than once if the Acres per Hour and/or the Gallons per Hour Used are different for various applications, for example, Disk Sand, Disk Clay, Disk Stubble, Disk Seedbed, Bale Alfalfa, or, Bale Straw. These machinery operation names will be available options on the Acres page.

Tractor/Self Propelled Used (Column B). Select the tractor or power unit used in this machinery operation from the pull down list.

Implement Used (Column C). Select the implement or attachment used in this machinery operation from the pull down list.

Acres per Hour (Column D). In this column enter the acres commonly or typically covered in an hour for this machinery operation. An equation can be entered here. If this operation usually takes 5 and a half hours to cover 127 acres, $=127/5.5$ can be entered to calculate 23.09 acres per hour. Other agricultural producers and equipment dealers may be sources of information if Acres per Hour is not known. Also Acres per Hour can be estimated using the three columns to the right if the value in this column is set to 0.

Operation Width (Column E, reference). The operation width is copied from the information entered on the Machinery Assets page for reference and for calculation if the Acre per Hour is set to 0.

Speed in MPH (Column F, optional). If Acres per Hour is set to 0, in this column enter the typical operating speed for this machinery operation. If unknown, other agricultural producers and equipment dealers may be sources of this information.

Power Unit Percentage (Column G, optional). If Acres per Hour is set to 0, in this column enter the power unit percentage for this machinery operation. 100% would be driving in a straight line with no overlap, no corners, no turn arounds, or other tillage inefficiencies. If corners and overlap add 15% more time to the operation, then 115% would be entered here. Machinery operations on terraced land may have higher percentages.

Acres/Hour Used in Calculations (Column H). In this column are the Acres per Hour that will be used in calculations. If the Acres per Hour column has a number other than 0, that number will appear in this column. If Acres per Hour is set to 0, this column will show the result of the calculation of Acres per Hour from Operation Width, Speed in MPH and Power Unit Percentage.

Gallons per Hour Used (Column I). In this column enter the gallons of fuel burned in one hour for this machinery operation. An equation can be entered here. If this operation usually takes 3 and a half hours while consuming 30 gallons of fuel, $=30/3.5$ can be entered to calculate 8.57 gallons per hour. Other agricultural producers and equipment dealers may be sources of information if Gallons per Hour is not known.

Labor Percentage (Column J). Set this column to 100% if the power unit operator is paid by machine hours. If not, enter a higher percentage to account for maintenance, travel to and from the field, or any other time periods that add to operator time to complete this machinery operation. If maintenance and travel increase operator labor by 15% for this machinery operation, enter 115% in this column.

Extra Labor (Column K). If other labor is required for this machinery operation (for example, planting, spraying, harvesting), enter a percentage of power unit operator labor to reflect this Extra Labor. Entering 100% will add one hour of Extra Labor for each hour of power unit operator labor. Entering 50% will add one half hour of Extra Labor for each hour of power unit operator labor. If there are two extra people involved in the machinery operation both paid for the same hours as the power unit operator, enter 200%.

Fuel Type (Column L, reference). This column is for reference. The information is transferred from the Machinery Assets page based on the selection made in the Tractor/Self Propelled Used column to the left.

The remaining columns of this table are results calculated from the information entered to this point in the spreadsheet. The green columns are cash or variable (if the machinery is not operated these costs would be 0) costs. The light and dark pink columns are totals. The yellow columns are fixed or ownership costs. To the far right of the table are some white columns with other information that may be of interest to someone in some circumstance. The shaded cost columns could be used to compare the same machinery operation done with different power units and/or implements.

Diesel Per Acre (Column M). The cost per acre of diesel fuel used in this machinery operation is shown in this column.

Gasoline Per Acre (Column N). The cost per acre of gasoline used in this machinery operation is shown in this column.

Tractor Labor Per Acre (Column O). The cost per acre of power unit labor for this machinery operation is shown in this column.

Extra Labor Per Acre (Column P). The cost per acre of extra labor for this machinery operation is shown in this column.

Power R&M (Column Q). The cost per acre of power unit repair and maintenance for this machinery operation is shown in this column.

Implement R&M (Column R). The cost per acre of implement repair and maintenance for this machinery operation is shown in this column.

Interest Per Acre (Column S). The cost per acre of interest (fuel, labor, repairs and maintenance expenses for 6 months) for this machinery operation is shown in this column.

Total Cash Costs (Column T). The total cash costs per acre for this machinery operation are shown in this column.

Power Depreciation (Column U). The cost per acre of power unit depreciation for this machinery operation is shown in this column.

Implement Depreciation (Column V). The cost per acre of implement depreciation for this machinery operation is shown in this column.

Power Interest Cost (Column W). The cost per acre of interest on the investment in the power unit for this machinery operation is shown in this column.

Implement Interest Cost (Column X). The cost per acre of interest on the investment in the implement for this machinery operation is shown in this column.

Total Fixed Costs (Column Y). The total fixed costs per acre for this machinery operation are shown in this column.

Total Costs Per Acre (Column Z). The total of cash and fixed costs per acre for this machinery operation is shown in this column.

