ABCs of Farming

Activity Based Costing

What Is It? - Activity based approach to tracking cost of production

Examples

- Crop Operation:
  - Pre-plant ground preparation
  - Seeding/Fertilization
  - Pest Control
  - Harvest
  - Post Harvest Land
- Hog Operation:
  - Breeding
  - Farrowing
  - Weaner
  - Finishing

Hay Harvest Example:

- Swathing
- Raking
- Turning
- Baling
- Hauling & Stacking
- Tarping

Value of Information

- Identifies costs of each activity
- Enables comparison to:
  - Industry or competitor costs
  - Custom rates
- Helps identify alternatives to optimize
  - "In-source/out-source" decision
  - Farming/ranching practices
- Establishes basis for pricing
  - hiring or providing custom services

Costs/Acre* - Conventional Seeding - Spring Peas

Operation	Cost/Acre
Fall Plow	$18.00
Spring Harrow	3.50
Spring Cultivate	5.00
Cultivate/Spray Incorporate	6.50
2nd Incorporation-Cultivator	5.00
Seed-Conventional Drill	12.00
Harrow	3.50
Roller/Packer	3.00
Total Costs Per Acre	$56.50

Costs derived from activity based accounting/industry standard rates

Costs/Acre* - Direct Seeded Spring Peas

Operation	Cost/Acre
Fall Heavy Harrow	$4.00
Fall Roundup-Green Bridge	7.00
Custom Hire-Direct Seed Drill	17.00
Harrow	3.00
Roller/Packer	3.00
Total Costs Per Acre	$35.50

Savings/Ac = $21

Other Qualitative Factors: less water loss, less compaction, less erosion risk

Costs derived from industry standard rates

Information Needed to Do Analysis

- Ownership costs
  - Cost of power unit/implement
  - Planning Horizon/useful life
  - Salvage value
  - Cost of capital or borrowing
  - Insurance & housing costs
  - Tax rates
- WARNING: Use YOUR costs
  - NOT economic costs from someone else's data
  - NOT replacement cost
- Annual usage of power unit – all operations
- Operating costs
  - Fuel
    - Consumption/hour
    - Cost of fuel
  - Labor cost
    - Primary operators
    - Support personnel
  - Repairs and Maintenance
  - Other Equip Support Overhead Costs (combine labor vs parts example)
- Productivity of Operation
  - Working width
  - Speed
  - Field efficiency %

