Save Money, Time, & Soil

The Economic$ of No-Till

Ted Bay
UW-Extension Retired

Green County LWCD™

MONROE
LA CROSSE
MARQUE
Baraboo
COLU
SAUK
CRAWFORD
MADISON
D A N
MISSISSIPPI
I O W A
MILITARY
RIDGE
G R A N T
RIVER
G R E E N
LAFAYETTE

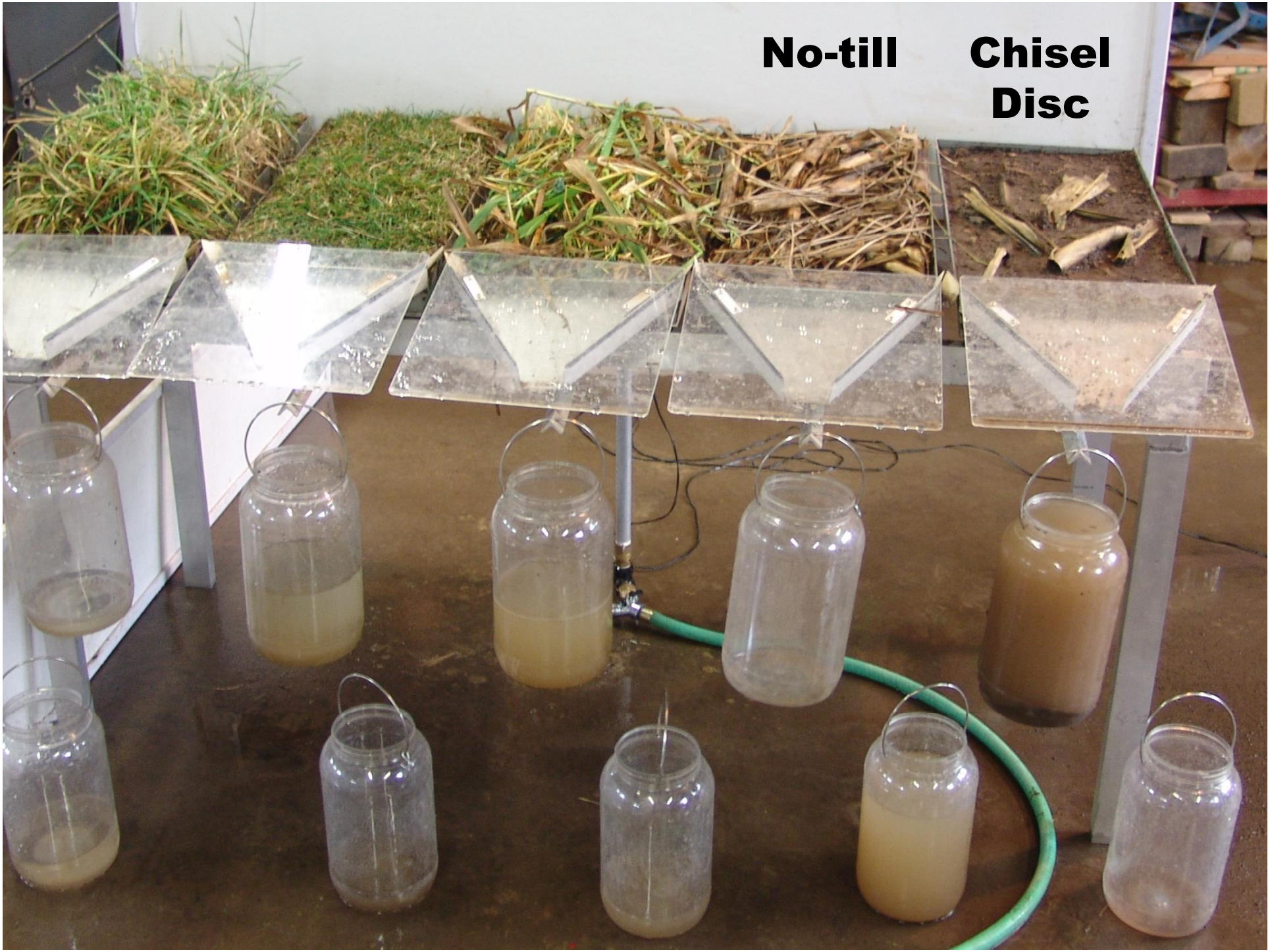
Why No-Till?

MONROE
LA CROSSE
MARQUE
SAUK
COLU
CRAWFORD
MADISON
DAN
IOWA
MILITARY
RIDGE
GRANT
GREEN
LAFAYETTE
MISSISSIPPI
RIVER

Why No-Till?

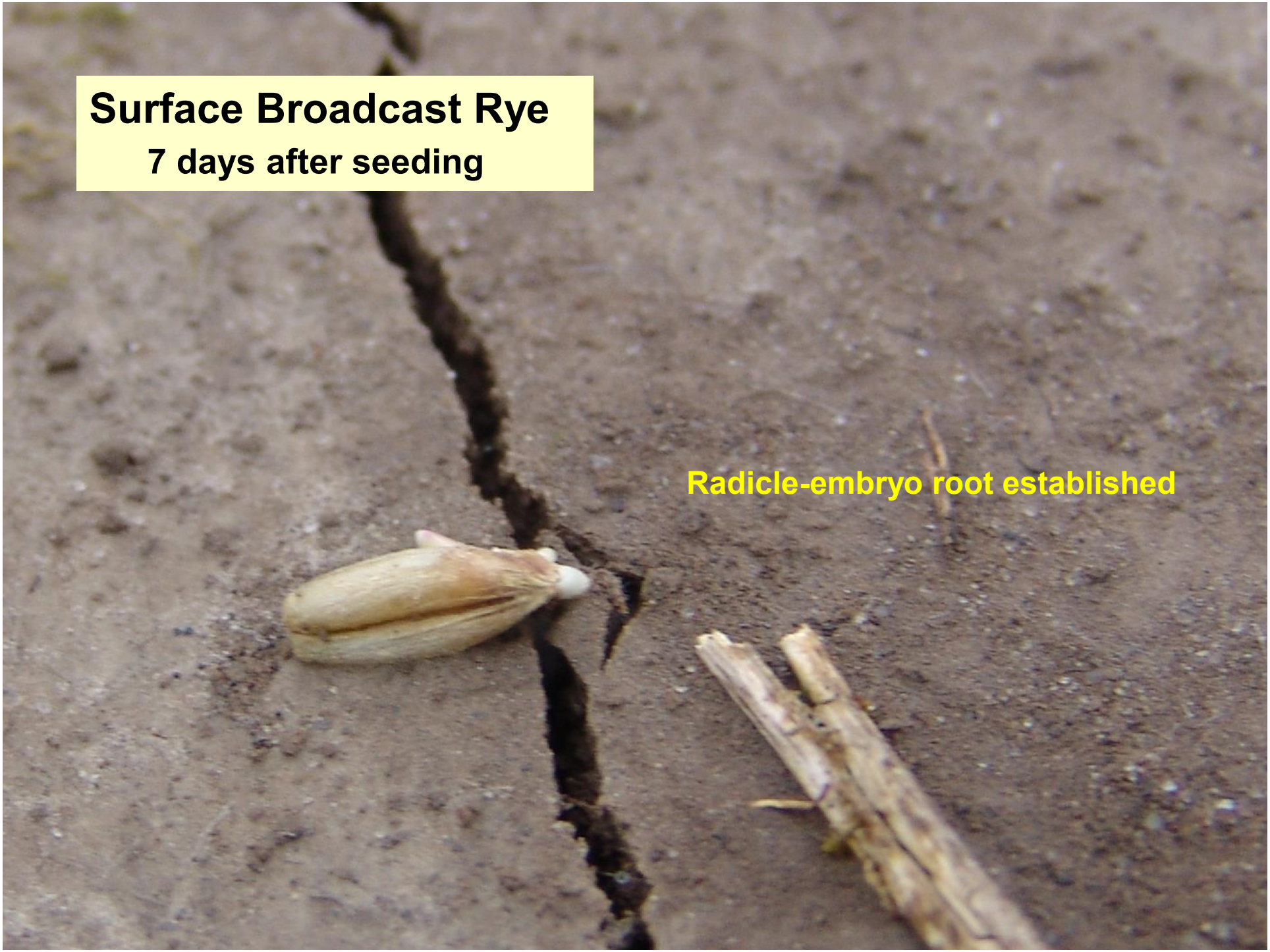
Can we reduce this?


Rainfall Simulator
Alfalfa/Grass Hay
Cont. Corn Silage/
Spring Vert. Tillage
Soybean in
Corn/Soybean
Rotation, Fall &
Spr Vert. Tillage
Soybean No-tilled
into Crimped Rye


No-till
Chisel
Disc

Erosion Up Close

Winter Rye Broadcast after Corn Silage


Surface Broadcast Rye
7 days after seeding
Radicle-embryo root established


Ten days


Twelve days


Three weeks


?
Three weeks


Each Dime is the equivalent
of 5-8 tons of soil loss/acre.


Not seen from the road


What is this erosion costing us?

Stan Buman:
Soil & Water Management Specialist - Land O'Lakes

Crops

Corn

Cover Crops

Forage

Soybean

Weeds

Crop Topics

Soil health

Weeds

Planting

Harvest

Pasture

Crop disease

Insects

Economics of soil loss

Soil health is vital, but soil loss is paramount because you're losing 15 bushels per acre/year worth of corn.

Kurt Lawton | Mar 13, 2017

Weather | LISTEN: Max Armstrong's Daily Updates | WATCH: This Week in Agribusiness | Advertise

Corn+Soybean Digest

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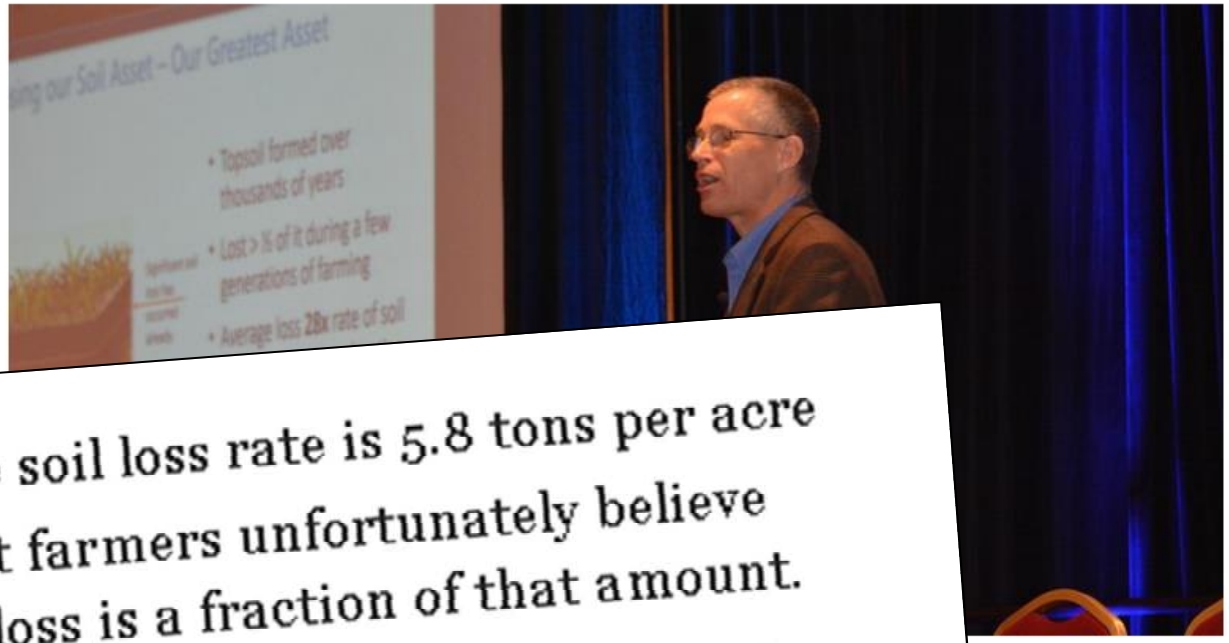
HOME > CROPS > CROP TOPICS > SOIL HEALTH

Stan Buman:
Soil & Water Management Specialist - Land O'Lakes



Crops
- Corn
- Cover Crops
- Forage
- Soybean
- Weeds
- Crop
- Soil h
- Weed
- Planti
- Harve
- Pastur
- Crop d
- Insects

- The average soil loss rate is 5.8 tons per acre per year. Most farmers unfortunately believe their erosion loss is a fraction of that amount.
- When you're losing soil, you're losing yield – to the tune of about 15 bushels per acre per year of lost potential.

Crops

Corn
Cover Crops
Forage
Fruit
Soybean
Sugar beets
Vegetables
Weeds
Wheat
Crop Protection
Crop Topics
Soil health

The high cost of soil erosion

Field Fodder: Soil lost to erosion costs farmers $100 million a year.

Sep 27, 2017

REDUCING EROSION: Farmers cannot control the climate, but they can manage their farms to reduce erosion.

Crops

Corn

Cover Crops

Forage

Fruit

Soybean

Sugar beets

University of Wisconsin-Madison soil scientist Francisco Arriaga estimates the nutrients present in 1 ton of an optimum soil are 2 pounds of nitrogen, 9 pounds of phosphorus and 31 pounds of potassium. The fertilizer value of these nutrients would total $12.80 per ton. If the average allowable soil loss is 4 to 5 tons per acre, that value is $51 to $64 per acre just in lost nutrients — not including lost future productivity. Remember, when sediments are eroding off your field, that's like dollars washing away, and it takes many years to replace what is lost in moments.

Why No-Till…

Farm with Residue

Why No-Till…

Farm with Residue

Take Advantage of Cover Crops

Why No-Till…

Farm with Residue

Take Advantage of Cover Crops

Economics of No-Till

Partial Budget Analysis:

Changing from Conventional Tillage to No-Till

Positives:

- ð **Added Income Due to Change**
- ð **Reduced Costs Due to Change**

- ð **Net Change:**

Negatives:

- ð **Added Costs Due to Change**
- ð **Reduced Income Due to Change**

Economics of No-Till

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- ð Added Income Due to Change
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Negatives:

- ð Added Costs Due to Change
- ð Reduced Income Due to Change

- ð Net Change:

The Value of Conserving Soil?

Economics of No-Till

Partial Budget Analysis:

Changing from Conventional Tillage to No-Till

Positives:

- ð Added Income Due to Change
- ð Reduced Costs Due to Change

Negatives:

- ð Added Costs Due to Change
- ð Reduced Income Due to Change

- ð Net Change:

The Value of Conserving Soil?

Budgeting Production Costs

Revenue = Yield x Price

- Costs
  - Cash Inputs
  - Interest
  - Equip. & Bldgs.
  - Land Cost
  - Labor
  - Management

Cash Inputs, Interest → Variable Costs

Equip. & Bldgs., Land Cost → Fixed Costs

Labor, Management → (Family Living)

Variable Costs + Fixed Costs + (Family Living) → Cost of Prod.

Breakeven Price

= Net Return

What will Change with No-Till?

Revenue = **Yield** x Price

\- Costs

Cash Inputs
Interest
} Variable Costs

Equip. & Bldgs.
Land Cost
} Fixed Costs

Labor
Management
} (Family Living)

} Cost of Prod.
Breakeven Price

= Net Return

What will Change with No-Till?

?

Revenue = **Yield** x Price

- Costs
  - **Cash Inputs**
  - Interest
  - **Equip.** & Bldgs.
  - Land Cost
  - **Labor**
  - Management

Variable Costs

Fixed Costs

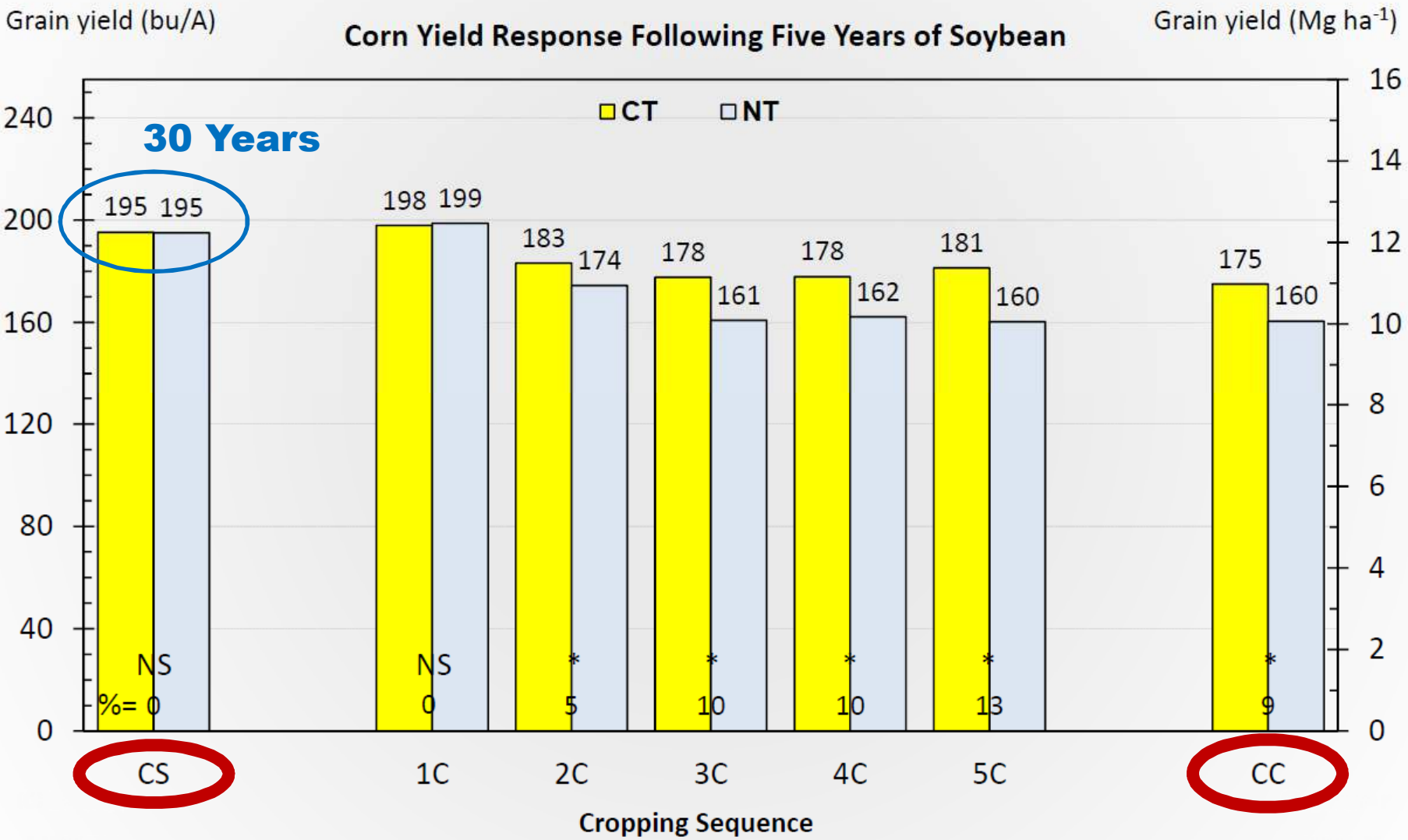
(Family Living)

Cost of Prod.

