

Interest—Interest is computed on the investment, which decreases as the machine depreciates. To determine in advance the annual interest cost of using a new machine, multiply the interest rate by the average value of the machine which is about one half the first cost. For the tractor in our example, this would be 6 per cent of \$450.00 or \$27.00.

Housing—The annual charge for a shelter including depreciation and upkeep is about 10 per cent of the first cost. For a shelter of about 1,000 square feet costing \$300.00 to build, the annual charge would be \$30.00, and the cost per square foot would be 3 cents. If the tractor occupies an area about 14 x 7 feet or 98 square feet, the annual cost of housing is \$2.94.

Summary of Tractor Costs

Fixed Charges (Per Year)

Depreciation	\$ 75.00	
Interest	27.00	
Housing	2.94	
Total	\$104.94	
Fixed costs per hour (\$104.94 ÷ 450).....		\$0.233

Operating Costs Per Hour

Fuel—1.6 gallons at 14¢.....	\$0.224	
Lubricants (cylinder oil, transmission oil, and grease) .....	.025	
Repairs (at 2 per cent of cost new per year) .....	.04	
Total operating costs per hour.....	\$0.289	
TOTAL COST PER HOUR.....		\$0.522

FARM MACHINERY USE

The cost of using any farm machine may be found in a manner similar to above. Depreciation, interest, repairs, and housing are usually considered for machinery. In the example below we use a grain drill 10 feet wide costing \$240.00. We assume the life to be 20 years; the interest rate, 6 per cent; the annual acreage covered, 90; and the acres seeded per day, 15.

The annual costs are as follows:

Depreciation (\$240 ÷ 20)	\$12.00
Interest (\$120.00 x .06)	7.20
Repairs (½ per cent of cost new).....	1.20
Housing (72 square feet x \$0.03).....	2.16
Total	\$22.56
Cost per acre (\$22.56 ÷ 90).....	\$0.25
Cost per day (\$22.56 ÷ 6).....	\$3.76

Depreciation is the largest item of fixed costs in machinery use. Annual depreciation can be reduced by increasing the useful life of a machine by better care, more timely repairing, proper adjustments, adequate lubrication, and shelter.

The costs per hour can be reduced further by using the machine more hours each year.

HOURLY COST OF TRACTOR USE

The following tractor cost data are averages from records kept by farmers for two years on different sized tractors. While the actual cost of operating a particular tractor depends on many factors, these costs are close to what they would be for average use.

Drawbar Horsepower of Tractor	Cost Per Hour		
	Fixed	Operating	Total
5.5-12.0 .....	.24	.18	.42
12.0-18.5 .....	.26	.26	.52
18.5-25.0 .....	.29	.33	.62
25.0-31.5 .....	.47	.48	.95

TOTAL COST OF FIELD OPERATIONS

To determine the cost of performing any field operation, find the cost of the power, the machine, and the labor to run the outfit and add them together.

For example, to find the cost per acre to operate a 16-horsepower tractor with a 2-bottom plow, first figure the cost per hour to operate the tractor and the machine. For approximate values use the figures shown in the table above for a 16-horsepower tractor and in the table on the previous pages for a 2-bottom plow and add to these the cost per hour for labor. Using the figures in the tables and assuming a labor charge of 55 cents an hour, the cost per hour would be 52¢ + 18¢ + 55¢ = \$1.25. Plowing an average of four-fifths acre per hour, the cost per acre would be \$1.56.

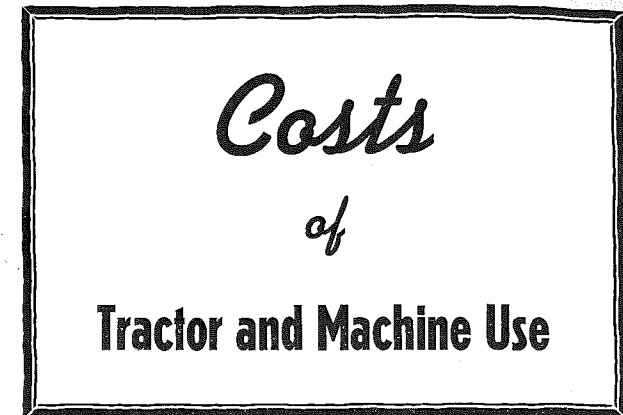
FAIR RENTAL RATES

A fair rental charge for a machine varies with conditions. If the machine is operated by the owner or someone hired by him the risks of damage need be no greater than on his own farm. If, however, the machine is turned over to the person hiring it to use as he sees fit, the owner is perhaps justified in adding a margin above actual use costs. Unusual or severe operating conditions may affect the rate charged. If the machine is hired for a short time only, the rate may be higher than if it is hired for a longer period. The person hiring the machine ought to pay transportation.

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FARMERS are faced with the job of producing more with less labor and with fewer new machines. The efficiency with which the job is done will depend to a large extent upon good management of power and machinery.

To get the work done properly, better use must be made of tractors and machines now on farms. This may require more custom work, exchange use, and cooperative ownership than usual.

In our present war emergency it is not only a patriotic duty for farmers to cooperate in using their machines to obtain maximum production, but it may be profitable machine management as well. Such increased use will probably not reduce the life of machines materially if properly lubricated, adjusted, and protected.

This pamphlet has been written ① to show why it is sometimes more economical to hire the use of certain machines than to own them, ② to suggest methods of exchanging the use of machines, ③ to show how the cost of using a machine may be determined, and ④ to provide normal cost use data for machines commonly used.