Diesel Required (Column AA). The gallons of diesel fuel burned per acre for this machinery operation are shown in this column.

Gasoline Required (Column AB). The gallons of gasoline burned per acre for this machinery operation are shown in this column.

Tractor Labor Required (Column AC). The hours of power unit operator labor per acre for this machinery operation are shown in this column.

Extra Labor Required (Column AD). The hours of other labor per acre for this machinery operation are shown in this column.

Fuel Interest (Column AE). The cost per acre of interest for the fuel expense for 6 months for this machinery operation is shown in this column.

Labor Interest (Column AF). The cost per acre of interest for the labor expense for 6 months for this machinery operation is shown in this column.

Repair Interest (Column AG). The cost per acre of interest for the repair and maintenance expense for 6 months for this machinery operation is shown in this column.

Operation Hours/Acre (Column AH). The hours per acre to conduct this machinery operation is shown in this column.

Power % Use (Column AI). The percent (as a factor) of power unit Annual Hours of Use per acre for this machinery operation is shown in this column.

Implement % Use (Column AJ). The percent (as a factor) of implement Annual Hours of Use per acre for this machinery operation is shown in this column.

Power Investment (Column AK). The investment per acre in the power unit used in this machinery operation is shown in this column.

Implement Investment (Column AL). The investment per acre in the implement used in this machinery operation is shown in this column.

Machinery Investment (Column AM). The total machinery investment per acre for this machinery operation is shown in this column.

Acres (Input Page).

This is the blue tab in the workbook. On this page an agricultural producer would match his machinery operations with a field or crop enterprise. The page has two sections. The first section is for specifying the crop enterprises or fields to be included in this analysis. Information is entered along a row. Also, there is one entry cell in this section. The second section is for matching the machinery operations defined on the Machinery Operations page with the crop enterprises or fields specified above in the first section. There is another table below this second section. This other table is an intermediate step in the calculations of the results. The light blue cells are for data entry. The white protected cells are calculations.

Entry Cells

Do the Acres entered on row 7 define an agricultural operation (farm or ranch) ? (Cell D5). Select Yes or No from the pull down list. If Yes is selected, Annual Hours Used (Column P) and Number of Units (Column Q) in the tables on the Machinery Assets page will be calculated.

Table Rows

FIELD OR CROP ENTERPRISE (Row 6). Enter the common name used to refer to each crop enterprise or field to be included in the analysis. Enter the first name in Column D, the second in Column E, and so on, moving one column to the right each time. There are 40 columns available with the last column being AQ. If a crop is farmed differently on some fields, include a column for this different set of machinery operations with a unique name so that the machinery operations can be correctly specified and matched with the new name.

ACRES (Row 7). For each crop enterprise or field name entered on row 6, enter the acres associated. If the workbook is being used to compare various combinations of power units and implements to accomplish the same machinery operation, enter the same acreage for each name entered.

Table Columns

Operations (Column A). This column shows a list of the machinery operations defined on the Machinery Operations page.

Power Unit (Column B, reference). This column shows the power unit for the machinery operation in Column A for reference.

Implement (Column C, reference). This column shows the Implement for the machinery operation in Column A for reference.

TIMES OPERATION IS DONE (Columns D-AQ). In these columns enter the times each machinery operation is performed for each crop enterprise or field identified in Row 6. Much of the time the number 1 will be entered. If the field is disk twice during the production cycle, enter 2. If the spray rig will apply chemical 4 different times, enter 4. If the machinery operation is only performed every third year, enter .33

Per Acre Results.

This is the first white tab in the workbook. The table contains similar results as Columns M-AM from the Machinery Operations page. This table is calculated and organized by the crop enterprise or field names entered on the Acres page. The per acre expense or input usage for each crop enterprise or field name specified is show. The information in this table can be used in the Spreadsheet Budgets Workbook.

Table Columns

Field or Crop (Column A). This column contains a list of the crop enterprises or fields specified on the Acres page.

Acres (Column B, reference). This column is for reference. The information is transferred from the Acres page based on the field or crop listed in the column to the left.

The remaining columns of this table are results calculated from the information entered in the spreadsheet. The green columns are cash or variable (if the machinery is not operated these costs would be 0) costs. The light and dark pink columns are totals. The yellow columns are fixed or ownership costs. To the far right of the table are some white columns with other information that may be of interest to someone in some circumstance or may be used to complete budgets in the Spreadsheet Budgets Workbook. The shaded cost columns could be used to compare the same crop enterprise or field farmed with different sets of machinery operations.

Diesel Per Acre (Column C). The cost per acre of diesel fuel used in this crop enterprise or field is shown in this column.

Gasoline Per Acre (Column D). The cost per acre of gasoline used in this crop enterprise or field is shown in this column.

Tractor Labor Per Acre (Column E). The cost per acre of power unit labor for this crop enterprise or field is shown in this column.

Extra Labor Per Acre (Column F). The cost per acre of extra labor for this crop enterprise or field is shown in this column.

Power R&M (Column G). The cost per acre of power unit repair and maintenance for this crop enterprise or field is shown in this column.

Implement R&M (Column H). The cost per acre of implement repair and maintenance for this crop enterprise or field is shown in this column.