Breakeven Price

= Net Return

Tillage does not affect corn yield in CS/1C, but improves yield 5% in 2C, and 10% in 3C …



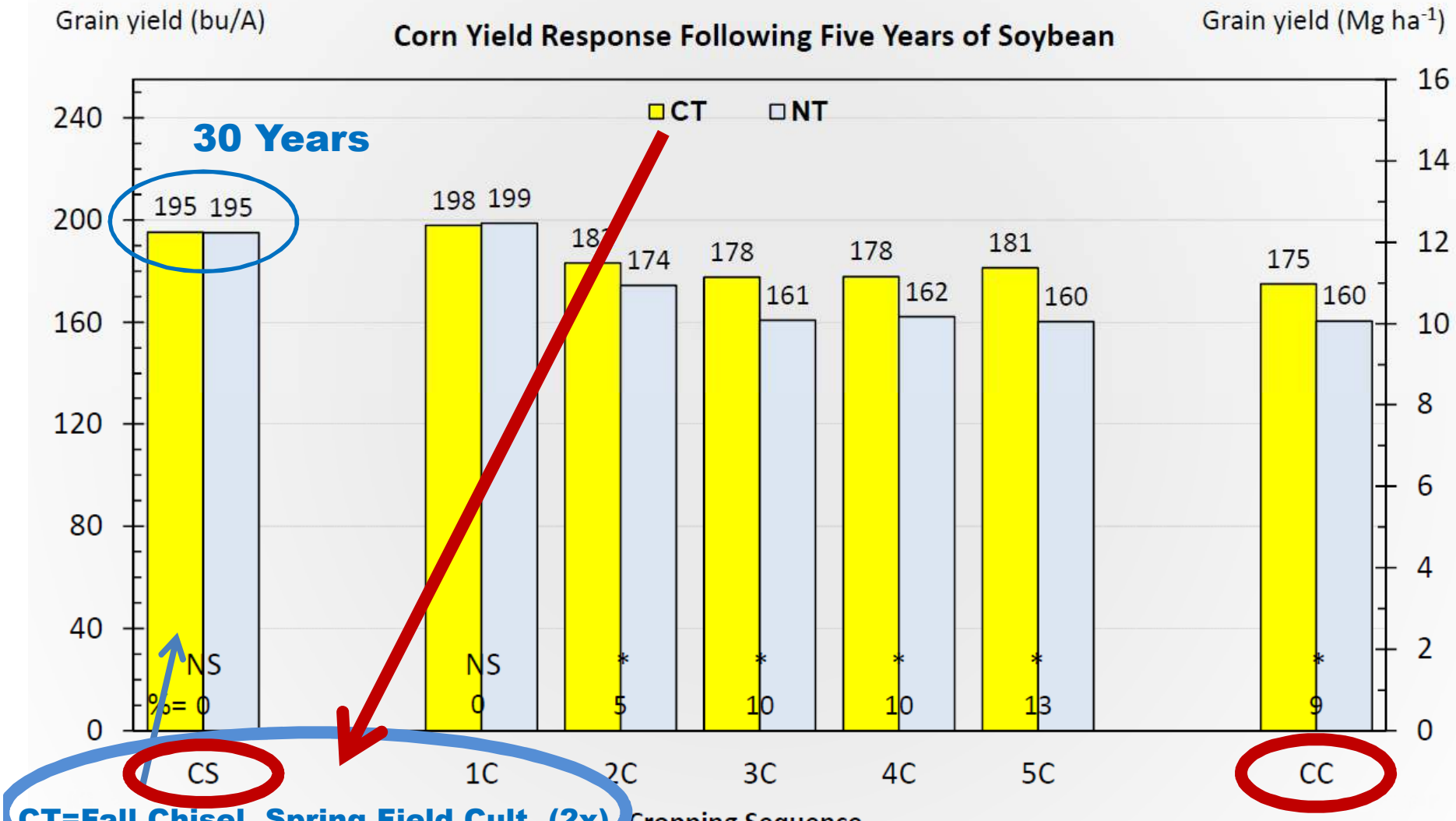
C= Corn, S= Soybean, 1C= First year corn, 2C= Second year corn … CC= Continuous corn

CT=Fall Chisel & Spr Fld Cult (2x)

http://corn.agronomy.wisc.edu

Lauer, 1987-2016 (Arlington, Control treatments)

Tillage does not affect corn yield in CS/1C, but improves yield 5% in 2C, and 10% in 3C …

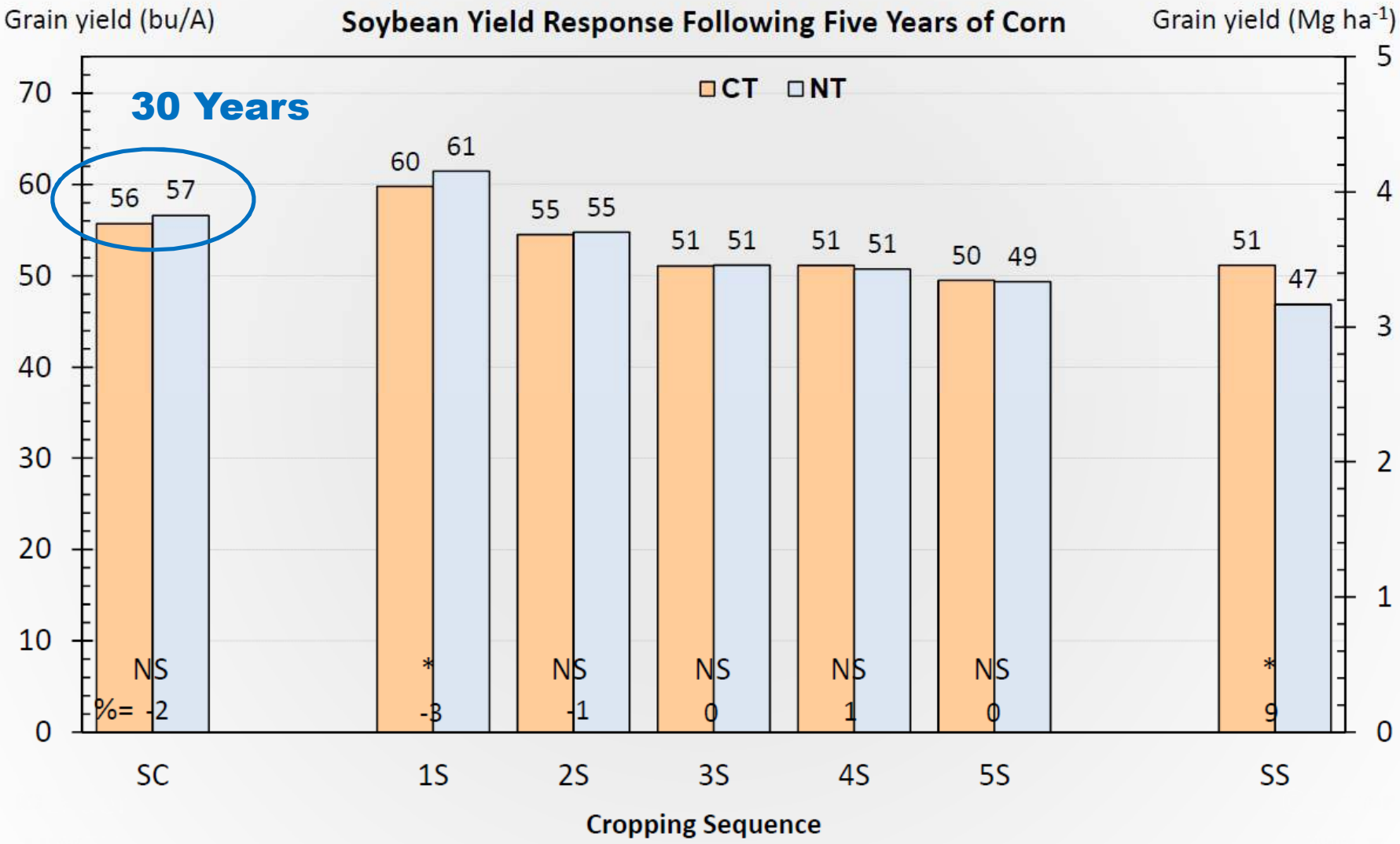


CT=Fall Chisel & Spr Fld Cult (2x)

http://corn.agronomy.wisc.edu

Lauer, 1987-2016 (Arlington, Control treatments)

Tillage either decreases soybean grain yield 3% in 1S or has no effect on soybean yield, except for SS.



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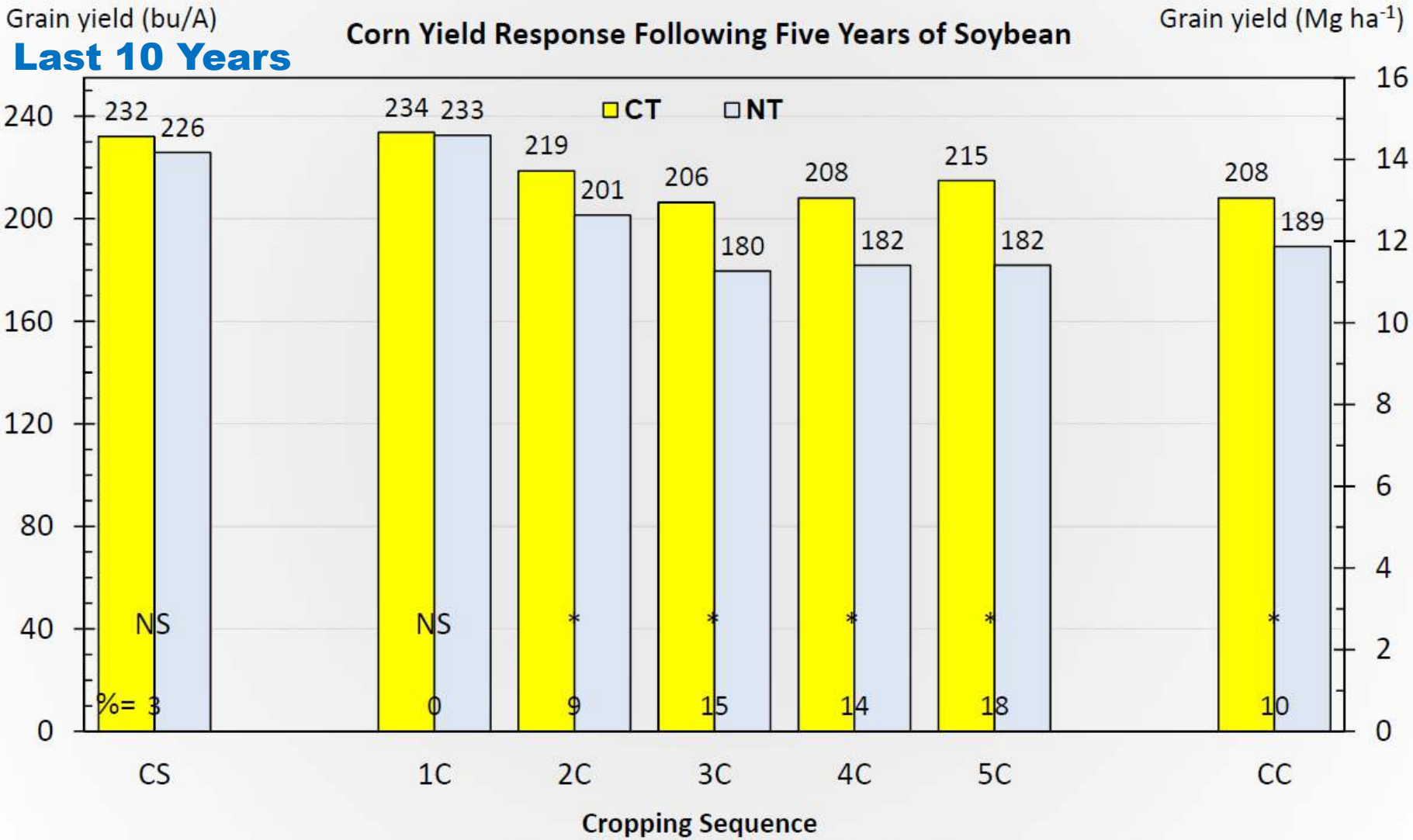
University of Wisconsin-Extension

http://corn.agronomy.wisc.edu

Lauer, 1987-2016 (Arlington, Control treatments)

Tillage does not affect corn yield in CS/1C, but improves yield 9% in 2C, and 15% in 3C …



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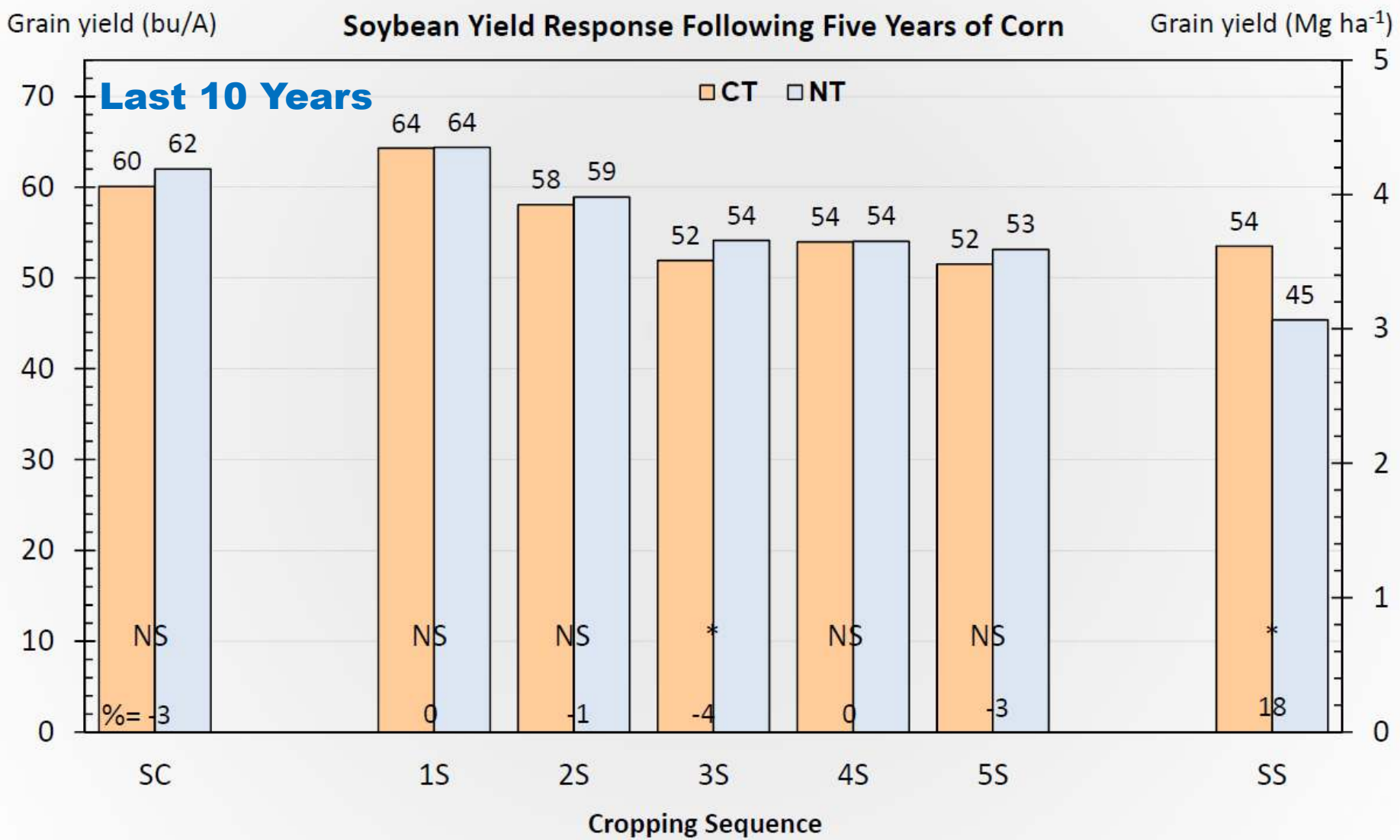
Tillage has no effect on soybean yield, except for SS.



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Lauer, 2007-2016 (Arlington, Control treatments)

What will Change with No-Till?

No Δ

Revenue = **Yield** x Price

- Costs
  - **Cash Inputs** } Variable Costs
  - Interest
  - **Equip.** & Bldgs. } Fixed Costs
  - Land Cost
  - **Labor** } (Family Living)
  - Management

} Cost of Prod.

Breakeven Price

= Net Return

What will Change with No-Till?

Revenue = **Yield** x Price

- Costs
  - **Cash Inputs** — Variable Costs
  - Interest
  - **Equip.** & Bldgs. — Fixed Costs
  - Land Cost
  - **Labor** — (Family Living)
  - Management

Cost of Prod.
Breakeven Price

= Net Return

Economics of No-Till

Cost changes associated with adopting no-till:

	Increases	Decreases
Herbicide	$ XXX	
Interest on Operating Capital	XXX	
Repair		$XXX
Fuel		XXX
Labor		XXX
Equipment Insurance		XXX
Equipment Depreciation		XXX
Equipment Interest		XXX

Operating Loan

Deprec. & OH

Economics of No-Till

Cost changes associated with adopting no-till

	Increases	Decreases
Herbicide	$ 5-16 ($11)	
Interest on Operating Capital	XXX (<$1)	
Repair	Combined in Equipment Operation Costs	$XXX
Fuel		XXX
Labor		XXX
Equipment Insurance		XXX
Equipment Depreciation		XXX
Equipment Interest		XXX

Economics of No-Till

Cost & Benefit Comparison

- Costs of Planting with Tillage vs No-Till
- Change in crop Production & Input Costs
- Conservation Value

Economics of No-Till

Cost & Benefit Comparison

- Costs of Planting with Tillage vs No-Till
- Change in crop Production & Input Costs
- Conservation Value

- Custom Rate Cost Comparison – easier
- Actual Farm Costs Comparison – More Accurate

Economics of No-Till

Cost & Benefit Comparison

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1,500 acre Grain Farm with Family Labor

Economics of No-Till

Cost & Benefit Comparison

- Costs of Planting with Tillage vs No-Till
- Change in crop Production & Input Costs
- Conservation Value

- Custom Rate Cost Comparison – easier
- Actual Farm Costs Comparison – More Accurate

1,500 acre Grain Farm with Family Labor

- The Numbers will be Different for Everyone

What will Change with No-Till?