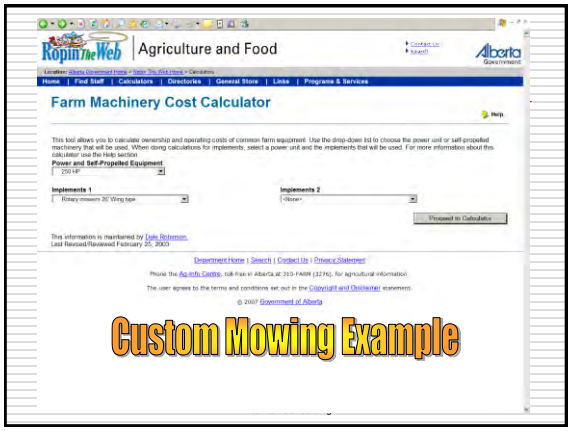
Common Applications for Analysis

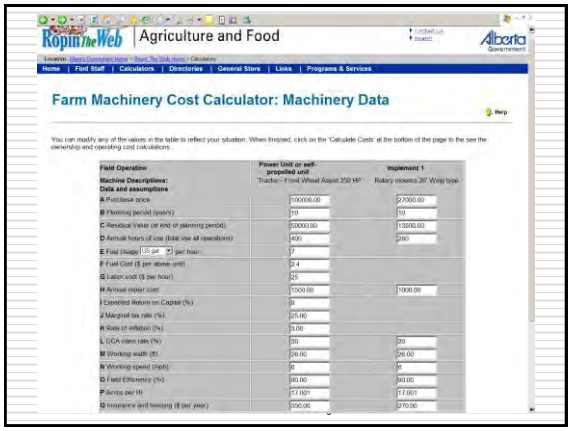
No Tillers

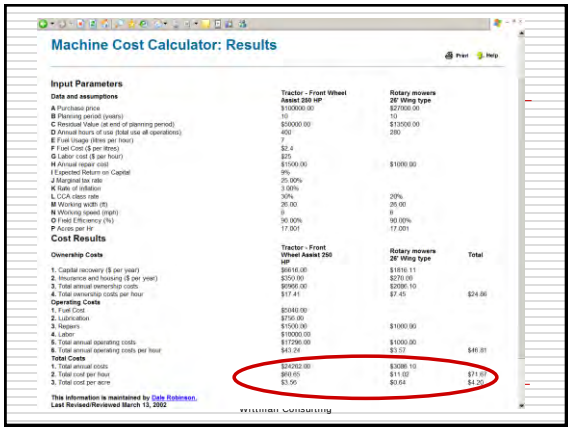
- Mowing
- Spraying
- No till drill operation

Hay Growers

- Swathing
- Raking/Turning
- Baling







Machine Cost Calculator: Results

Print Help

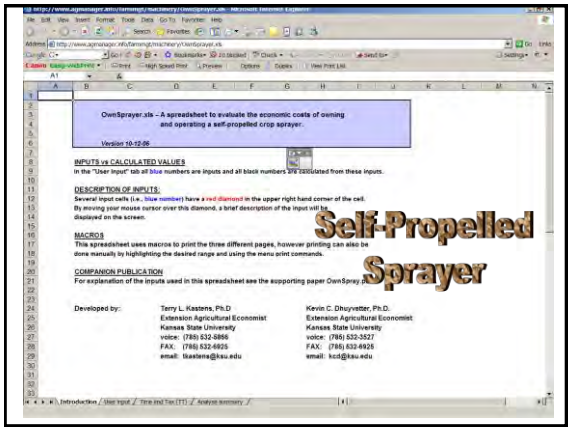
Input Parameters

Data and assumptions	Tractor - Front Wheel Assist 250 HP	Rotary mowers 20' Wing type
A Purchase price	$100000.00	$27000.00
B Planning period (years)	10	10
C Residual Value (at end of planning period)	$50000.00	$13000.00
D Annual hours of use (total use all operations)	400	200
E Fuel Usage (litres per hour)	7	
F Fuel Cost ($ per litres)	$2.4	
G Labor cost ($ per hour)	$25	
H Annual repair cost	$1500.00	$1000.00
I Expected Return on Capital	9%	
J Marginal tax rate	25.00%	
K Rate of inflation	3.00%	
L CCA class rate	30%	20%
M Working width (ft)	26.00	25.00
N Working speed (mph)	9	6
O Field Efficiency (%)	90.00%	90.00%
P Acres per Hr	17.001	17.001

Cost Results

Ownership Costs	Tractor - Front Wheel Assist 250 HP	Rotary mowers 20' Wing type	Total
1. Capital recovery ($ per year)	$6616.00	$1816.11	
2. Insurance and housing ($ per year)	$350.00	$270.00	
3. Total annual ownership costs	$6966.00	$2086.10	
4. Total ownership costs per hour	$17.41	$7.45	$24.86
Operating Costs			
1. Fuel Cost	$2040.00		
2. Lubrication	$750.00		
3. Repairs	$1500.00	$1000.00	
4. Labor	$10000.00		
5. Total annual operating costs	$17290.00	$1000.00	
6. Total annual operating costs per hour	$43.24	$3.57	$46.81
Total Costs			
1. Total annual costs	$24262.00	$3086.10	
2. Total cost per hour	$60.65	$11.02	$71.67
3. Total cost per acre	$3.56	$0.64	$4.20

This information is maintained by Dale Robinson.
Last Revised/Reviewed March 13, 2002



OwnSprayer.xls - A spreadsheet to evaluate the economic costs of owning and operating a self-propelled crop sprayer.

Version 10-12-06

INPUTS vs CALCULATED VALUES
In the "User Input" tab all blue numbers are inputs and all black numbers are calculated from these inputs.