Ways to Use Table . . .

1 For approximate cost of using a machine for a day, use the figures in column 6.

2 If the cost new of your machine is different from the one given in column 1, multiply the cost new by the percentage figure in column 5. Since this gives the annual cost, divide by the number of days your machine is used per year for the cost per day.

3 To be still more thorough follow the method used in the illustration given in this pamphlet, substituting your own figures for the estimated life, interest rate, repairs, housing, and amount of use per year.

Average Cost of Using Farm Machinery

Machine	1 Cost new	2 Average life in years	3 Repairs as per cent of cost new	4 Annual cost		6 Cost per day	7 Days used per year
				Total	Per cent of cost new		
Tractor plow (2-16")	\$135.00	16	4.5	\$ 20.26	15.0	\$1.69	12
Tractor plow (3-16")	170.00	16	4.5	25.50	15.0	2.12	12
Disk harrow (15' single)	145.00	18	1.0	16.85	11.6	1.40	12
Spike-tooth harrow	45.00	20	1.5	4.45	9.9	.45	10
Field cultivator	140.00	15	1.5	18.51	13.2	1.30	14
Tractor cultivator 2 row	110.00	16	2.0	13.37	12.1	.90	15
Tractor cultivator 4 row	240.00	16	2.0	28.75	12.0	2.90	10
Grain drill tractor hitch 10 foot	240.00	20	0.5	22.56	9.4	3.75	6
Corn planter 2 row	85.00	18	1.5	9.62	11.3	1.60	6
Mower 6 foot	95.00	18	3.0	12.17	12.8	1.20	10
Side delivery rake	125.00	18	1.0	15.85	12.7	1.98	8
Hay loader	140.00	18	1.0	14.94	10.7	1.85	8
Grain binder (Tractor)	340.00	18	1.5	38.28	11.3	4.80	8
Corn binder 1 row (Tractor)	340.00	18	1.0	35.02	10.3	5.85	6
Combine (6 foot Auxiliary Motor)	900.00	10	2.0	138.31	15.4	9.25	15
Corn picker 2 row	700.00	12	2.0	96.65	13.8	8.05	12
Ensilage cutter	325.00	15	2.0	39.88	12.3	5.70	7
Manure spreader	160.00	16	1.5	20.12	12.6	.80	25
Pick-up baler	900.00	10	3.0	147.60*	16.4	7.38	20
Mower (Tractor)	130.00	12	4.0	20.93	16.1	1.61	10

* Wire and fuel not included.

Basis for Figures . . .

The values given in this table for average estimated life (2), repairs as per cent of cost new (3), and days used per year (7) are averages taken from farm surveys.

The total annual cost of machine use (4) includes, besides repairs, depreciation, interest, and housing, although these are not shown in the table.

The method used in figuring the value of these items was the same as shown in the example for the grain drill.

Increased use reduces cost. The cost per day (6) will be less when the machine is used more days per year.

THE WISE FARM manager purchases only those machines that are profitable for him to own. A farmer may wish to use a machine such as a corn picker or a combine, and yet the cost of using it only on his farm might be excessive.

Power and machinery costs may represent from one third to one half the total cost of producing small grains and intertilled crops. Therefore, the farm operator should pay particular attention to his machinery needs and to economical management and use.

Machines should be available when needed. Since the planting and harvesting seasons are definitely limited, ample machine capacity is necessary to do the work at the proper time. It is convenient to own and use exclusively each machine required on a farm, but often it is not economical.

The machine use cost on many farms is higher than it should be, and it could be reduced by increasing the annual use of machines.

It is important that a machine be used as many hours as possible during its life to keep down the cost per hour. Many machines are not worn out when they are discarded, but have become obsolete and have depreciated from exposure and careless handling. Such machines would serve almost as many years if they did the work on two farms instead of on only one.

INCREASE MACHINE USE

By Custom Work—The owner not only does his own work but also works for his neighbors at a certain fee per hour or per acre.

By Exchanging Machines—Here one farmer owns certain machines such as a grain binder and corn picker, and another owns other machines such as a silo filler and grain drill with the understanding that each machine will be used by its owner on both farms.

By Cooperative Ownership—Cooperative ownership is practiced in some cases, but in general is not as common as the other two methods.

Factors fundamental to the success of using machines on two or more farms are:

1. A machine should be operated by its owner or someone hired by him.
2. Farmers must be willing to cooperate and to adjust their work schedule to the availability of machines.
3. There must be a definite understanding with regard to charges and payments for the use of machines. Rates should be decided upon beforehand and settlement should be made frequently.

Figure Your Costs . . .

TRACTOR USE

To determine tractor use costs, it is necessary to know the first cost, the estimated life in years, the rate of interest, and the amount of use per year. In the following example we assume that the first cost is \$900.00, estimated life is 12 years, rate of interest is 6 per cent, and annual use is 450 hours. We further assume that the tractor has a drawbar rating of 16 horsepower, that the fuel consumption is 1.6 gallons per hour, that the cost of lubricants is 2½ cents per hour, and that the annual cost of tractor repairs is 2 per cent of the cost new.

Tractor costs may be divided into "fixed charges" and "operating costs." The fixed charges are those that remain relatively unchanged regardless of the actual number of hours of use per year. The operating costs are those that occur only when the tractor is operating.

Depreciation—Annual depreciation is the first cost divided by the estimated life in years or in this example \$900.00 divided by 12 which equals \$75.00. In estimating the life, assume a conservative life in keeping with conditions under which the machine will probably be used.