Revenue = **Yield** x Price

Use Your Numbers

- Costs
  - **Cash Inputs**
  - Interest
  - **Equip.** & Bldgs.
  - Land Cost
  - **Labor**
  - Management

Variable Costs

Fixed Costs

(Family Living)

Cost of Prod.

Breakeven Price

= Net Return

Tillage Equipment: What Is Your Investment?

No-Till Planter Investment?

Economics of No-Till

Cost & Benefit Comparison

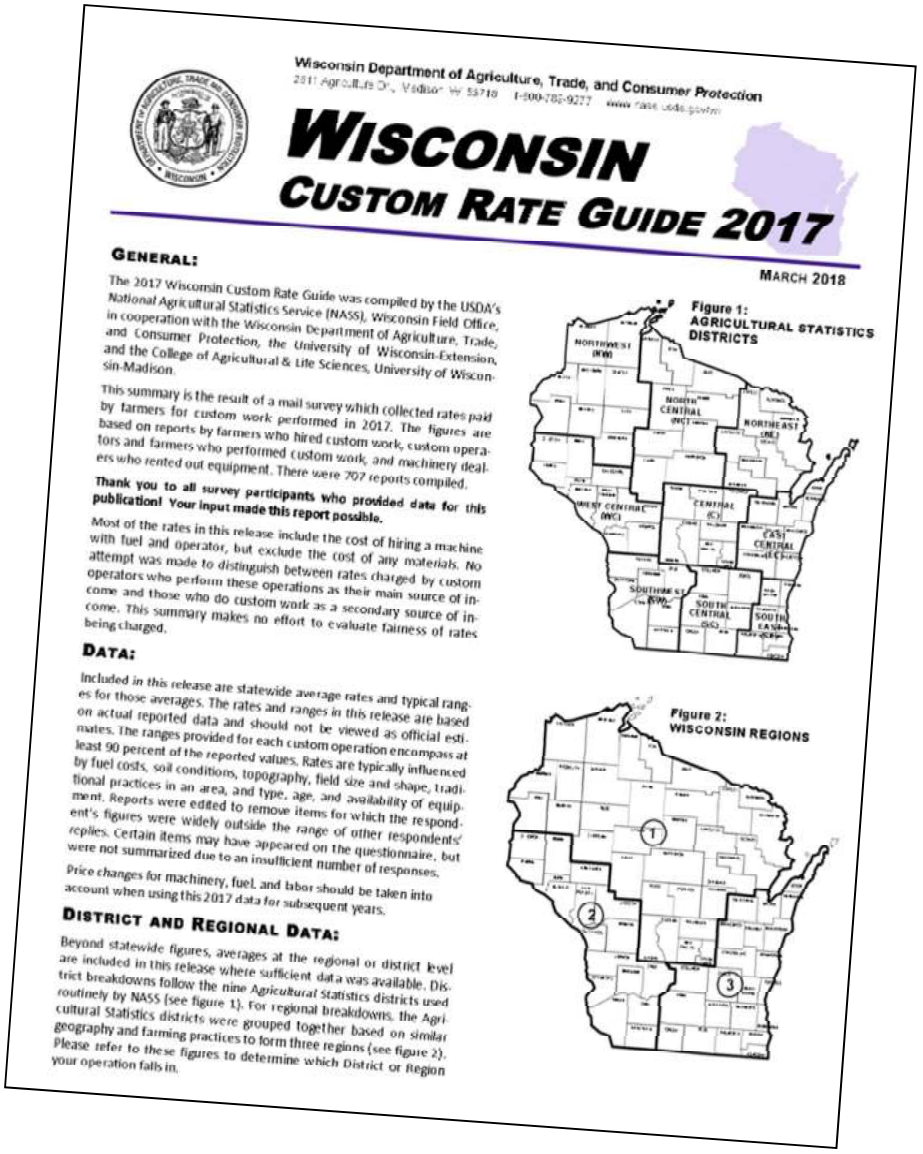
- Costs of Planting with Tillage vs No-Till
- Change in crop Production & Input Costs
- Conservation Value

- Custom Rate Cost Comparison – Easier
- Minnesota Cost Estimates – More Accurate
- Actual Farm Costs – Most Accurate Takes More Time

Machinery Costs

Custom Rate Comparison

Average Cost for SW WI



Wisconsin Department of Agriculture, Trade, and Consumer Protection

2811 Agriculture Dr., Madison WI 53718 1-800-762-9277 www.datcp.wi.gov

WISCONSIN CUSTOM RATE GUIDE 2017

MARCH 2018

GENERAL:

The 2017 Wisconsin Custom Rate Guide was compiled by the USDA's National Agricultural Statistics Service (NASS), Wisconsin Field Office, in cooperation with the Wisconsin Department of Agriculture, Trade, and Consumer Protection, the University of Wisconsin-Extension, and the College of Agricultural & Life Sciences, University of Wisconsin-Madison.

This summary is the result of a mail survey which collected rates paid by farmers for custom work performed in 2017. The figures are based on reports by farmers who hired custom work, custom operators and farmers who performed custom work, and machinery dealers who rented out equipment. There were 707 reports compiled.

Thank you to all survey participants who provided data for this publication! Your input made this report possible.

Most of the rates in this release include the cost of hiring a machine with fuel and operator, but exclude the cost of any materials. No attempt was made to distinguish between rates charged by custom operators who perform these operations as their main source of income and those who do custom work as a secondary source of income. This summary makes no effort to evaluate fairness of rates being charged.

DATA:

Included in this release are statewide average rates and typical ranges for those averages. The rates and ranges in this release are based on actual reported data and should not be viewed as official estimates. The ranges provided for each custom operation encompass at least 90 percent of the reported values. Rates are typically influenced by fuel costs, soil conditions, topography, field size and shape, traditional practices in an area, and type, age, and availability of equipment. Reports were edited to remove items for which the respondent's figures were widely outside the range of other respondents' replies. Certain items may have appeared on the questionnaire, but were not summarized due to an insufficient number of responses.

Price changes for machinery, fuel, and labor should be taken into account when using this 2017 data for subsequent years.

DISTRICT AND REGIONAL DATA:

Beyond statewide figures, averages at the regional or district level are included in this release where sufficient data was available. District breakdowns follow the nine Agricultural Statistics districts used routinely by NASS (see figure 1). For regional breakdowns, the Agricultural Statistics districts were grouped together based on similar geography and farming practices to form three regions (see figure 2). Please refer to these figures to determine which District or Region your operation falls in.

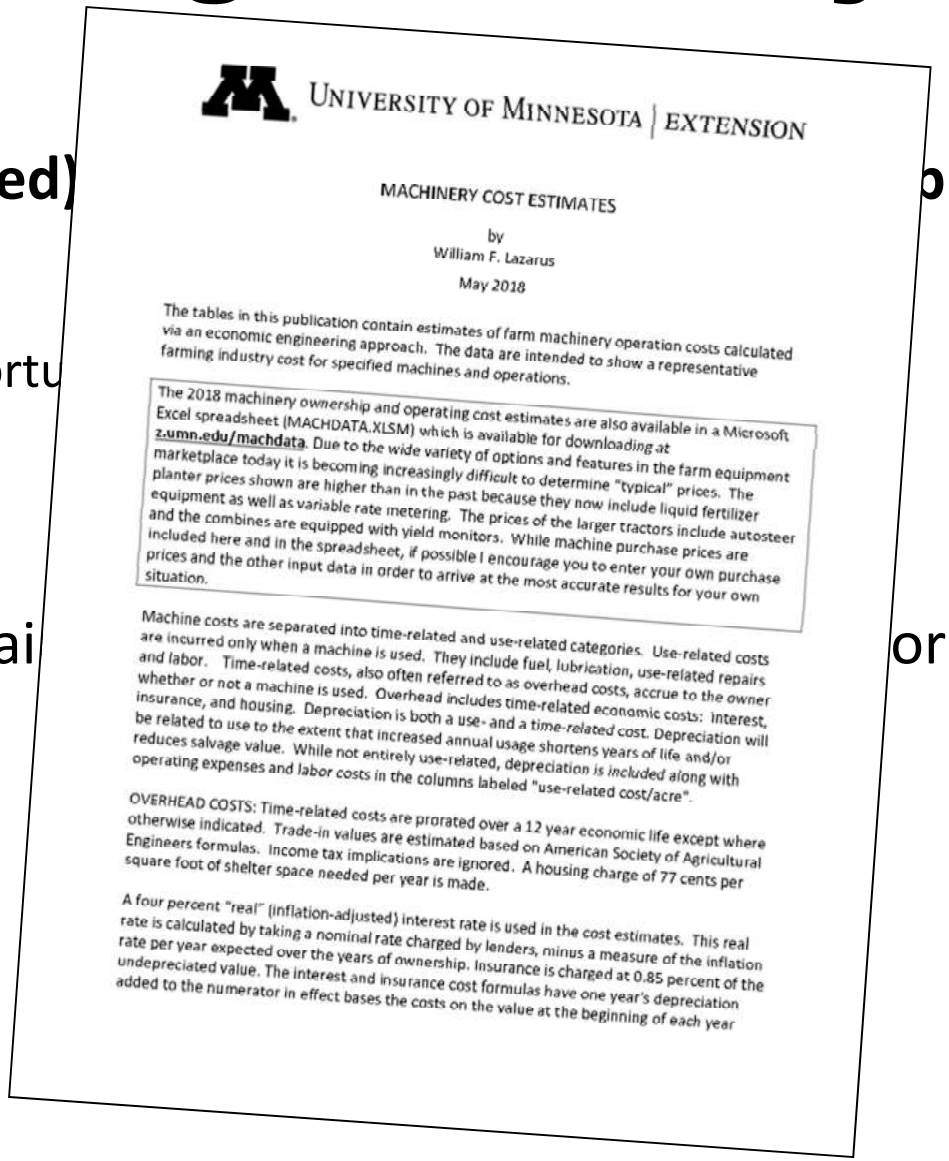
Figure 1: AGRICULTURAL STATISTICS DISTRICTS

Figure 2: WISCONSIN REGIONS

Estimating Machinery Costs

Ownership (Fixed) ble) Costs

- ð Depreciation
- ð Interest (Opportu
- ð (Taxes)
- ð Insurance
- ð Housing & Mai or



UNIVERSITY OF MINNESOTA | EXTENSION

MACHINERY COST ESTIMATES

by
William F. Lazarus
May 2018

The tables in this publication contain estimates of farm machinery operation costs calculated via an economic engineering approach. The data are intended to show a representative farming industry cost for specified machines and operations.

The 2018 machinery ownership and operating cost estimates are also available in a Microsoft Excel spreadsheet (MACHDATA.XLSM) which is available for downloading at z.umn.edu/machdata. Due to the wide variety of options and features in the farm equipment marketplace today it is becoming increasingly difficult to determine "typical" prices. The planter prices shown are higher than in the past because they now include liquid fertilizer equipment as well as variable rate metering. The prices of the larger tractors include autosteer and the combines are equipped with yield monitors. While machine purchase prices are included here and in the spreadsheet, if possible I encourage you to enter your own purchase prices and the other input data in order to arrive at the most accurate results for your own situation.

Machine costs are separated into time-related and use-related categories. Use-related costs are incurred only when a machine is used. They include fuel, lubrication, use-related repairs and labor. Time-related costs, also often referred to as overhead costs, accrue to the owner whether or not a machine is used. Overhead includes time-related economic costs: interest, insurance, and housing. Depreciation is both a use- and a time-related cost. Depreciation will be related to use to the extent that increased annual usage shortens years of life and/or reduces salvage value. While not entirely use-related, depreciation is included along with operating expenses and labor costs in the columns labeled "use-related cost/acre".

OVERHEAD COSTS: Time-related costs are prorated over a 12 year economic life except where otherwise indicated. Trade-in values are estimated based on American Society of Agricultural Engineers formulas. Income tax implications are ignored. A housing charge of 77 cents per square foot of shelter space needed per year is made.

A four percent "real" (inflation-adjusted) interest rate is used in the cost estimates. This real rate is calculated by taking a nominal rate charged by lenders, minus a measure of the inflation rate per year expected over the years of ownership. Insurance is charged at 0.85 percent of the undepreciated value. The interest and insurance cost formulas have one year's depreciation added to the numerator in effect bases the costs on the value at the beginning of each year

Value of Information?

Determining The Cost of Planting: No-Till

- 1,500 Acre Grain Farm – **from The Driftless**
- Ten Year Equipment Replacement Plan
- 250 hp Tractor bought new **$216,000**
- 16 Row Interplant No-Till Planter new **$162,000**
- Cost to Plant per Acre?
- Charge for Custom Work?

Cost of Planting - $/acre

- **Example Farm**
  - **$216,000 Tractor**
  - **$162,000 Planter**

Cost to Plant? $_____

Charge for Custom Planting? $_____

- **Your Farm**
  - **$_____ Tractor**
  - **$_____ Planter**

Cost to Plant? $_____

Charge for Custom Planting? $_____

Estimating Machinery Costs

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- Insurance
- Housing & Maint. Facilities

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

Estimating Machinery Costs

Ownership (Fixed) **ble) Costs**

- Depreciation
- Interest (Opportu
- Insurance
- Housing & Mair

or

Estimating Farm Machinery Costs

Ag Decision Maker

File A3-29

Machinery and equipment are major cost items in farm businesses. Larger machines, new technology, higher prices for parts and new machinery, and higher energy prices have all caused machinery and power costs to rise in recent years.

However, good machinery managers can control machinery and power costs per acre. Making smart decisions about how to acquire machinery, when to trade, and how much capacity to invest in can reduce machinery costs as much as $50 per acre. All these decisions require accurate estimates of the costs of owning and operating farm machinery.

Machinery Costs

Farm machinery costs can be divided into two categories: annual ownership costs, which occur regardless of machine use, and operating costs, which vary directly with the amount of machine use.

The true value of these costs cannot be known until the machine is sold or worn out. But the costs can be estimated by making a few assumptions about machine life, annual use, and fuel and labor prices. This publication contains a worksheet that can be used to calculate costs for a particular machine or operation.

Ownership costs (also called fixed costs) include depreciation, interest (opportunity cost), taxes, insurance, and housing and maintenance facilities.

Depreciation

Depreciation is a cost resulting from wear, obsolescence, and age of a machine. The degree of mechanical wear may cause the value of a particular machine to be somewhat above or below the average value for similar machines when it is traded or sold. The introduction of new technology or a major design change may make an older machine suddenly obsolete, causing a sharp decline in its remaining value. But age and accumulated hours of use are usually the most important factors in determining the remaining value of a machine.

Before an estimate of annual depreciation can be calculated, an economic life for the machine and a salvage value at the end of the economic life need to be specified. The economic life of a machine is the number of years over which costs are to be estimated. It is often less than the machine's service life because most farmers trade a machine for a different one before it is completely worn out. A good rule of thumb is to use an economic life of 10 to 12 years for most farm machines and a 15-year life for tractors, unless you know you will trade sooner.

Salvage value is an estimate of the sale value of the machine at the end of its economic life. It is the amount you could expect to receive as a trade-in allowance, an estimate of the used market value if you expect to sell the machine outright, or zero if you plan to keep the machine until it is worn out.

Estimates of the remaining value of tractors and other classes of farm machines as a percent of new list price are listed in Tables 1a and 1b. Note that for tractors, combines and forage harvesters the number of hours of annual use is also considered when estimating the remaining value. The factors were developed from published reports of used equipment auction values, and are estimates of the average "as-is" value of a class of machines in average mechanical condition at the farm. Actual market value will vary from these values depending on the condition of the machine, the current market for new machines, and local preferences or dislikes for certain models.

The appropriate values in Table 1 should be multiplied by the current list price of a replacement machine of equivalent size and type, even if the actual machine was or will be purchased for less than list price.

An example problem will be used throughout this publication to illustrate the calculations. The example is a 180-PTO horsepower diesel tractor with a list price of $200,000. Dealer discounts are assumed to reduce the actual purchase price to $180,000. An economic life of 15 years is selected.