DESCRIPTION OF INPUTS:
Several input cells (i.e., blue number) have a red diamond in the upper right hand corner of the cell. By moving your mouse cursor over this diamond, a brief description of the input will be displayed on the screen.

MACROS
This spreadsheet uses macros to print the three different pages, however printing can also be done manually by highlighting the desired range and using the menu print commands.

COMPANION PUBLICATION
For explanation of the inputs used in this spreadsheet see the supporting paper OwnSprayer.pdf

Self-Propelled Sprayer

Developed by:

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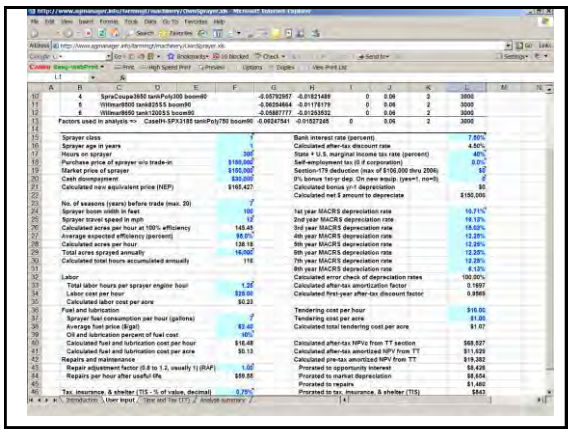
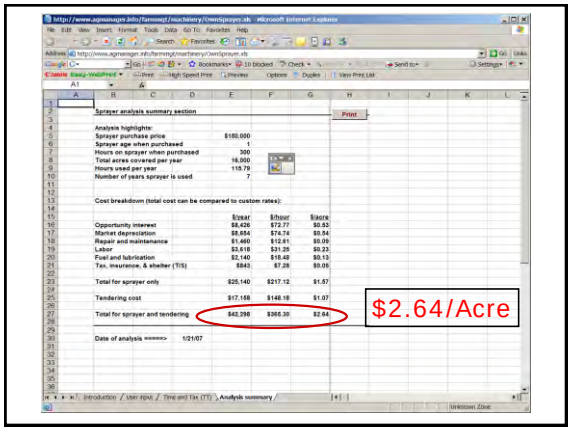
Introduction / User Input / Time and Tax (TT) / Analysis summary /



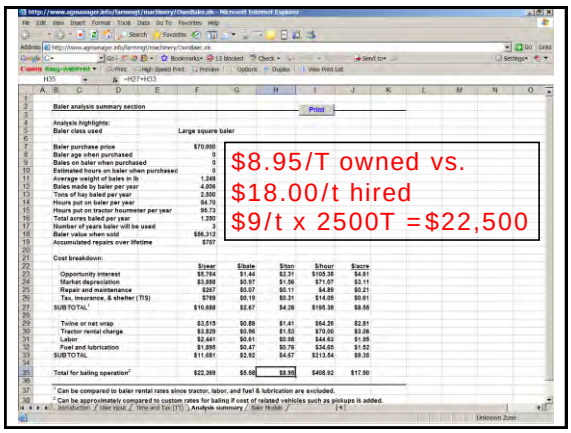
10	4	SpraCoupe3650 tank Poly300 boom80		-0.05792957	-0.01821489	0	0.06	2	3000	
11	5	Wilmar8500 tank82555 boom90		-0.06356464	-0.01176179	0	0.06	2	3000	
12	6	Wilmar8650 tank120355 boom90		-0.05887777	-0.01253502	0	0.06	2	3000	
13	Factors used in analysis =>		Case IH-SPX3185 tankPoly750 boom90		-0.06247541	-0.01537245	0	0.06	2	3000