Interest Per Acre (Column I). The cost per acre of interest (fuel, labor, repairs and maintenance expenses for 6 months) for this crop enterprise or field is shown in this column.

Total Cash Costs (Column J). The total cash costs per acre for this crop enterprise or field are shown in this column.

Power Depreciation (Column K). The cost per acre of power unit depreciation for this crop enterprise or field is shown in this column.

Implement Depreciation (Column L). The cost per acre of implement depreciation for this crop enterprise or field is shown in this column.

Power Interest Cost (Column M). The cost per acre of interest on the investment in power units used in this crop enterprise or field is shown in this column.

Implement Interest Cost (Column N). The cost per acre of interest on the investment in implements used in this crop enterprise or field is shown in this column.

Total Fixed Costs (Column O). The total fixed costs per acre for this crop enterprise or field are shown in this column.

Total Costs Per Acre (Column P). The total of cash and fixed costs per acre for this crop enterprise or field is shown in this column.

Diesel Required (Column Q). The gallons of diesel fuel burned per acre for this crop enterprise or field are shown in this column.

Gasoline Required (Column R). The gallons of gasoline burned per acre for this crop enterprise or field are shown in this column.

P. U. Labor Required (Column S). The hours of power unit operator labor per acre for this crop enterprise or field are shown in this column.

Extra Labor Required (Column T). The hours of other labor per acre for this crop enterprise or field are shown in this column.

Power Investment (Column U). The investment per acre in the power units used in this crop enterprise or field is shown in this column.

Implement Investment (Column V). The investment per acre in the implements used in this crop enterprise or field is shown in this column.

Machinery Investment (Column W). The total machinery investment per acre for this crop enterprise or field is shown in this column.

Crop Results.

This is the second white tab in the workbook. The table contains similar results as Columns C-W from the Per Acre Results page. This table is calculated and organized by the crop enterprise or field names entered on the Acres page. The total expense or input usage for each crop enterprise or field name specified is show. Row 49 contains totals for each column for the whole agricultural operation if the acres entered on the Acres page describe an agricultural operation.

Table Columns

Field or Crop (Column A). This column contains a list of the crop enterprises or fields specified on the Acres page.

Acres (Column B, reference). This column is for reference. The information is transferred from the Acres page based on the field or crop listed in the column to the left.

The remaining columns of this table are results calculated from the information entered in the spreadsheet. The green columns are cash or variable (if the machinery is not operated these costs would be 0) costs. The light and dark pink columns are totals. The yellow columns are fixed or ownership costs. To the far right of the table are some white columns with other information that may be of interest to someone in some circumstance. The shaded cost columns could be used to compare the same crop enterprise or field farmed with different sets of machinery operations.

Diesel Per Acre (Column C). The total cost of diesel fuel used in this crop enterprise or field is shown in this column.

Gasoline Per Acre (Column D). The total cost of gasoline used in this crop enterprise or field is shown in this column.

Tractor Labor Per Acre (Column E). The total cost of power unit labor for this crop enterprise or field is shown in this column.

Extra Labor Per Acre (Column F). The total cost of extra labor for this crop enterprise or field is shown in this column.

Power R&M (Column G). The total cost of power unit repair and maintenance for this crop enterprise or field is shown in this column.

Implement R&M (Column H). The total cost of implement repair and maintenance for this crop enterprise or field is shown in this column.

Interest Per Acre (Column I). The total cost of interest (fuel, labor, repairs and maintenance expenses for 6 months) for this crop enterprise or field is shown in this column.

Total Cash Costs (Column J). The total cash costs for this crop enterprise or field are shown in this column.

Power Depreciation (Column K). The total cost of power unit depreciation for this crop enterprise or field is shown in this column.

Implement Depreciation (Column L). The total cost of implement depreciation for this crop enterprise or field is shown in this column.

Power Interest Cost (Column M). The total cost of interest on the investment in power units used in this crop enterprise or field is shown in this column.

Implement Interest Cost (Column N). The total cost of interest on the investment in implements used in this crop enterprise or field is shown in this column.

Total Fixed Costs (Column O). The total fixed costs for this crop enterprise or field are shown in this column.

Total Costs Per Acre (Column P). The total of cash and fixed costs for this crop enterprise or field is shown in this column.

Diesel Required (Column Q). The total gallons of diesel fuel burned for this crop enterprise or field are shown in this column.

Gasoline Required (Column R). The total gallons of gasoline burned for this crop enterprise or field are shown in this column.

P. U. Labor Required (Column S). The total hours of power unit operator labor for this crop enterprise or field are shown in this column.

Extra Labor Required (Column T). The total hours of other labor for this crop enterprise or field are shown in this column.

Power Investment (Column U). The investment in power units used in this crop enterprise or field is shown in this column.

Implement Investment (Column V). The investment in implements used in this crop enterprise or field is shown in this column.

Machinery Investment (Column W). The total machinery investment for this crop enterprise or field is shown in this column.

Other Pages.

The gray tabs in the spreadsheet contain various intermediate calculations and data organization. This information is likely to be of little interest.