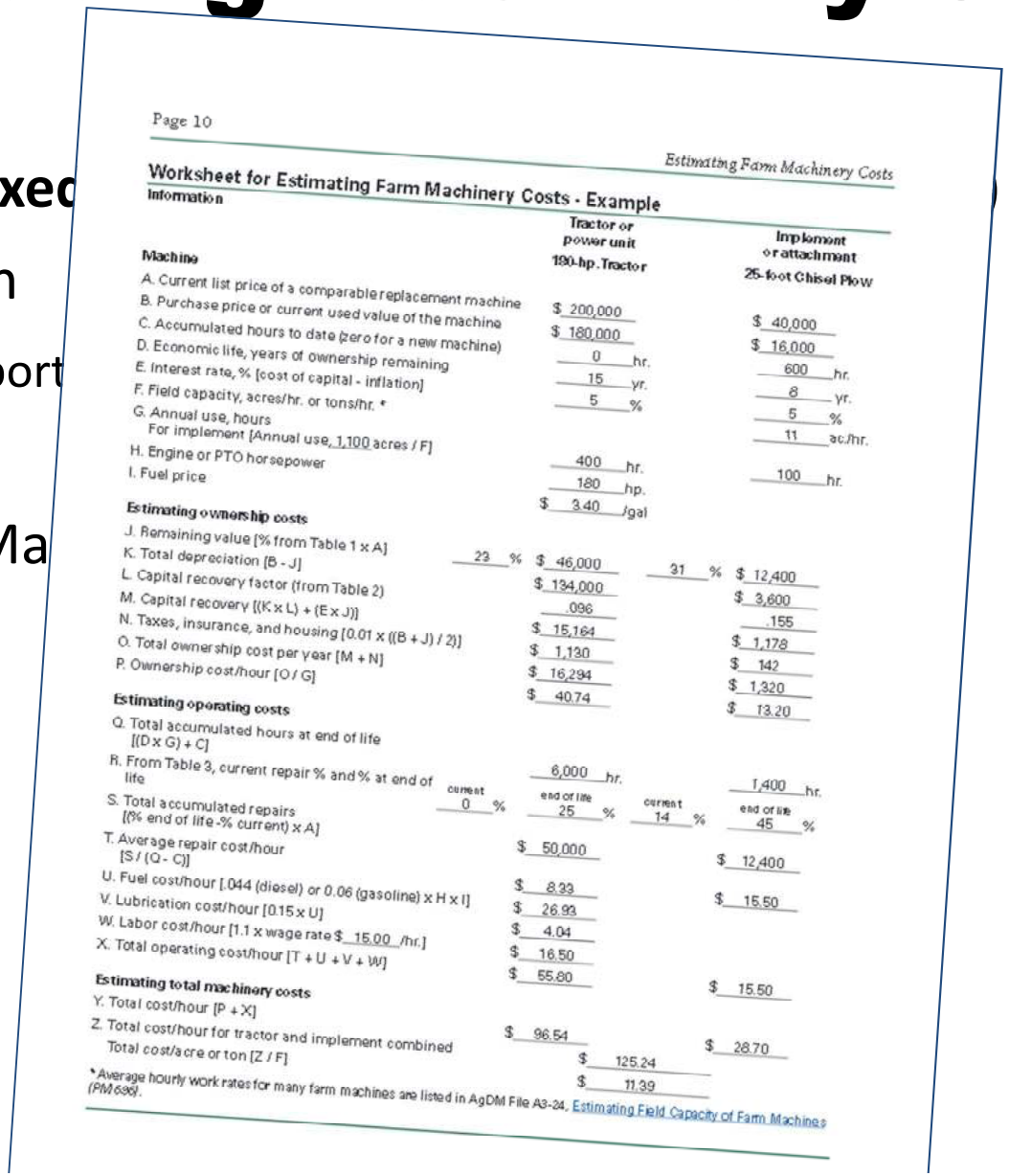
IOWA STATE UNIVERSITY
Extension and Outreach

PM 710 Revised May 2015

Estimating Machinery Costs

Ownership (Fixed **Costs**

- Depreciation
- Interest (Opport
- Insurance
- Housing & Ma



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Estimating Farm Machinery Costs

Worksheet for Estimating Farm Machinery Costs - Example

Information		Tractor or power unit		Implement or attachment
Machine		180-hp. Tractor		25-foot Chisel Plow
A. Current list price of a comparable replacement machine		$ 200,000		$ 40,000
B. Purchase price or current used value of the machine		$ 180,000		$ 16,000
C. Accumulated hours to date (zero for a new machine)		0 hr.		600 hr.
D. Economic life, years of ownership remaining		15 yr.		8 yr.
E. Interest rate, % [cost of capital - inflation]		5 %		5 %
F. Field capacity, acres/hr. or tons/hr. *				11 ac./hr.
G. Annual use, hours For implement [Annual use, 1,100 acres / F]		400 hr.		100 hr.
H. Engine or PTO horsepower		180 hp.		
I. Fuel price		$ 3.40 /gal		
Estimating ownership costs				
J. Remaining value [% from Table 1 x A]	23 %	$ 46,000	31 %	$ 12,400
K. Total depreciation [B - J]		$ 134,000		$ 3,600
L. Capital recovery factor (from Table 2)		.096		.155
M. Capital recovery [(K x L) + (E x J)]		$ 15,164		$ 1,178
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]		$ 1,130		$ 142
O. Total ownership cost per year [M + N]		$ 16,294		$ 1,320
P. Ownership cost/hour [O / G]		$ 40.74		$ 13.20
Estimating operating costs				
Q. Total accumulated hours at end of life [(D x G) + C]		6,000 hr.		1,400 hr.
R. From Table 3, current repair % and % at end of life	current 0 %	end of life 25 %	current 14 %	end of life 45 %
S. Total accumulated repairs [(% end of life -% current) x A]		$ 50,000		$ 12,400
T. Average repair cost/hour [S / (Q - C)]		$ 8.33		$ 15.50
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]		$ 26.93		
V. Lubrication cost/hour [0.15 x U]		$ 4.04		
W. Labor cost/hour [1.1 x wage rate $ 15.00 /hr.]		$ 16.50		
X. Total operating cost/hour [T + U + V + W]		$ 55.80		$ 15.50
Estimating total machinery costs				
Y. Total cost/hour [P + X]		$ 96.54		$ 28.70
Z. Total cost/hour for tractor and implement combined		$ 125.24		
Total cost/acre or ton [Z / F]		$ 11.39		

* Average hourly work rates for many farm machines are listed in AgDM File A3-24, Estimating Field Capacity of Farm Machines (PM 696).

Worksheet for Estimating Farm Machinery Costs

Information	Tractor or power unit 180-hp. Tractor	Implement or attachment 25-foot Chisel Plow
Machine		
A. Current list price of a comparable replacement machine	$_____	$_____
B. Purchase price or current used value of the machine	$_____	$_____
C. Accumulated hours to date (zero for a new machine)	_____hr.	_____hr.
D. Economic life, years of ownership remaining	_____yr.	_____yr.
E. Interest rate, % [cost of capital - inflation]	_____%	_____%
F. Field capacity, acres/hr. or tons/hr. *		_____./hr.
G. Annual use, hours For implement [Annual use, _____acres / F]	_____hr.	_____hr.
H. Engine or PTO horsepower	_____hp.	
I. Fuel price	$_____/gal	
Estimating ownership costs		
J. Remaining value [% from Table 1 x A] _____%	$_____	_____% $_____
K. Total depreciation [B - J]	$_____	$_____
L. Capital recovery factor (from Table 2)	_____	_____
M. Capital recovery [(K x L) + (E x J)]	$_____	$_____
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]	$_____	$_____
O. Total ownership cost per year [M + N]	$_____	$_____
P. Ownership cost/hour [O / G]	$_____	$_____
Estimating operating costs		
Q. Total accumulated hours at end of life [(D x G) + C]	_____hr.	_____hr.
R. From Table 3, current repair % and % at end of life	current _____% end of life _____%	current _____% end of life _____%
S. Total accumulated repairs [(% end of life -% current) x A]	$_____	$_____
T. Average repair cost/hour [S / (Q - C)]	$_____	$_____
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]	$_____	
V. Lubrication cost/hour [0.15 x U]	$_____	
W. Labor cost/hour [1.1 x wage rate $_____/hr.]	$_____	_____
X. Total operating cost/hour [T + U + V + W]	$_____	$_____
Estimating total machinery costs		
Y. Total cost/hour [P + X]	$_____	$_____
Z. Total cost/hour for tractor and implement combined	$_____	
Total cost/acre or ton [Z / F]	$_____	

* Average hourly work rates for many farm machines are listed in AgDM File A3-24, Estimating Field Capacity of Farm Machines *(PM 696)*.

Worksheet for Estimating Farm Machinery Costs

Information	Tractor or power unit	Implement or attachment
	250-hp. Tractor	16-row NT Planter
Machine		
A. Current list price of a comparable replacement machine	$ 240,000	$ 180,000
B. Purchase price or current used value of the machine	$ 216,000	$ 162,000
C. Accumulated hours to date (zero for a new machine)	0 hr.	0 hr.
D. Economic life, years of ownership remaining	10 yr.	10 yr.
E. Interest rate, % [cost of capital - inflation]	3 %	3 %
F. Field capacity, acres/hr. or tons/hr. *		16.8 a ./hr.
G. Annual use, hours For implement [Annual use, 1,500 acres / F] 16.8 a	200 hr.	90 hr.
H. Engine or PTO horsepower	250 hp.	
I. Fuel price	$ 2.83 /gal	

$$\frac{\text{1,500 acres}}{\text{16.8 a/hr}} = \text{89.3 hrs/year}$$

Estimating ownership costs

J. Remaining value [% from Table 1 x A]	33 %	$ 79,200	40 %	$ 72,000
K. Total depreciation [B - J]		$ 136,800		$ 90,000
L. Capital recovery factor (from Table 2)		.117		.117
M. Capital recovery [(K x L) + (E x J)]		$ 18,382		$ 12,690
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]		$ 1,476		$ 1,170
O. Total ownership cost per year [M + N]		$ 19,858		$ 13,860
P. Ownership cost/hour [O / G]		$ 99.29/hr		$ 154.00/hr

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

	30-79 hp Tractor			80-149 hp Tractor			150+ hp Tractor			Combine, Forage Harvestor		
Annual Hours	**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.

Estimating ownership costs

$240,000 x .33 = $79,200

$180,000 x .40 = $72,000

J. Remaining value [% from Table 1 x A]	**33** %	$ **79,200**	**40** %	$ **72,000**
K. Total depreciation [B - J]		$ **136,800**		$ **90,000**
L. Capital recovery factor (from Table 2)		**.117**		**.117**
M. Capital recovery [(K x L) + (E x J)]		$ **18,382**		$ **12,690**
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]		$ **1,476**		$ **1,170**
O. Total ownership cost per year [M + N]		$ **19,858**		$ **13,860**
P. Ownership cost/hour [O / G]		$ **99.29/hr**		$ **154.00/hr**

Estimating ownership costs

$240,000 x .33 = $79,200

$180,000 x .40 = $72,000

J. Remaining value [% from Table 1 x A]	33 %	$ 79,200	40 %	$ 72,000
K. Total depreciation [B - J]	$216,000 - $79,200 =	$ 136,800		$ 90,000
L. Capital recovery factor (from Table 2)		.117		.117
M. Capital recovery [(K x L) + (E x J)]		$ 18,382		$ 12,690
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]		$ 1,476		$ 1,170
O. Total ownership cost per year [M + N]		$ 19,858		$ 13,860
P. Ownership cost/hour [O / G]		$ 99.29/hr		$ 154.00/hr

$162,000 - $72,000 = $90,000

Table 2. Capital recovery factors.

Int. rate	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%
Years														
1	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	1.140	1.150
2	0.515	0.523	0.530	0.538	0.545	0.553	0.561	0.568	0.576	0.584	0.592	0.599	0.607	0.615
3	0.347	0.354	0.360	0.367	0.374	0.381	0.388	0.395	0.402	0.409	0.416	0.424	0.431	0.438
4	0.263	0.269	0.275	0.282	0.289	0.295	0.302	0.309	0.315	0.322	0.329	0.336	0.343	0.350
5	0.212	0.218	0.225	0.231	0.237	0.244	0.250	0.257	0.264	0.271	0.277	0.284	0.291	0.298
6	0.179	0.185	0.191	0.197	0.203	0.210	0.216	0.223	0.230	0.236	0.243	0.250	0.257	0.264
7	0.155	0.161	0.167	0.173	0.179	0.186	0.192	0.199	0.205	0.212	0.219	0.226	0.233	0.240
8	0.137	0.142	0.149	0.155	0.161	0.167	0.174	0.181	0.187	0.194	0.201	0.208	0.216	0.223
9	0.123	0.128	0.134	0.141	0.147	0.153	0.160	0.167	0.174	0.181	0.188	0.195	0.202	0.210
10	0.111	0.117	0.123	0.130	0.136	0.142	0.149	0.156	0.163	0.170	0.177	0.184	0.192	0.199
11	0.102	0.108	0.114	0.120	0.127	0.133	0.140	0.147	0.154	0.161	0.168	0.176	0.183	0.191
12	0.095	0.100	0.107	0.113	0.119	0.126	0.133	0.140	0.147	0.154	0.161	0.169	0.177	0.184
13	0.088	0.094	0.100	0.106	0.113	0.120	0.127	0.134	0.141	0.148	0.156	0.163	0.171	0.179
14	0.083	0.089	0.095	0.101	0.108	0.114	0.121	0.128	0.136	0.143	0.151	0.159	0.167	0.175
15	0.078	0.084	0.090	0.096	0.103	0.110	0.117	0.124	0.131	0.139	0.147	0.155	0.163	0.171
16	0.074	0.080	0.086	0.092	0.099	0.106	0.113	0.120	0.128	0.136	0.143	0.151	0.160	0.168
17	0.070	0.076	0.082	0.089	0.095	0.102	0.110	0.117	0.125	0.132	0.140	0.149	0.157	0.165
18	0.067	0.073	0.079	0.086	0.092	0.099	0.107	0.114	0.122	0.130	0.138	0.146	0.155	0.163
19	0.064	0.070	0.076	0.083	0.090	0.097	0.104	0.112	0.120	0.128	0.136	0.144	0.153	0.161
20	0.061	0.067	0.074	0.080	0.087	0.094	0.102	0.110	0.117	0.126	0.134	0.142	0.151	0.160

Estimating ownership costs

$240,000 x .33 = $79,200

$180,000 x .40 = $72,000

J. Remaining value [% from Table 1 x A]	33 %	$ 79,200	40 %	$ 72,000
K. Total depreciation [B - J]	$216,000 - $79,200 =	$ 136,800		$ 90,000
L. Capital recovery factor (from Table 2)		.117		.117
M. Capital recovery [(K x L) + (E x J)]		$ 18,382		$ 12,690
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]		$ 1,476		$ 1,170
O. Total ownership cost per year [M + N]		$ 19,858		$ 13,860
P. Ownership cost/hour [O / G]		$ 99.29/hr		$ 154.00/hr

($136,800 x .117) + (.03 x $79,200)

($16,005.60) + ($2,376) = $18,381.60

($90,000 x .117) + (.03 x $72,000)

($10,530) + ($2,160) = $12,690

Estimating ownership costs					
J. Remaining value [% from Table 1 x A]	33 %	$ 79,200	40 %	$ 72,000
K. Total depreciation [B - J]		$ 136,800		$ 90,000
L. Capital recovery factor (from Table 2)		.117		.117
M. Capital recovery [(K x L) + (E x J)]		$ 18,382		$ 12,690
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]		$ 1,476		$ 1,170
O. Total ownership cost per year [M + N]		$ 19,858		$ 13,860
P. Ownership cost/hour [O / G]		$ 99.29/hr		$ 154.00/hr

$240,000 x .33 = $79,200

$180,000 x .40 = $72,000

$216,000 - $79,200 =

Tractor:

Insurance, and housing $= .01 \times \frac{B + J}{2}$

$= .01 \times \frac{\$216,000 + \$79,200}{2}$

$= .01 \times \frac{\$295,200}{2}$

$= .01 \times \$147,600 = \$1,476$

Estimating ownership costs	$240,000 x .33 = $79,200		$180,000 x .40 = $72,000	
J. Remaining value [% from Table 1 x A]	33 %	$ 79,200	40 %	$ 72,000
K. Total depreciation [B - J]	$216,000 - $79,200 =	$ 136,800		$ 90,000
L. Capital recovery factor (from Table 2)		.117		.117
M. Capital recovery [(K x L) + (E x J)]		$ 18,382		$ 12,690
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]		$ 1,476		$ 1,170
O. Total ownership cost per year [M + N]		$ 19,858		$ 13,860
P. Ownership cost/hour [O / G]		$ 99.29/hr		$ 154.00/hr

Planter:

Insurance, and housing $= .01 \times \frac{B + J}{2}$

$= .01 \times \frac{\$162,000 + \$72,000}{2}$

$= .01 \times \frac{\$234,000}{2}$

$= .01 \times \$117,000 = \$1,170$

Estimating ownership costs

$240,000 x .33 = $79,200

$180,000 x .40 = $72,000

J. Remaining value [% from Table 1 x A]	33 %	$ 79,200	40 %	$ 72,000
K. Total depreciation [B - J]	$216,000 - $79,200 =	$ 136,800		$ 90,000
L. Capital recovery factor (from Table 2)		.117		.117
M. Capital recovery [(K x L) + (E x J)]		$ 18,382		$ 12,690
N. Taxes, insurance, and housing [0.01 x ((B + J) / 2)]		$ 1,476		$ 1,170
O. Total ownership cost per year [M + N]		$ 19,858		$ 13,860
P. Ownership cost/hour [O / G]		$ 99.29/hr		$ 154.00/hr

$$\frac{\$19{,}858/\text{yr}}{200\ \text{hrs./yr}} = \$99.29/\text{hr.}$$

$$\frac{\$13{,}860/\text{yr}}{90\ \text{hrs./yr}} = \$154.00/\text{hr.}$$

Estimating operating costs

Q. Total accumulated hours at end of life [(D x G) + C]		2,000 hr.		900 hr.
R. From Table 3, current repair % and % at end of life	current 0 %	end of life 1 %	current 0 %	end of life 26 %
S. Total accumulated repairs [(% end of life -% current) x A]		$ 2,400		$ 46,800
T. Average repair cost/hour [S / (Q - C)]		$ 1.20		$ 52.00
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]		$ 31.13		
V. Lubrication cost/hour [0.15 x U]		$ 4.67		
W. Labor cost/hour [1.1 x wage rate $_____/hr.]		$ 30.80		←
X. Total operating cost/hour [T + U + V + W]		$ 67.90		$ 52.00

Worksheet for Estimating Farm Machinery Costs

Information	Tractor or power unit	Implement or attachment
	250-hp. Tractor	16-row NT Planter
Machine		
A. Current list price of a comparable replacement machine	$ 240,000	$ 180,000
B. Purchase price or current used value of the machine	$ 216,000	$ 162,000
C. Accumulated hours to date (zero for a new machine)	0 hr.	0 hr.
D. Economic life, years of ownership remaining	10 yr.	10 yr.
E. Interest rate, % [cost of capital - inflation]	3 %	3 %
F. Field capacity, acres/hr. or tons/hr. *		16.8 a ./hr.
G. Annual use, hours For implement [Annual use, 1,500 acres / F] 16.8 a	200 hr.	90 hr.
H. Engine or PTO horsepower	250 hp.	
I. Fuel price	$ 2.83 /gal	

Estimating operating costs

Q. Total accumulated hours at end of life [(D x G) + C]	(10 yrs x 200 hrs./yr) + 0 (used hrs.) =	2,000 hr.	10 x 90 =	900 hr.
R. From Table 3, current repair % and % at end of life	current 0 %	end of life 1 %	current 0 %	end of life 26 %
S. Total accumulated repairs [(% end of life -% current) x A]		$ 2,400		$ 46,800
T. Average repair cost/hour [S / (Q - C)]		$ 1.20		$ 52.00
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]		$ 31.13		
V. Lubrication cost/hour [0.15 x U]		$ 4.67		
W. Labor cost/hour [1.1 x wage rate $_____/hr.]		$ 30.80		←
X. Total operating cost/hour [T + U + V + W]		$ 67.80		$ 52.00

Table 3. Accumulated repair costs as a percent of new list price.

Type of Machinery	Accumulated hours									
	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
Two-wheel drive tractor	1%	3%	6%	11%	18%	25%	34%	45%	57%	70%
Four-wheel drive tractor	0%	1%	3%	5%	8%	11%	15%	19%	24%	30%
	200	**400**	**600**	**800**	**1,000**	**1,200**	**1,400**	**1,600**	**1,800**	**2,000**
Moldboard plow	2%	6%	12%	19%	29%	40%	53%	68%	84%	101%
Heavy-duty disk	1%	4%	8%	12%	18%	25%	32%	40%	49%	58%
Tandem disk	1%	4%	8%	12%	18%	25%	32%	40%	49%	58%
Chisel plow	3%	8%	14%	20%	28%	36%	45%	54%	64%	74%
Field cultivator	3%	7%	13%	20%	27%	35%	43%	52%	61%	71%
Harrow	3%	7%	13%	20%	27%	35%	43%	52%	61%	71%
Roller-packer, mulcher	2%	5%	8%	12%	16%	20%	25%	29%	34%	39%
Rotary hoe	2%	6%	11%	17%	23%	30%	37%	44%	52%	61%
Row crop cultivator	0%	2%	6%	10%	17%	25%	36%	48%	62%	78%
	200	**400**	**600**	**800**	**1,000**	**1,200**	**1,400**	**1,600**	**1,800**	**2,000**
Combine heads	0%	2%	4%	8%	14%	21%	30%	41%	54%	69%
Potato harvester	2%	5%	9%	14%	19%	25%	30%	37%	43%	50%
Mower-conditioner	1%	4%	8%	13%	18%	24%	31%	38%	46%	55%
Mower-conditioner (rotary)	1%	3%	6%	10%	16%	23%	31%	41%	52%	64%
Rake	2%	5%	8%	12%	17%	22%	27%	33%	39%	45%
Rectangular baler	1%	4%	9%	15%	23%	32%	42%	54%	66%	80%
Large square baler	1%	2%	4%	7%	10%	14%	18%	23%	29%	35%
Forage harvester (pull)	1%	3%	7%	10%	15%	20%	26%	32%	38%	45%
	300	**600**	**900**	**1,200**	**1,500**	**1,800**	**2,100**	**2,400**	**2,700**	**3,000**
Forage harvester (SP)	0%	1%	2%	4%	7%	10%	13%	17%	22%	27%
Combine (SP)	0%	1%	2%	4%	6%	9%	12%	16%	20%	25%
Windrower (SP)	1%	2%	5%	9%	14%	19%	26%	35%	44%	54%
Cotton picker (SP)	1%	4%	9%	15%	23%	32%	42%	53%	66%	79%
	100	**200**	**300**	**400**	**500**	**600**	**700**	**800**	**900**	**1,000**
Mower (sickle)	1%	3%	6%	10%	14%	19%	25%	31%	38%	46%
Mower (rotary)	0%	2%	4%	7%	11%	16%	22%	28%	36%	44%
Large round baler	1%	2%	5%	8%	12%	17%	23%	29%	36%	43%
Sugar beet harvester	3%	7%	12%	18%	24%	30%	37%	44%	51%	59%
Rotary tiller	0%	1%	3%	6%	9%	13%	18%	23%	29%	36%
Row crop planter	0%	1%	3%	5%	7%	11%	15%	20%	26%	32%
Grain drill	0%	1%	3%	5%	7%	11%	15%	20%	26%	32%
Fertilizer spreader	3%	8%	13%	19%	26%	32%	40%	47%	55%	63%

Estimating operating costs

Q. Total accumulated hours at end of life [(D x G) + C]	(10 yrs x 200 hrs./yr) + 0 (used hrs.) = 2,000 hr.		10 x 90 = 900 hr.	
R. From Table 3, current repair % and % at end of life	current 0 %	end of life 1 %	current 0 %	end of life 26 %
S. Total accumulated repairs [(% end of life -% current) x A]	(.01 - .00) x $240,000 = $ 2,400		.26 x $180,000 = $ 46,800	
T. Average repair cost/hour [S / (Q - C)]	$ 1.20		$ 52.00	
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]	$ 31.13			
V. Lubrication cost/hour [0.15 x U]	$ 4.67			
W. Labor cost/hour [1.1 x wage rate $_____/hr.]	$ 30.80		←	
X. Total operating cost/hour [T + U + V + W]	$ 67.80		$ 52.00	

Tractor:

Average Repair Cost/Hour = $2,400/(2,000 – 0) = $2,400/2,000hrs. = $1.20/hr.

Planter:

Average Repair Cost/Hour = $46,800/(900 – 0) = $46,800/900hrs. = $52.00/hr.

Estimating operating costs

Q. Total accumulated hours at end of life [(D x G) + C]	**(10 yrs x 200 hrs./yr) + 0 (used hrs.) =**	**2,000** hr.	**10 x 90 =**	**900** hr.
R. From Table 3, current repair % and % at end of life	current **0** %	end of life **1** %	current **0** %	end of life **26** %
S. Total accumulated repairs [(% end of life -% current) x A]	**(.01 - .00) x $240,000 =**	$ **2,400**	**.26 x $180,000 =**	$ **46,800**
T. Average repair cost/hour [S / (Q - C)]		$ **1.20**		$ **52.00**
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]		$ **31.13**		
V. Lubrication cost/hour [0.15 x U]		$ **4.67**		
W. Labor cost/hour [1.1 x wage rate $_____/hr.]		$ **30.80**		←
X. Total operating cost/hour [T + U + V + W]		$ **67.80**		$ **52.00**

Estimating operating costs

Q. Total accumulated hours at end of life [(D x G) + C]	(10 yrs x 200 hrs./yr) + 0 (used hrs.) =	2,000 hr.	10 x 90 =	900 hr.
R. From Table 3, current repair % and % at end of life	current 0 %	end of life 1 %	current 0 %	end of life 26 %
S. Total accumulated repairs [(% end of life -% current) x A]	(.01 - .00) x $240,000 =	$ 2,400	.26 x $180,000 =	$ 46,800
T. Average repair cost/hour [S / (Q - C)]		$ 1.20		$ 52.00
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]		$ 31.13		
V. Lubrication cost/hour [0.15 x U]		$ 4.67		
W. Labor cost/hour [1.1 x wage rate $_____/hr.]		$ 30.80		←
X. Total operating cost/hour [T + U + V + W]		$ 67.80		$ 52.00

Fuel Cost/Hour = .044 x 250 x $2.83/gal = $31.13/hr.

Lubrication Cost/Hour = 0.15 x $31.13/hr. = $4.67

Estimating operating costs

Q. Total accumulated hours at end of life [(D x G) + C]	(10 yrs x 200 hrs./yr) + 0 (used hrs.) =	2,000 hr.	10 x 90 =	900 hr.
R. From Table 3, current repair % and % at end of life	current 0 %	end of life 1 %	current 0 %	end of life 26 %
S. Total accumulated repairs [(% end of life -% current) x A]	(.01 - .00) x $240,000 =	$ 2,400	.26 x $180,000 =	$ 46,800
T. Average repair cost/hour [S / (Q - C)]		$ 1.20		$ 52.00
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]		$ 31.13		
V. Lubrication cost/hour [0.15 x U]		$ 4.67		
W. Labor cost/hour [1.1 x wage rate $ 28 /hr.]		$ 30.80		←
X. Total operating cost/hour [T + U + V + W]		$ 67.80/hr		$ 52.00/hr

	Ownership Cost P =	**$99.29/hr**	**$154.00/hr**
	Operating Cost X =	**67.80**	**52.00**
Estimating total machinery costs			
Y. Total cost/hour [P + X]		$ **167.09/hr**	$ **206.00/hr**
Z. Total cost/hour for tractor and implement combined		$ **373.09/hr**	
Total cost/acre or ton [Z / F]		$	

* Average hourly work rates for many farm machines are listed in AgDM File A3-24, Estimating Field Capacity of Farm Machines *(PM 696)*.

Estimating total machinery costs

Y. Total cost/hour [P + X]	$ 167.00/hr	$ 206.00/hr
Z. Total cost/hour for tractor and implement combined		$ 373/hr
Total cost/acre or ton [Z / F] **$373/hr ÷ 16.8 acres/hr = $22.20/a**		$ 22/acre

* Average hourly work rates for many farm machines are listed in AgDM File A3-24, Estimating Field Capacity of Farm Machines *(PM 696)*.

Machinery Costs

	Custom Rate Guide	Minnesota Cost Estimate	Actual Cost Analysis
Fall Chisel Plowing	$16	$16	
Spring Field Cult. (2x)	$30	$19	
Conventional Planter	$18	$17	
No-Till Planter	$19		$22

Machinery Costs

	Custom Rate Guide	Minnesota Cost Estimate	Actual Cost Analysis
Fall Chisel Plowing	$16	$16	
Spring Field Cult. (2x)	$30	$19	
Conventional Planter	$18	$17	
No-Till Planter	$19		$22

To Compare Conventional to No-till

Corn/Bean Rotation

Corn 2019

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
ð **Yield History** Crop Insurance 10 year APH					
ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
ð **Expenses**					
- Inputs	- 241	-253	- 274	-330	-341
ð Seed ($256 RRCRWCB ($3.20/k))	$ 96 30K	$ 96 30K	$102 32K	$109 34K	$115 36K
ð Fertilizer-Nitrogen (lbs. of N/acre, $.38/lb.)	46 120 lbs.	46 120 lbs.	53 140 lbs.	61 160 lbs.	61 160 lbs.
-P_2O_5($.44/lb) K_2O($.29/lb) SO_4($.28/lb.)	39 55P 40K 12S	49 70P 50K 12S	54 75P 60K 12S	60 85P 65K 12S	63 90P 70K 12S
ð Herbicide (two pass)	26	26	26	26	26
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 214	- 230	- 245	- 261	- 276
MN Cost Estimate { ð Tillage (fall chisel, Spr. Field Cult. (2x))	35	35	35	35	35
MN Cost Estimate { ð Planting, Operator, Fuel (conventional)	$ 17	17	17	17	17
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 660	- 718	- 784	- 886	- 943
ð **Net Return**	($ 135)	($ 105)	($ 84)	($ 98)	($ 68)
Breakeven Cost/bu.	**$4.40/bu**	**$4.10**	**$3.92**	**$3.94**	**$3.77**

Corn 2019

Corn/Bean Rotation

What Changes with No-Till?

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ð Herbicide (two pass)	26	26	26	26	26
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 214	- 230	- 245	- 261	- 276
MN Cost Estimate { ð Tillage (fall chisel, Spr. Field Cult. (2x))	35	35	35	35	35
ð Planting, Operator, Fuel (conventional)	$ 17	17	17	17	17
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
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Corn 2019

Corn/Bean Rotation

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ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 214	- 230	- 245	- 261	- 276
ð Tillage (fall chisel, Spr. Field Cult. (2x))	~~35~~	~~35~~	~~35~~	~~35~~	~~35~~
ð Planting, Operator, Fuel (conventional)	$~~17~~ 22	~~17~~ 22	~~17~~ 22	~~17~~ 22	~~17~~ 22
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
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Corn/Bean Rotation

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MN Cost Estimate ð Tillage (fall chisel, Spr. Field Cult. (2x)) Depr. & OH	~~35~~ 6	~~35~~ 6	~~35~~ 6	~~35~~ 6	~~35~~ 6
ð Planting, Operator, Fuel (conventional)	$~~17~~ 22	~~17~~ 22	~~17~~ 22	~~17~~ 22	~~17~~ 22
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
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Corn 2019

Corn/Bean Rotation

What Changes with No-Till?

Tillage Labor Cost?

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ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
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Corn 2019

Corn/Bean Rotation

What Changes with No-Till?

Tillage Labor Cost?
.2 hr x $28 = $5.60

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ð Planting, Operator, Fuel (conventional)	$~~17~~ 22 + 6	~~17~~ 22 + 6	~~17~~ 22 + 6	~~17~~ 22 + 6	~~17~~ 22 + 6
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
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Economics of No-Till

Partial Budget Analysis:

Changing from Conventional Tillage to No-Till

Positives:

- ð **Added Income Due to Change**
- ð **Reduced Costs Due to Change**

- ð **Net Change:**

Negatives:

- ð **Added Costs Due to Change**
- ð **Reduced Income Due to Change**

Partial Budget Analysis: CT to NT

Keep Tillage Equipment

Positives:

- **Added Income Due to Change**
  - No change in yield = $ 0/a
- **Reduced Costs Due to Change**
  - Tillage cost $35 - $6 Depr&OH = $29/a

  Total = $29/a
- **Net Change:** $29 - $22 = + $ 7/acre

Negatives:

- **Added Costs Due to Change**
  - Increased Herbicide Cost = $11/a
  - Tillage Labor to No-till .2hrx$28 6/a
  - Increased Planting Cost 5/a
- **Reduced Income Due to Change**
  - No change in yield = $ 0/a

  Total = $22/a

Partial Budget Analysis: CT to NT

Keep Tillage Equipment

Positives:

- **Added Income Due to Change**
  - No change in yield = $ 0/a
- **Reduced Costs Due to Change**
  - Tillage cost $35 - $6 Depr&OH = $29/a

  Total = $29/a
- **Net Change:** $29 - $22 = + $ 7/acre

  $7.00/a X 1,500 acres = $10,500

Negatives:

- **Added Costs Due to Change**
  - Increased Herbicide Cost = $11/a
  - Tillage Labor to No-till .2hrx$28 6/a
  - Increased Planting Cost 5/a
- **Reduced Income Due to Change**
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  Total = $22/a

Corn/Bean Rotation

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ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
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What Changes with No-Till?

MN Cost Estimate

~~**Tillage Labor Cost?**~~
~~**2 hr x $28 = $56**~~

Corn 2019

Corn/Bean Rotation

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ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 660	- 718	- 784	- 886	- 943
ð **Net Return**	($ 135)	($ 105)	($ 84)	($ 98)	($ 68)
Breakeven Cost/bu.	**$4.40/bu**	**$4.10**	**$3.92**	**$3.94**	**$3.77**

~~Tillage Labor Cost?~~
~~2 hr x $28 = $5.60~~

Partial Budget Analysis: CT to NT

Trade-In Tillage Equipment

Positives:

- Added Income Due to Change
  - No change in yield = $ 0/a
- Reduced Costs Due to Change
  - Tillage cost $35 - $0 Depr&OH = $35/a

  Total = $35/a
- Net Change: $35 - $16 = + $ 19/acre

  $19.00/a X 1,500 acres = $28,500

Negatives:

- Added Costs Due to Change
  - Increased Herbicide Cost = $11/a
  - Tillage Labor to No-till .2hrx$28 0/a
  - Increased Planting Cost 5/a
- Reduced Income Due to Change
  - No change in yield = $ 0/a

  Total = $16/a

Why No-Till…

Farm with Residue

Take Advantage of Cover Crops

Competitive Grant Report E2014-17

LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

Economic impacts of soil erosion in Iowa

Abstract:

Everyone agrees that soil erosion is detrimental to Iowa agriculture. This study attempts to quantify the effects of erosion on contemporary crop yields and gauge the longer term impact on the agricultural economy in the state.

Principal Investigator:

Richard M. Cruse
Agronomy

Q What is the impact of existing soil erosion rates on crop yield and subsequent income alterations?

A Field measurements of topsoil depth coupled with crop yield monitor data were combined to identify the relationship between topsoil depth and corn yield. From this data, and other research complementing this study, short- and long-term economic impacts were estimated.

ECOLOGY

Background

Nearly everyone who travels across Iowa sees stark evidence of soil erosion. This is the movement of soil particles by wind or water, especially following spring rains that fall before the growing crops cover the soil surface. Soil erosion pollutes Iowa waters and it likely hurts crop yields. However, there is little reliable information about how much crop yields are reduced and/or the state-level economic impact of erosion on Iowa's landscape.

Topsoil, the richest soil which has the most favorable effects on crop yield, is thinned by soil erosion. Normally this means water infiltration rates and water holding capacity are reduced, fertility is lowered, and soil health in general suffers. The resulting impacts on crop productivity often are reflected in crop yield variability within a farm

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ECOLOGY

Studied 7 Iowa Farms 2007-2013:
Corn-Soybean Rotations, Similar Tillage
Measured Topsoil in the Fields - 40 Locations in each field
Matched Yield Maps and Topsoil Locations

Topsoil, the richest soil which has the most favorable effects on crop yield, is thinned by soil erosion. Normally this means water infiltration rates and water holding capacity are reduced, fertility is lowered, and soil health in general suffers. The resulting

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Yield loss per inch of topsoil lost was 2.2 bu./acre

Soil loss average of 5.7 ton/acre/year

Soil renewal of .5 ton/acre/year

Net loss of .037 of an inch of topsoil/year (Dime=.053)

Topsoil, the richest soil which has the most favorable effects on crop yield, is thinned by soil erosion. Normally this means water infiltration rates and water holding capacity are reduced, fertility is lowered, and soil health in general suffers. The resulting

Hi Ted:

I wish I had better news for you.

Literature as well as our work indicate the cost of soil loss is major, but the effect is revealed over the long haul. Converting to no-till definitely has value, but expecting it to pay big (or even noticeably) in the short term due to soil conservation is wishful thinking. Investments in conservation are returned a decade or two down the road.

There is another point relative to no-till use and soil conservation. Those engaged with the soil health discussion must understand, building soil health will NOT occur if you are losing topsoil. The indirect effect of conservation systems like no-till are often overlooked. From the on-site perspective, stopping soil erosion is a long term profitability issue.

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Human beings in our culture are wired to pay attention to problems that are:

Visible–right in front of our eyes, not microscopic or far away.

Symptomatic–this is a version of 'visible'. If the problem has symptoms, and the symptoms are painful and getting worse, you have our attention. Symptoms that are stable or getting better feel much less urgent. *(because of improved management and genetics, yields continue to increase – soil erosion is a permanent yield drag being masked by other factors).*

What is the Value of a Ton of Soil?

- Suppose you prevent some soil erosion, what's it worth?
- Hansen and Ribaudo (2008) "Economic Measures of Soil Conservation Benefits: Regional Values for Policy Assessment" USDA ERS TB 1922
- Lit review, multiple impacts, by county for policy analysis
- Irrigation ditches & canals, **Recreational fishing,** Freshwater & marine fisheries, Flood damages, Road drainage ditches, Municipal & industrial water use, Municipal water treatment, Steam power plants, Soil productivity, Dust cleaning, **Water-based recreation,** Navigation, Reservoir services
- **Lower bound on value of eroded/saved soil**

Paul Mitchell: Agricultural and Applied Economics, UW-Madison

- ð Benefit in WI ranges from $8.81 to $6.57/ton
- ð $1.21/ton of this is for Soil Productivity
- ð Fairly constant across WI counties

Figure 5
Range and distribution of all water-erosion benefit values, by county

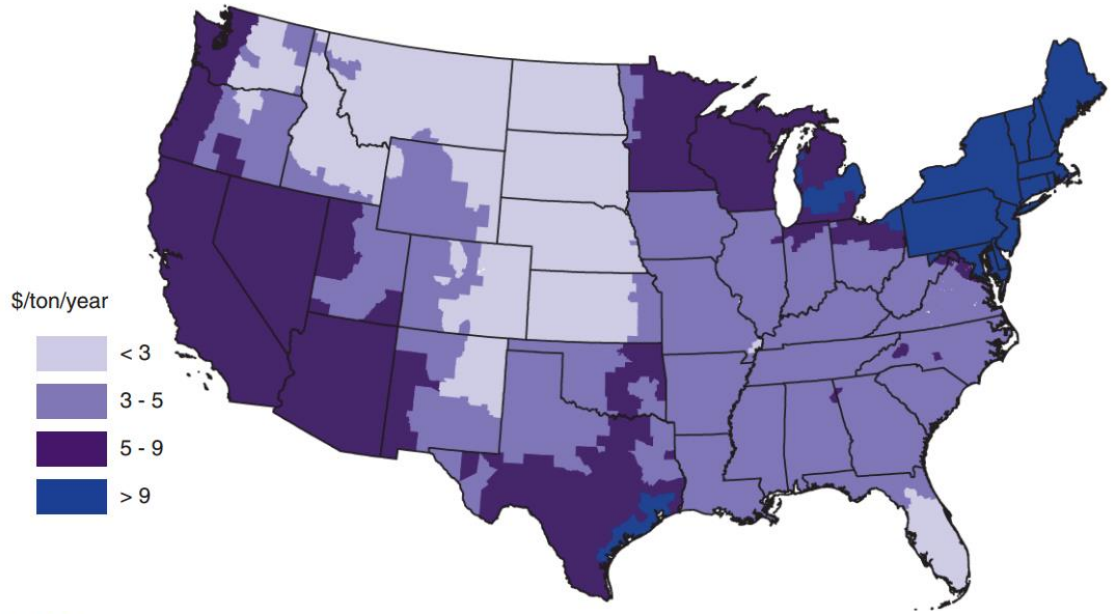
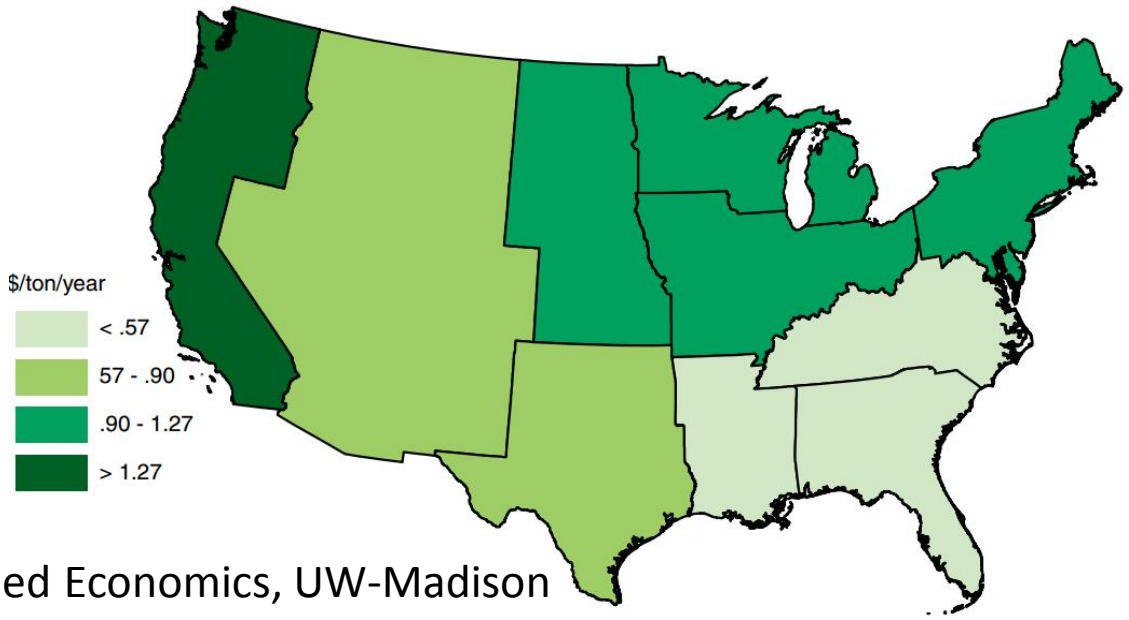


Figure 6
Range and distribution of all wind-erosion benefit values, by county



Paul Mitchell: Agricultural and Applied Economics, UW-Madison

Soil Erosion: Farmer Cost

- Farmer's direct cost as Soil Productivity Loss = $1.21/ton
- In 1990 dollars, so convert to current dollars using CPI:

  $1.21 x 1.79 = $2.17/ton annually
- Wisconsin state average soil loss is 4.6 tons/A in 2007 (Google "Soil Erosion on Cropland 2007 NRCS")

  $2.17/ton x 4.6 ton/A = $9.98/A annually
- Soil erosion costs WI farmers on average about $10/A in lost productivity each year

Paul Mitchell: Agricultural and Applied Economics, UW-Madison

Cover crops and Soil Loss

- **Continuous corn silage rotation**
- **Cover crop (rye) drilled in October**
- **Cover crop (rye) aerially applied in September**
- **No-till vs. spring chisel**

Tillage	Cover Crop	Soil Loss (ton/ac/yr
No-till	None	2.1
	Aerially-applied	0.1
	Drill-seeded	1.1
Chisel plow	None	5.4
	Aerially-applied	1.5
	Drill-seeded	2.2

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$2.17/ton x 3.3 ton = $7.16/acre

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Why No-Till…

Farm with Residue

Take Advantage of Cover Crops

Reduced Soil Erosion = $??

No-Till…

Farm with Residue

Take Advantage of Cover Crops

Reduced Soil Erosion = $??

'Financial benefit will depend on the specifics of each farmer, each farm, each field and each year'

Custom work:

Estimating total machinery costs

Y. Total cost/hour [P + X]	$ 167.00/hr	$ 206.00/hr
Z. Total cost/hour for tractor and implement combined		$ 373/hr
Total cost/acre or ton [Z / F] **$373/hr ÷ 16.8 acres/hr = $22.20/a**		$ 22/acre

* Average hourly work rates for many farm machines are listed in AgDM File A3-24, Estimating Field Capacity of Farm Machines *(PM 696)*.

Estimating total machinery costs

Y. Total cost/hour [P + X]	$ 167.00/hr	$ 206.00/hr
Z. Total cost/hour for tractor and implement combined		$ 373/hr
Total cost/acre or ton [Z / F] **$373/hr ÷ 12 acres/hr = $31.08/a**		$ 31/acre

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16.9a – 12.0a = 4.8acres x $22 = $105.60/hr

12a/hr x $22/a = $264/hr

Estimating total machinery costs

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Estimating operating costs

Q. Total accumulated hours at end of life [(D x G) + C]	(10 yrs x 200 hrs./yr) + 0 (used hrs.) =	2,000 hr.	10 x 90 =	900 hr.
R. From Table 3, current repair % and % at end of life	current 0 %	end of life 1 %	current 0 %	end of life 26 %
S. Total accumulated repairs [(% end of life -% current) x A]	(.01 - .00) x $240,000 =	$ 2,400	.26 x $180,000 =	$ 46,800
T. Average repair cost/hour [S / (Q - C)]		$ 1.20		$ 52.00
U. Fuel cost/hour [.044 (diesel) or 0.06 (gasoline) x H x I]		$ 31.13		
V. Lubrication cost/hour [0.15 x U]		$ 4.67		
W. Labor cost/hour [1.1 x wage rate $ 28 /hr.]		$ 30.80		←
X. Total operating cost/hour [T + U + V + W]		$ 67.80/hr		$ 52.00/hr

Operating Costs = $67.80 + $52.00 = $119.80

$120/hr

12a/hr x $22/a = $264/hr - $120 = $144 to Fixed Costs

Estimating total machinery costs

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Why Practice Conservation?

Resources

Partial Budgeting: A Tool to Analyze Farm Business Changes
https://www.extension.iastate.edu/agdm/wholefarm/pdf/c1-50.pdf

No-Tillage and Conservation Tillage: Economic Considerations
https://extensiondata.missouri.edu/pub/pdf/agguides/agecon/g00355.pdf?_ga=2.113809799.1677720281.1539625118-844515308.1538109248

Considerations in Selecting No-Till
https://store.extension.iastate.edu/product/Considerations-in-Selecting-No-Till-Resource-Conservation-Practices

Minnesota Machinery Cost Estimates
https://extension.umn.edu/business/farm-finance#machinery-cost-estimates-919262

Iowa Estimating Farm Machinery Costs
https://www.extension.iastate.edu/agdm/crops/html/a3-29.html

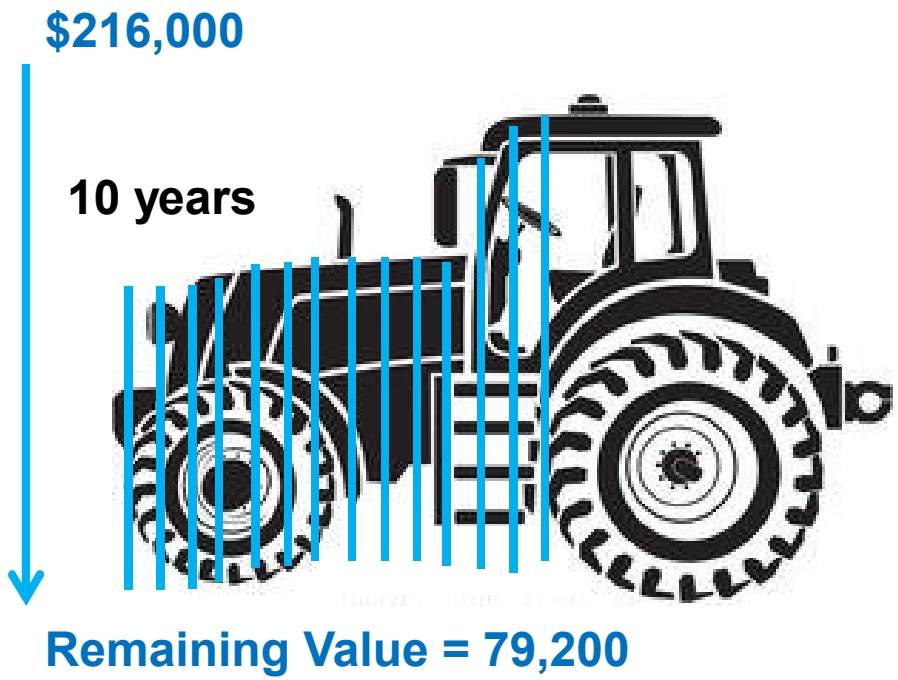

Questions?


Thank You

Estimating Machinery Costs

Ownership (Fixed) Costs

- Depreciation
- Interest
- Insurance
- Housing & Maint. Facilities



Depreciation = $216,000 - $79,200 = $136,800
+ Interest on Remaining Value (Interest Rate = 3%)
Insurance & Housing = 1% of average value

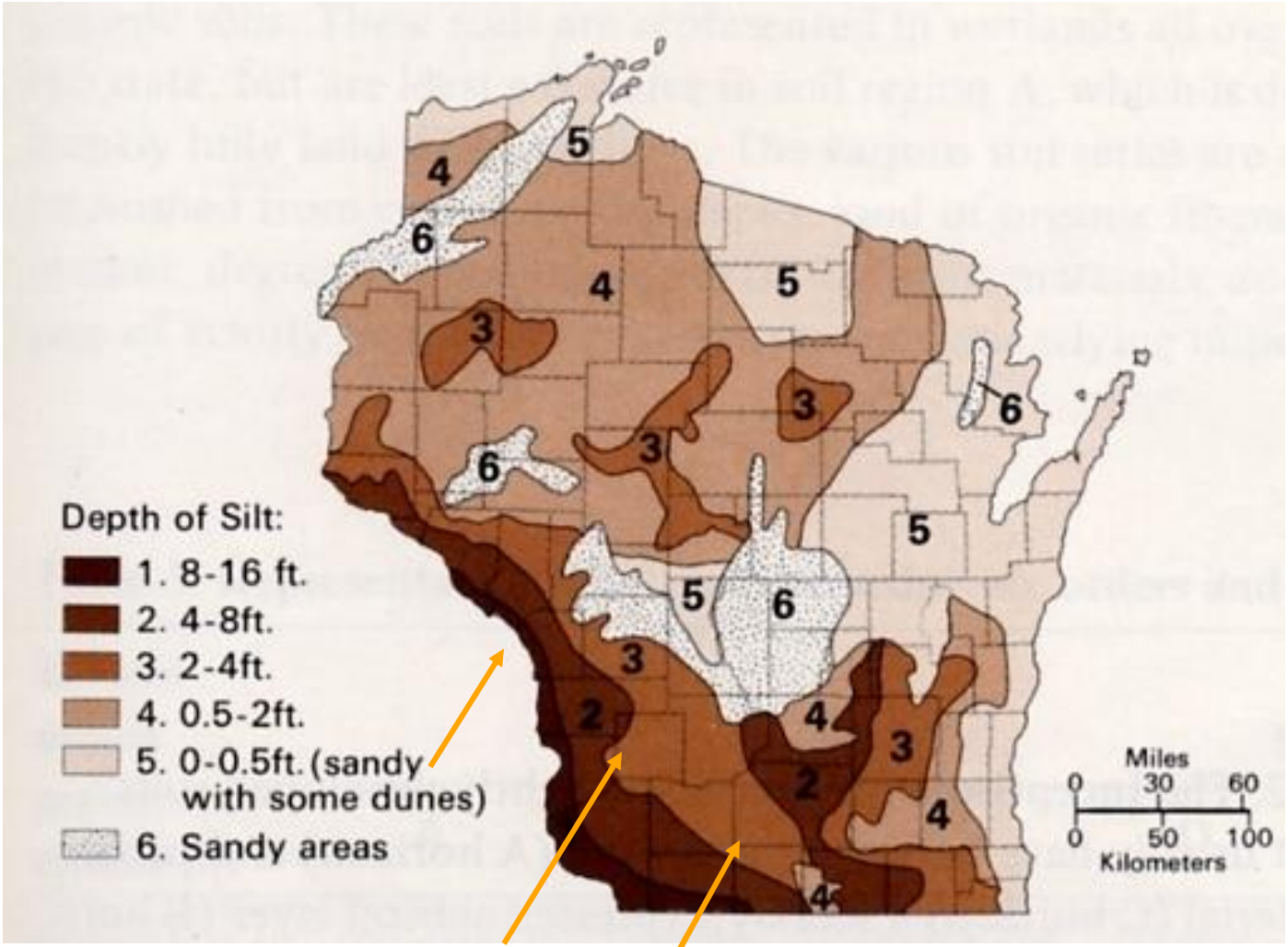
Annual Capital Recovery = $18,382

---------- = 1,476

Total ownership cost/year $19,858

At 200 hrs/yr total ownership cost = $99.29/hr

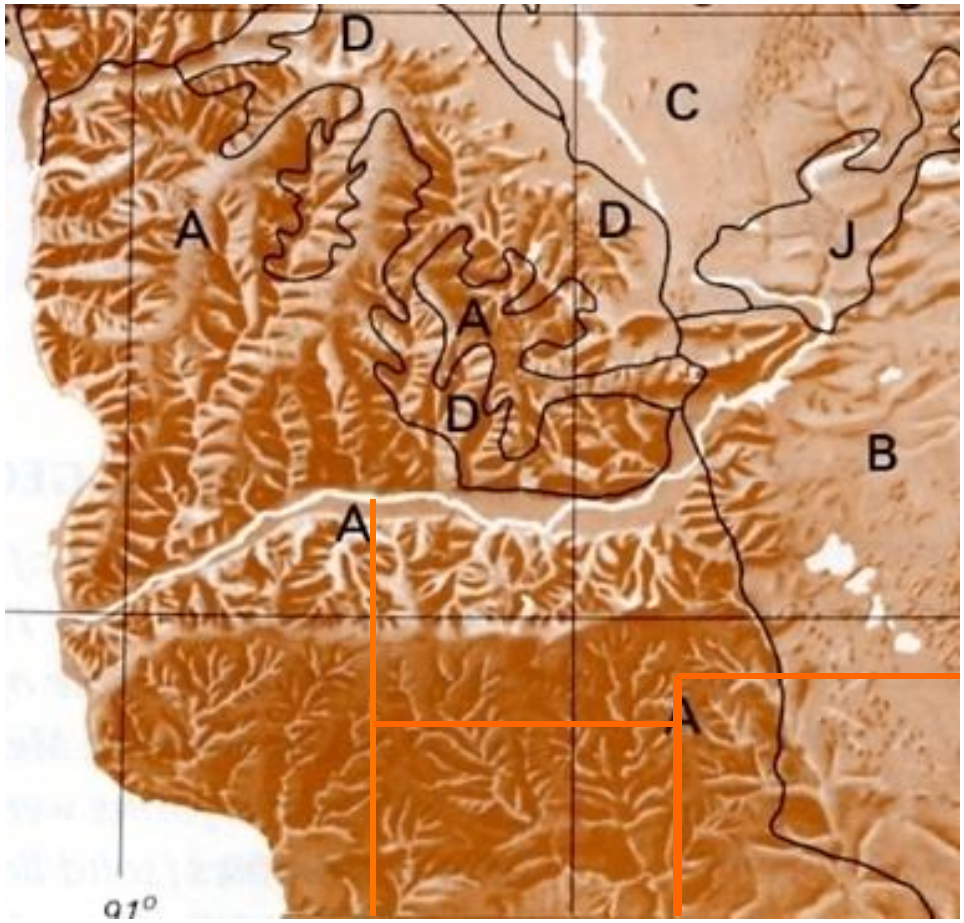
Foundation of Wisconsin Soils



Silt Blown in by Ice Age Winds

Landscape of Southwest Wisconsin

"It is fortunate the dolomite bedrock of this region was blanketed with wind-blown silt. Without it, the area would be a hilly wasteland."[1]

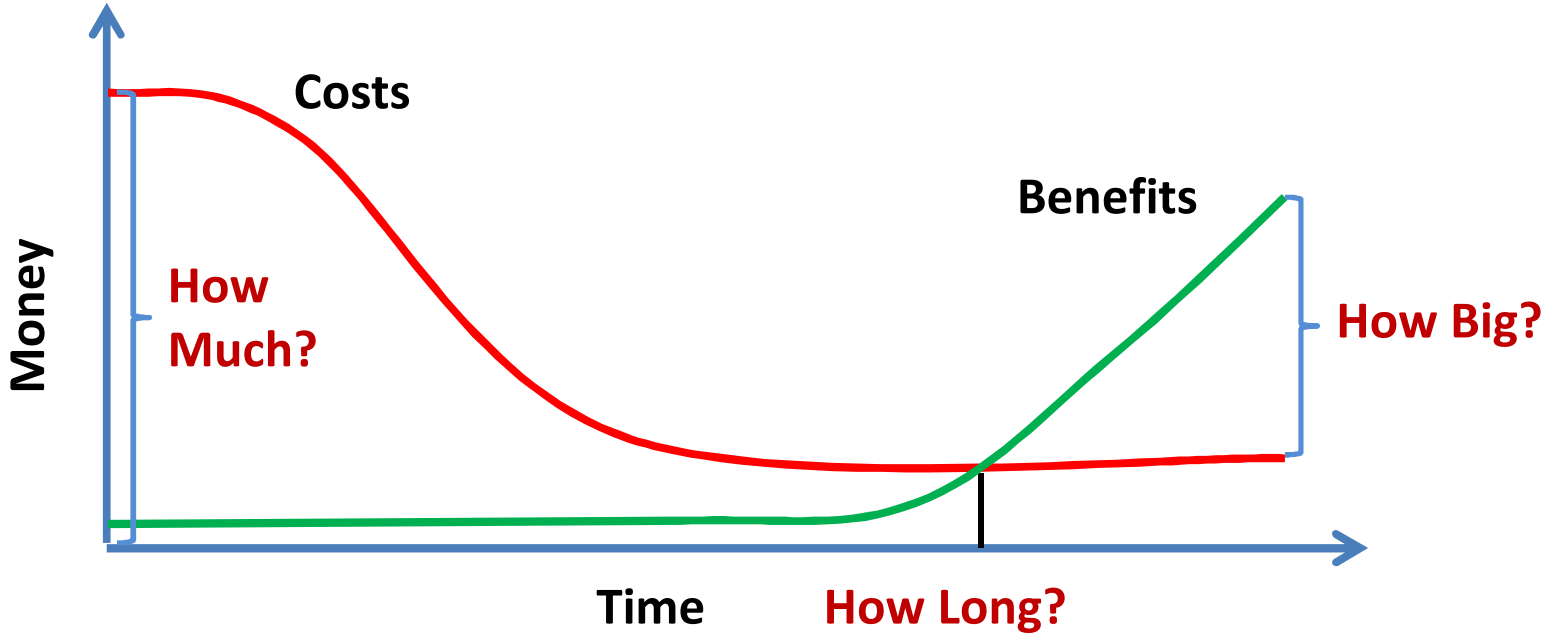


[1] Geological and Natural History Survey

Building Black Gold Farm Tour, Olmsted Co. MN, Noah Fish, Joe Ahlquist

Costs, Benefits and the Human Condition

- A common issue underlying many human problems
- Pay high costs now, wait a long time before benefits become apparent and eventually exceed costs



Paul Mitchell: Agricultural and Applied Economics, UW-Madison

Corn/Bean Rotation

Corn 2019

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
ð **Yield History** Crop Insurance 10 year APH					
ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
ð **Expenses**					
- Inputs	- 241	-253	- 274	-330	-341
ð Seed ($256 RRCRWCB ($3.20/k))	$ 96 30K	$ 96 30K	$102 32K	$109 34K	$115 36K
ð Fertilizer-Nitrogen (lbs. of N/acre, $.38/lb.)	46 120 lbs.	46 120 lbs.	53 140 lbs.	61 160 lbs.	61 160 lbs.
-P_2O_5($.44/lb) K_2O($.29/lb) SO_4($.28/lb.)	39 55P 40K 12S	49 70P 50K 12S	54 75P 60K 12S	60 85P 65K 12S	63 90P 70K 12S
ð Herbicide (two pass)	26	26	26	26	26
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 214	- 230	- 245	- 261	- 276
MN Cost Estimate { ð Tillage (fall chisel, Spr. Field Cult. (2x))	35	35	35	35	35
MN Cost Estimate { ð Planting, fuel (conventional)	$ 17	17	17	17	17
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 660	- 718	- 784	- 886	- 943
ð **Net Return**	($ 135)	($ 105)	($ 84)	($ 98)	($ 68)
Breakeven Cost/bu.	**$4.40/bu**	**$4.10**	**$3.92**	**$3.94**	**$3.77**

Corn/Bean Rotation No-Till — Corn 2019

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- Equipment (Custom Rates Inc. Labor) & Buildings	- 150	- 171	- 187	- 203	- 219
ð Tillage (fall chisel, Spr. Field Cult. (2x))					
ð Planting, fuel (Conventional)	$ 18	18	18	18	18
ð Fertilizing	5	5	5	5	5
ð Spraying	6	6	6	6	6
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- Management	- 32	- 37	- 42	- 47	- 53
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WI Custom Rate Guide

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ð Tillage (fall chisel, Spr. Field Cult. (2x)) **Depr. & OH**	6	6	6	6	6
ð Planting, fuel (no-till)	$~~18~~ 22	~~18~~ 22	~~18~~ 22	~~18~~ 22	~~18~~ 22
ð Fertilizing	5	5	5	5	5
ð Spraying	6	6	6	6	6
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- Inputs	- 241	-253	- 274	-330	-341
ð Seed ($256 RRCRWCB ($3.20/k))	$ 96 30K	$ 96 30K	$102 32K	$109 34K	$115 36K
ð Fertilizer-Nitrogen (lbs. of N/acre, $.38/lb.)	46 120 lbs.	46 120 lbs.	53 140 lbs.	61 160 lbs.	61 160 lbs.
-P_2O_5($.44/lb) K_2O($.29/lb) SO_4($.28/lb.)	39 55P 40K 12S	49 70P 50K 12S	54 75P 60K 12S	60 85P 65K 12S	63 90P 70K 12S
ð Herbicide (two pass)	~~26~~ 37	~~26~~ 37	~~26~~ 37	~~26~~ 37	~~26~~ 37
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 150	- 171	- 187	- 203	- 219
ð Tillage (fall chisel, Spr. Field Cult. (2x)) **Depr. & OH**	6	6	6	6	6
ð Planting, fuel (no-till)	$ ~~18~~ 22	~~18~~ 22	~~18~~ 22	~~18~~ 22	~~18~~ 22
ð Fertilizing **Tillage Labor Cost?**	5	5	5	5	5
ð Spraying	6	6	6	6	6
ð Hvst,Cart,Fuel,Hndlg	40	42	44	46	48
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 596	- 659	- 726	- 828	- 886
ð **Net Return**	**($ 71)**	**($ 46)**	**($ 26)**	**($ 40)**	**($ 11)**
Breakeven Cost/bu.	**$3.97/bu**	**$3.77**	**$3.63**	**$3.68**	**$3.54**

Corn/Bean Rotation No-Till

Corn 2019

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
ð **Yield History** Crop Insurance 10 year APH					
ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
ð **Expenses**					
- Inputs	- 241	-253	- 274	-330	-341
ð Seed ($256 RRCRWCB ($3.20/k))	$ 96 30K	$ 96 30K	$102 32K	$109 34K	$115 36K
ð Fertilizer-Nitrogen (lbs. of N/acre, $.38/lb.)	46 120 lbs.	46 120 lbs.	53 140 lbs.	61 160 lbs.	61 160 lbs.
-P_2O_5($.44/lb) K_2O($.29/lb) SO_4($.28/lb.)	39 55P 40K 12S	49 70P 50K 12S	54 75P 60K 12S	60 85P 65K 12S	63 90P 70K 12S
ð Herbicide (two pass)	~~26~~ 37	~~26~~ 37	~~26~~ 37	~~26~~ 37	~~26~~ 37
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 150	- 171	- 187	- 203	- 219
ð Tillage (fall chisel, Spr. Field Cult. (2x)) **Depr. & OH**	6	6	6	6	6
ð Planting, fuel (no-till)	$ ~~18~~ 22	~~18~~ 22	~~18~~ 22	~~18~~ 22	~~18~~ 22
ð Fertilizing	5	5	5	5	5
ð Spraying	6	6	6	6	6
ð Hvst,Cart,Fuel,Hndlg	40	42	44	46	48
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 596	- 659	- 726	- 828	- 886
ð **Net Return**	**($ 71)**	**($ 46)**	**($ 26)**	**($ 40)**	**($ 11)**
Breakeven Cost/bu.	**$3.97/bu**	**$3.77**	**$3.63**	**$3.68**	**$3.54**

Tillage Labor Cost?
.2 hr x $28 = $5.60

Economics of No-Till?

Partial Budget Analysis:
Conventional Tillage to No-Till

Positives:

- **Added Income Due to Change**
- **Reduced Costs Due to Change**

- **Net Change:**

Negatives:

- **Added Costs Due to Change**
- **Reduced Income Due to Change**

Partial Budget Analysis: CT to NT

Keep Tillage Equipment

Positives:

- **Added Income Due to Change**
  - No change in yield = $ 0/a
- **Reduced Costs Due to Change**
  - Tillage cost $46 - $6 Depr&OH = $40/a

  Total = $40/a
- **Net Change: $40 - $21 = + $19/acre**

Negatives:

- **Added Costs Due to Change**
  - Increased Herbicide Cost = $11/a
  - Tillage Labor to No-till .2hrx$28 6/a
  - Increased Planting Cost 4/a
- **Reduced Income Due to Change**
  - No change in yield = $ 0/a

  Total = $21/a

Partial Budget Analysis: CT to NT

Keep Tillage Equipment

Positives:

- **Added Income Due to Change**
  - No change in yield = $ 0/a
- **Reduced Costs Due to Change**
  - Tillage cost $46 - $6 Depr&OH = $40/a

  Total = $40/a
- **Net Change: $40 - $21 = + $19/acre**

$19/acre x 1,500 acres = $28,500 annually

Negatives:

- **Added Costs Due to Change**
  - Increased Herbicide Cost = $11/a
  - Tillage Labor to No-till .2hrx$28 6/a
  - Increased Planting Cost 4/a
- **Reduced Income Due to Change**
  - No change in yield = $ 0/a

  Total = $21/a

Partial Budget Analysis: CT to NT

Trade in Tillage Equipment, Increase Acreage (Utilize labor Savings)

Positives:

- Added Income Due to Change
  - No change in yield = $ 0/a
- Reduced Costs Due to Change
  - Tillage cost $46 - ~~$6 Depr&OH~~ = $46/a

  Total = $46/a
- Net Change: $46 - $15 = + $31/acre

Negatives:

- Added Costs Due to Change
  - Increased Herbicide Cost = $11/a
  - Tillage Labor to No-Till .2hrx$28 ~~6/a~~
  - Increased Planting Cost 4/a
- Reduced Income Due to Change
  - No change in yield = $ 0/a

  Total = $15/a

Partial Budget Analysis: CT to NT

Trade in Tillage Equipment, Increase Acreage (Utilize labor Savings)

Positives:

- Added Income Due to Change
  - No change in yield = $ 0/a
- Reduced Costs Due to Change
  - Tillage cost $46 - ~~$6 Depr&OH~~ = $46/a

  Total = $46/a
- Net Change: $46 - $15 = + $31/acre

$31/acre x 1,500 acres = $46,500 annually

Negatives:

- Added Costs Due to Change
  - Increased Herbicide Cost = $11/a
  - Tillage Labor to No-Till .2hrx$28 ~~6/a~~
  - Increased Planting Cost 4/a
- Reduced Income Due to Change
  - No change in yield = $ 0/a

  Total = $15/a

Estimating Machinery Costs

1,500 Acre Grain Farm – 10 yr. Equip. Replacement Cycle
Family Labor-Fixed Family Draw

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- (Taxes)
- Insurance
- Housing & Maint. Facilities

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

List Price _____

Purchase Price _____

Machine Life _____

Annual Use _____

Fuel Price _____

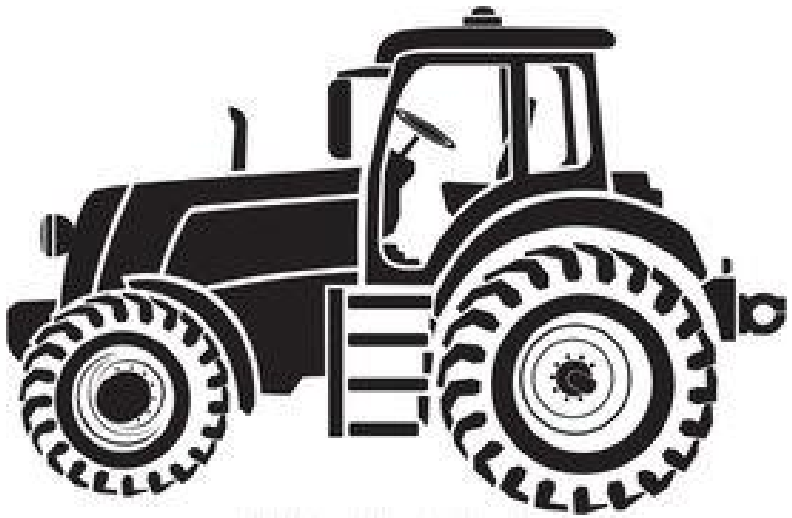
Labor Rate _____

Estimating Machinery Costs

Tractor – 250hp

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- (Taxes)
- Insurance
- Housing & Maint. Facilities

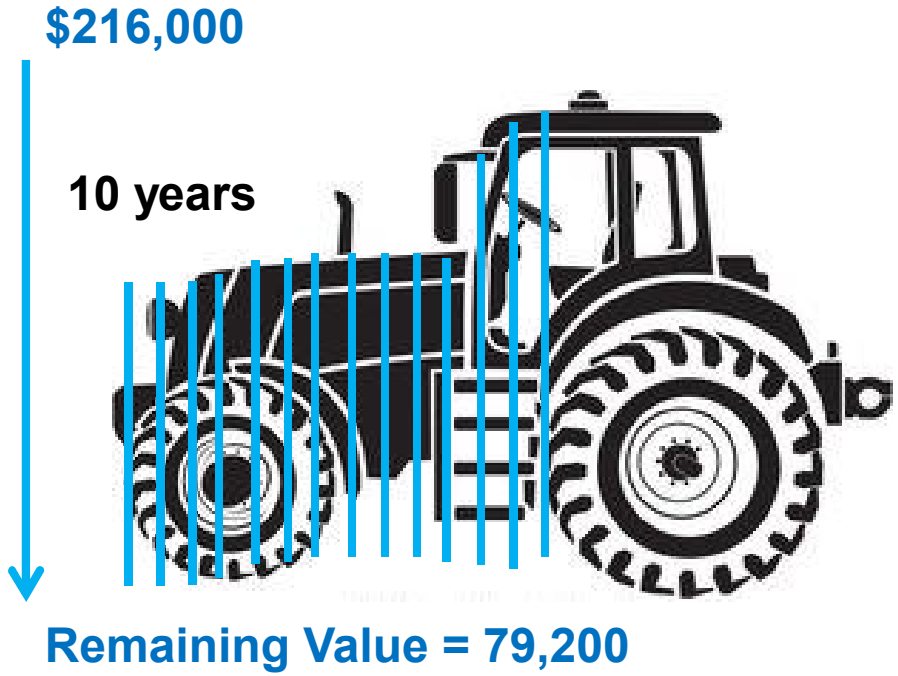


List Price	**$240,000**
Purchase Price	**$216,000**
Machine Life	**10 years**
Annual Use	**200 hours**
Fuel Price	**$2.83/gallon** **$2.00/g**
Labor Rate	**$28.00/hour**

Estimating Machinery Costs

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- (Taxes)
- Insurance
- Housing & Maint. Facilities



Depreciation = $216,000 - $79,200 = $136,800
+ Interest on Remaining Value (Interest Rate = 3%)
Insurance & Housing = 1% of average value

Annual Capital Recovery = $18,382

---------- = 1,476

Total ownership cost/year $19,858

At 200 hrs/yr total ownership cost = $99.29/hr

Estimating Machinery Costs

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

Estimating Machinery Costs

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

Total accumulated repairs = $2,400 for 2000 hrs = $ 1.20/hr
Fuel cost = $ 31.13/hr
Lubrication cost = $ 3.30/hr
Labor cost (1.1 x wage rate $28/hr) = $ 30.80/hr
Total Operating Cost = $ 66.43/hr

Total Ownership Cost = $ 99.29/hr
Total Tractor Cost = $165.72/hr

Estimating Machinery Costs

Planter – 16 Row Interplant

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- (Taxes)
- Insurance
- Housing & Maint. Facilities

Operating (Variable) Costs

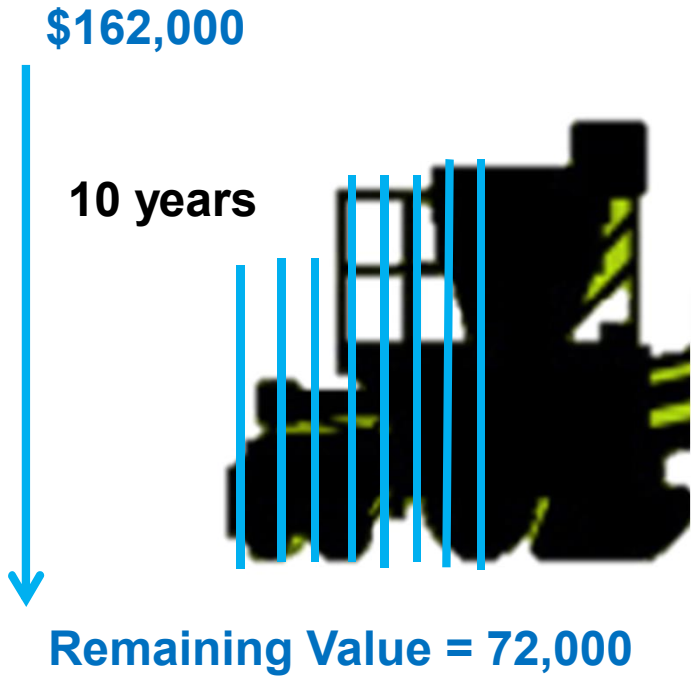
- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

List Price	**$180,000**
Purchase Price	**$162,000**
Machine Life	**10 years**
Annual Use	**90 hours**
Planting Rate	**16.8 a/hr**

Estimating Machinery Costs

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- (Taxes)
- Insurance
- Housing & Maint. Facilities



Depreciation = $162,000 - $72,000 = $90,000
+ Interest on Remaining Value (Interest Rate = 3%) } **Annual Capital Recovery = $12,690**
Insurance & Housing = 1% of average value ---------- **= 1,170**
Total ownership cost/year $13,860
At 90 hrs/yr total ownership cost = $154/hr

Estimating Machinery Costs

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

Total accumulated repairs = $46,800 for 900 hrs = $ 52.00/hr

Total Operating Cost = $ 52.00/hr

Total Ownership Cost = $154.00/hr

Total Planter Cost = $206.00/hr

Estimating Machinery Costs

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- (Taxes)
- Insurance
- Housing & Maint. Facilities

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

Tractor Cost = $165.72/hr
Planter Cost = 206.00/hr
Total Cost = $371.72/hr

Estimating Machinery Costs

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- (Taxes)
- Insurance
- Housing & Maint. Facilities

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

Tractor Cost = $165.72/hr
Planter Cost = 206.00/hr
Total Cost = $371.72/hr

At 16.8 acres/hr = $22.13/a $22/acre

Estimating Machinery Costs

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)
- (Taxes)
- Insurance
- Housing & Maint. Facilities

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator Labor

Tractor Cost = $165.72/hr
Planter Cost = 206.00/hr
Total Cost = $371.72/hr

At 16.8 acres/hr = $22.13/a $22/acre

At 12.0 acres/hr = $31.00/acre

Corn/Bean Rotation

Corn 2019

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
ð **Yield History** Crop Insurance 10 year APH					
ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
ð **Expenses**					
- Inputs	- 241	-253	- 274	-330	-341
ð Seed ($256 RRCRWCB ($3.20/k))	$ 96 30K	$ 96 30K	$102 32K	$109 34K	$115 36K
ð Fertilizer-Nitrogen (lbs. of N/acre, $.38/lb.)	46 120 lbs.	46 120 lbs.	53 140 lbs.	61 160 lbs.	61 160 lbs.
-P_2O_5($.44/lb) K_2O($.29/lb) SO_4($.28/lb.)	39 55P 40K 12S	49 70P 50K 12S	54 75P 60K 12S	60 85P 65K 12S	63 90P 70K 12S
ð Herbicide (two pass)	26	26	26	26	26
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 226	- 242	- 257	- 273	- 288
ð Tillage (fall chisel, Spring Field Cultivator (2x))	46	46	46	46	46
ð Planting-Tractor, Operator, fuel (conventional)	$ 18	18	18	18	18
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 672	- 730	- 796	- 898	- 955
ð **Net Return**	($ 147)	($ 117)	($ 96)	($ 110)	($ 80)
Breakeven Cost/bu.	**$4.48/bu**	**$4.17**	**$3.98**	**$3.99**	**$3.82**

WI Custom Rate Guide

Ave. for SW WI

Corn/Bean Rotation

Corn 2019

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
ð **Yield History** Crop Insurance 10 year APH					
ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
ð **Expenses**					
- Inputs	- 241	-253	- 274	-330	-341
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ð Herbicide (two pass)	26	26	26	26	26
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 226	- 242	- 257	- 273	- 288
WI Custom Rate Guide { ð Tillage (fall chisel, Spr. Field Cult. (2x))	46	46	46	46	46
ð Planting, Operator, Fuel (conventional)	$ 18	18	18	18	18
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
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ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
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- Total Expenses	- 672	- 730	- 796	- 898	- 955
ð **Net Return**	($ 147)	($ 117)	($ 96)	($ 110)	($ 80)
Breakeven Cost/bu.	**$4.48/bu**	**$4.17**	**$3.98**	**$3.99**	**$3.82**

Corn 2019

Corn/Bean Rotation

What Changes with No-Till?

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
ð **Yield History** Crop Insurance 10 year APH					
ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
ð **Expenses**					
- Inputs	- 241	-253	- 274	-330	-341
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ð Herbicide (two pass)	26	26	26	26	26
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 226	- 242	- 257	- 273	- 288
WI Custom Rate Guide ð Tillage (fall chisel, Spr. Field Cult. (2x))	46	46	46	46	46
WI Custom Rate Guide ð Planting, Operator, Fuel (conventional)	$ 18	18	18	18	18
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 672	- 730	- 796	- 898	- 955
ð **Net Return**	($ 147)	($ 117)	($ 96)	($ 110)	($ 80)
Breakeven Cost/bu.	**$4.48/bu**	**$4.17**	**$3.98**	**$3.99**	**$3.82**

Corn/Bean Rotation No-Till — Corn 2019

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
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ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
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ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 181	- 197	- 212	- 228	- 243
WI Custom Rate Guide { ð Tillage (fall chisel, Spr. Field Cult. (2x))	~~46~~	~~46~~	~~46~~	~~46~~	~~46~~
WI Custom Rate Guide { ð Planting, Operator, Fuel (no-till)	$ ~~18~~ 19	~~18~~ 19	~~18~~ 19	~~18~~ 19	~~18~~ 19
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 627	- 685	- 751	- 853	- 910
ð **Net Return**	**($ 102)**	**($ 72)**	**($ 51)**	**($ 65)**	**($ 35)**
Breakeven Cost/bu.	**$4.18/bu**	**$3.91**	**$3.76**	**$3.79**	**$3.64**

Corn/Bean Rotation No-Till — Corn 2019

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
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ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
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ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 181	- 197	- 212	- 228	- 243
WI Custom Rate Guide { ð Tillage (fall chisel, Spr. Field Cult. (2x))	~~46~~	~~46~~	~~46~~	~~46~~	~~46~~
ð Planting, Operator, Fuel (no-till) +$34	$ ~~18~~ 19	~~18~~ 19	~~18~~ 19	~~18~~ 19	~~18~~ 19
ð Fertilizing	5	5	5	5	5
ð Spraying	18	18	18	18	18
ð Hvst,Cart,Fuel,Hndlg	52	54	55	57	58
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- 28	- 28	- 28	- 28	- 28
ð 1.0 Hour @ $28/hr.					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 627	- 685	- 751	- 853	- 910
ð **Net Return**	($ 102)	($ 72)	($ 51)	($ 65)	($ 35)
Breakeven Cost/bu.	**$4.18/bu**	**$3.91**	**$3.76**	**$3.79**	**$3.64**

Economics of No-Till

Comparison of cash, noncash, variable and fixed costs

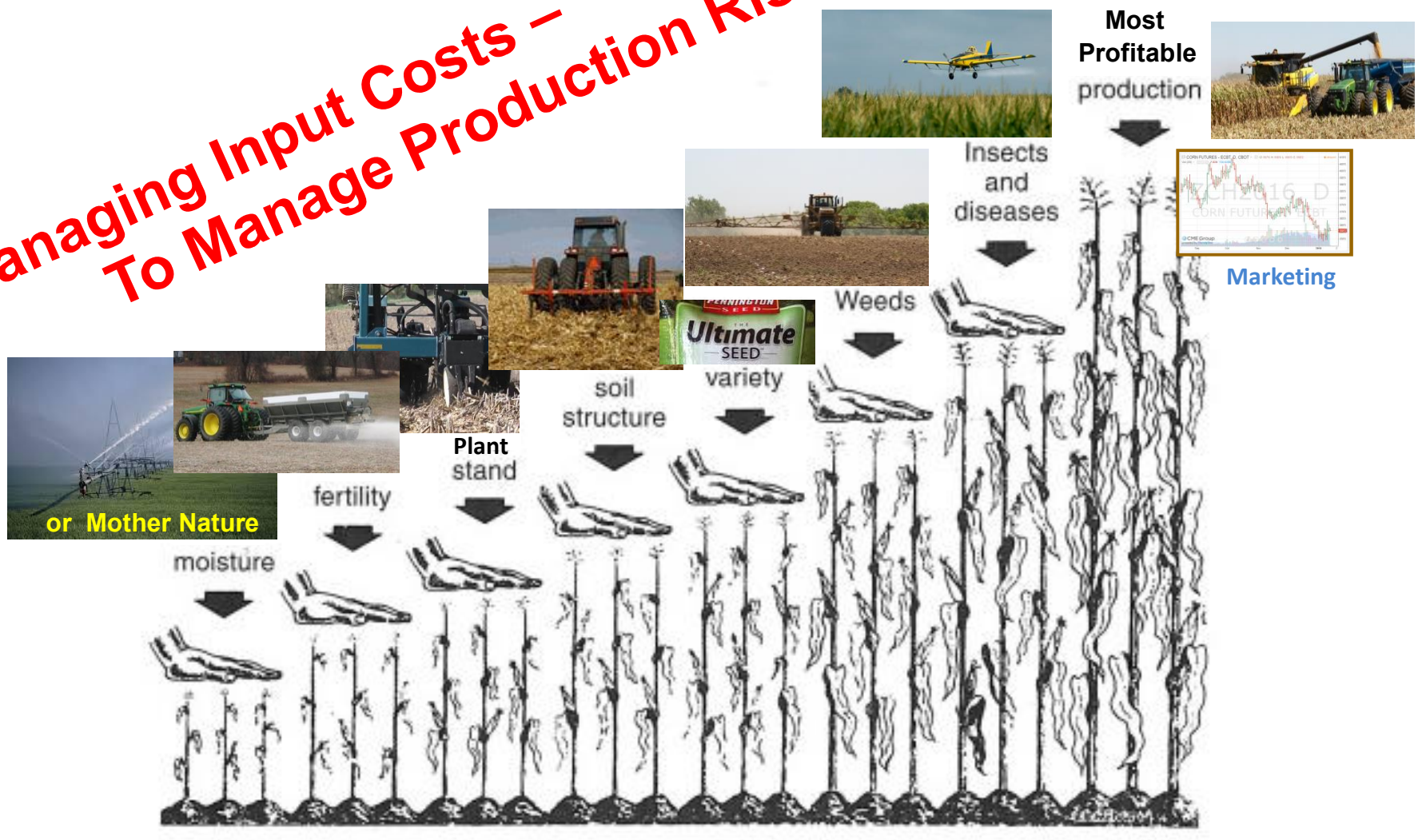
	Cash cost	Noncash cost
Variable cost	Fuel, seed, fertilizer, herbicides, equipment repair, hired labor	Some tractor depreciation and interest
Fixed cost	Property tax, insurance, self-employed labor (Family Living/Family Draw)	Some tractor depreciation, implement depreciation and interest, land charge

Depreciation with Use

Depreciation with Age

Family Labor ('skilled') - $28/hr

Evaluating No-Till



Source: Potash and Phosphate Institute.

What will Change with No-Till?

Revenue = **Yield** x Price

How to Use Your Costs

- Costs

Cash Inputs — Variable Costs
Interest

Equip. & Bldgs. — Fixed Costs
Land Cost

Labor — (Family Living)
Management

Variable Costs + Fixed Costs + (Family Living) = **Cost of Prod.**
Breakeven Price

= Net Return


Interested in Soil Health?

Cover crops and Soil Loss

Chisel Plow 5.4 ton/a Soil Loss

No-Till 2.1 ton/a Soil Loss

3.3 Tons Reduced Soil Loss

Tillage	Cover Crop	Soil Loss (ton/ac/yr
No-till	None	2.1
	Aerially-applied	0.1
	Drill-seeded	1.1
Chisel plow	None	5.4
	Aerially-applied	1.5
	Drill-seeded	2.2

Cover crops and Soil Loss

Chisel Plow 5.4 ton/a Soil Loss

No-Till 2.1 ton/a Soil Loss

3.3 T Reduced Soil Loss

3.3 ton x $12.80/ton = $42.24

Saving in reduced nutrient loss

Tillage	Cover Crop	Soil Loss (ton/ac/yr
No-till	None	2.1
	Aerially-applied	0.1
	Drill-seeded	1.1
Chisel plow	None	5.4
	Aerially-applied	1.5
	Drill-seeded	2.2

Rye Cover Crop Effects on Soil Quality in No-Till Corn Silage–Soybean Cropping Systems

Soil Sci. Soc. Am. J. 78:968–976

9-years: Cover crop (rye) every year or no cover crop

- At end of 9 years:
- Organic matter increase from 4.9 to 5.7 %
- Increased N supply from the soil by 38%
- Slight yield advantage for corn silage (0.5 to 1 ton/ac)
- Potential yield increase with soybeans (0-5 bu/ac)

In a Rainstorm

Estimating Machinery Costs

Ownership (Fixed) Costs

- Depreciation
- Interest (Opportunity Cost)(Taxes)
- Insurance
- Housing & Maint. Facilities

Operating (Variable) Costs

- Repairs
- Maintenance
- Fuel
- Lubrication
- Operator

$70,000
$6.04/a

$376,000 (2 heads)
$29.17/a corn $20.77/a beans

$45,000
$14.63/a

Value of Soil Organic Matter

Assumptions: 2,000,000 pounds soil in top 6 inches
1% organic matter = 20,000#

Nutrients Content:

- Nitrogen: 1000#
- Phosphorous: 100#
- Potassium: 100#
- Sulfur: 100#
- Carbon: 10,000# or 5 ton

* $0.50/#N = $500
* $0.48/#P = $ 48
* $0.42/#K = $ 42
* $0.50/#S = $ 50
* $2/Ton = $ 10

Value of 1% SOM Nutrients/Acre = $650

Jim Kinsella/Terry Taylor (2006) Jim Hoorman (2011)

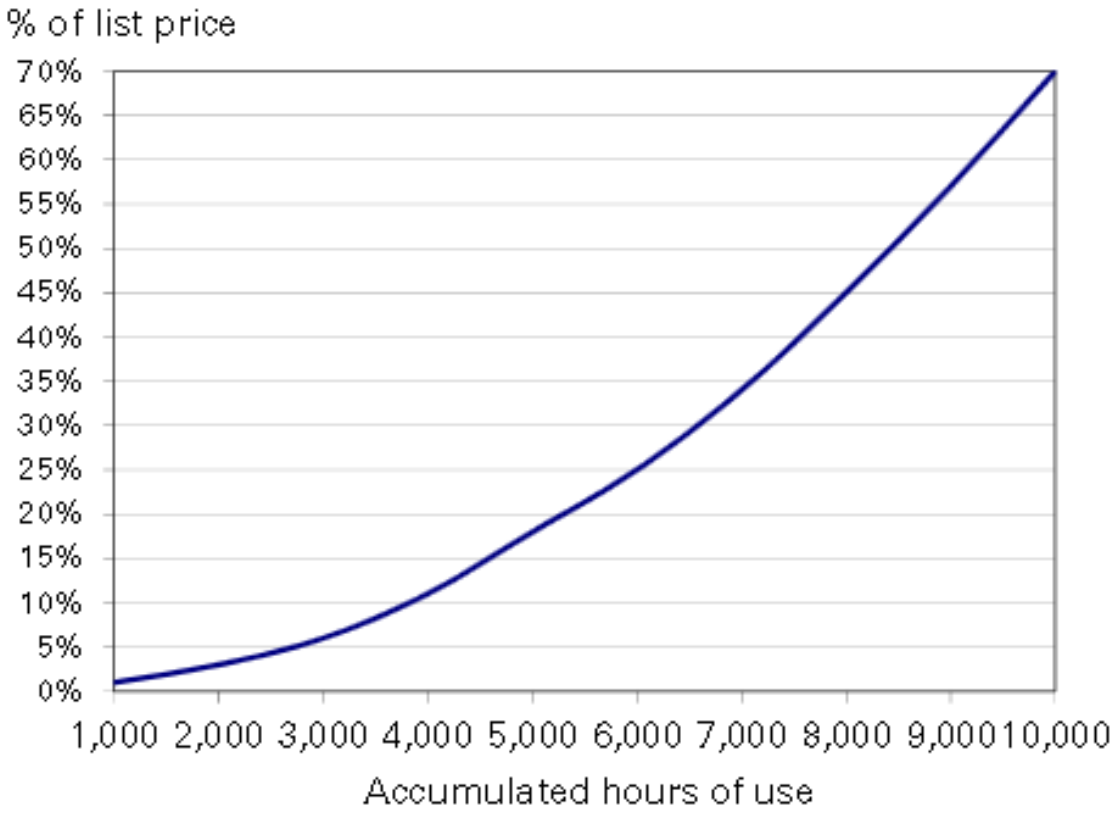
Cover crops and Soil Loss

- Edmund Clay Loam, 4% slope
- T = 2 ton/ac/yr
- Continuous corn silage rotation
- Cover crops (rye) drilled in October

Tillage	Cover Crop	Soil Loss (ton/ac/yr
No-till	None	2.1
	Aerially-applied	0.1
	Drill-seeded	1.1
Chisel plow	None	5.4
	Aerially-applied	1.5
	Drill-seeded	2.2

Estimating Machinery Costs

Figure 1. Accumulated repair costs for two-wheel drive tractor.



Corn/Bean Rotation No-Till

Corn 2019

	150 bu.	175 bu.	200 bu.	225 bu.	250 bu.
ð **Yield History** Crop Insurance 10 year APH					
ð **Income** $3.50/bu. (ave. cash price 2019)	$525	$613	$700	$788	$875
ð **Expenses**					
- Inputs	- 241	-253	- 274	-330	-341
ð Seed ($256 RRCRWCB ($3.20/k))	$ 96 30K	$ 96 30K	$102 32K	$109 34K	$115 36K
ð Fertilizer-Nitrogen (lbs. of N/acre, $.38/lb.)	46 120 lbs.	46 120 lbs.	53 140 lbs.	61 160 lbs.	61 160 lbs.
-P_2O_5($.44/lb) K_2O($.29/lb) SO_4($.28/lb.)	39 55P 40K 12S	49 70P 50K 12S	54 75P 60K 12S	60 85P 65K 12S	63 90P 70K 12S
ð Herbicide (two pass)	~~26~~ 37	~~26~~ 37	~~26~~ 37	~~26~~ 37	~~26~~ 37
ð Insecticide ($20)					
ð Fungicide w/application ($32)				32	32
ð Crop Insurance	24	26	28	30	32
ð Operating Loan Interest	10	10	11	12	12
- Equipment (Custom Rates Inc. Labor) & Buildings	- 150	- 171	- 187	- 203	- 219
ð Tillage (fall chisel, Spr. Field Cult. (2x)) **Depr. & OH**	6	6	6	6	6
ð Planting, fuel (no-till)	$ ~~18~~ 22	~~18~~ 22	~~18~~ 22	~~18~~ 22	~~18~~ 22
ð Fertilizing	5	5	5	5	5
ð Spraying	6	6	6	6	6
ð Hvst,Cart,Fuel,Hndlg	40	42	44	46	48
ð Drying 8 pts, $.03/pt	36	42	48	54	60
ð Storage $.02/bu 6 mo.	18	21	24	27	30
ð Trucking $.16/bu	24	28	32	36	40
ð Miscellaneous	9	10	11	12	13
- Land Charge (rent)	- 145	- 170	- 195	- 220	- 245
ð Opportunity Cost, Loan, Taxes, Ins.					
- Labor	- ~~28~~ 34	- ~~28~~ 34	- ~~28~~ 34	- ~~28~~ 34	- ~~28~~ 34
ð 1.0 Hour @ $28/hr. **1.2 Hours @ $28/hr**					
- Management	- 32	- 37	- 42	- 47	- 53
ð 6% of gross revenue					
- Total Expenses	- 596	- 659	- 726	- 828	- 886
ð **Net Return**	**($ 71)**	**($ 46)**	**($ 26)**	**($ 40)**	**($ 11)**
Breakeven Cost/bu.	**$3.97/bu**	**$3.77**	**$3.63**	**$3.68**	**$3.54**

Economics of No-Till

Partial Budget Analysis:
Conventional Tillage to No-Till

Several Possible Farm Scenarios:

Family Labor/Fixed Family Draw – Tillage operations by family Labor

Economics of No-Till

Ted Bay

UW-Extension Crops & Farm Management Agent-Retired

Save Money, Time, & Soil:

The Economics of No-Till

Ted Bay UW-Extension-Ret

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Value of 1% SOM Nuts./Acre = $650/20,000#=$.0325/lb.

Jim Kinsella/Terry Taylor (2006) Jim Hoorman (2011)