Sprayer class	7	Bank interest rate (percent)	7.50%
Sprayer age in years	1	Calculated after-tax discount rate	4.50%
Hours on sprayer	200	State + U.S. marginal income tax rate (percent)	40%
Purchase price of sprayer w/o trade-in	$160,000	Self-employment tax (0 if corporation)	0.0%
Market price of sprayer	$160,000	Section-179 deduction (max of $106,000 thru 2006)	$0
Cash downpayment	$30,000	0% bonus 1st-yr dep. On new equip. (yes=1, no=0)	0
Calculated new equivalent price (NEP)	$165,427	Calculated bonus yr-1 depreciation	$0
		Calculated net $ amount to depreciate	$150,000
No. of seasons (years) before trade (max. 20)	7		
Sprayer boom width in feet	100	1st year MACRS depreciation rate	10.71%
Sprayer travel speed in mph	12	2nd year MACRS depreciation rate	19.13%
Calculated acres per hour at 100% efficiency	145.46	3rd year MACRS depreciation rate	15.02%
Average expected efficiency (percent)	95.0%	4th year MACRS depreciation rate	12.23%
Calculated acres per hour	138.18	5th year MACRS depreciation rate	12.23%
Total acres sprayed annually	16,000	6th year MACRS depreciation rate	12.23%
Calculated total hours accumulated annually	116	7th year MACRS depreciation rate	12.28%
		8th year MACRS depreciation rate	6.13%
Labor		Calculated error check of depreciation rates	100.00%
Total labor hours per sprayer engine hour	1.20	Calculated after-tax amortization factor	0.1697
Labor cost per hour	$18.00	Calculated first-year after-tax discount factor	0.8969
Calculated labor cost per acre	$0.23		
Fuel and lubrication		Tendering cost per hour	$10.00
Sprayer fuel consumption per hour (gallons)	7	Tendering cost per acre	$1.00
Average fuel price ($/gal)	$2.40	Calculated total tendering cost per acre	$1.07
Oil and lubrication percent of fuel cost	18%		
Calculated fuel and lubrication cost per hour	$16.48	Calculated after-tax NPVs from TT section	$68,527
Calculated fuel and lubrication cost per acre	$0.13	Calculated after-tax amortized NPV from TT	$11,629
Repairs and maintenance		Calculated pre-tax amortized NPV from TT	$19,382
Repair adjustment factor (0.0 to 1.2, usually 1) (RAF)	1.00	Prorated to opportunity interest	$8,426
Repairs per hour after useful life	$69.55	Prorated to market depreciation	$8,654
		Prorated to repairs	$1,480
Tax, insurance, & shelter (TIS - % of value, decimal)	0.78%	Prorated to tax, insurance, & shelter (TIS)	$643

Introduction / User Input / Time and Tax (TT) / Analysis summary /

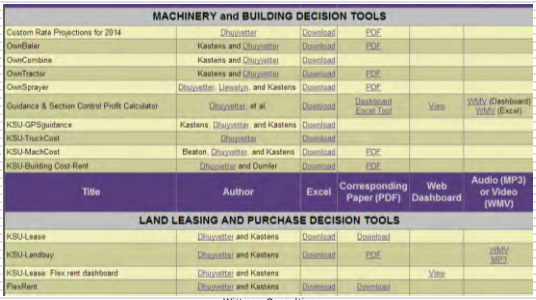


Let's examine a baler purchase analysis…using Ag Manager



Equipment & Land Decisions

www.agmanager.info/tools/default.asp#LAND



MACHINERY and BUILDING DECISION TOOLS					
Custom Rate Projections for 2014	Dhuyvetter	Download	PDF		
OwnBaler	Kastens and Dhuyvetter	Download	PDF		
OwnCombine	Kastens and Dhuyvetter	Download			
OwnTractor	Kastens and Dhuyvetter	Download	PDF		
OwnSprayer	Dhuyvetter, Llewelyn, and Kastens	Download	PDF		
Guidance & Section Control Profit Calculator	Dhuyvetter, et al	Download	Dashboard Excel Tool	View	WMV (Dashboard) WMV (Excel)
KSU-GPSguidance	Kastens, Dhuyvetter, and Kastens	Download			
KSU-TruckCost	Dhuyvetter	Download			
KSU-MachCost	Beaton, Dhuyvetter, and Kastens	Download	PDF		
KSU-Building Cost-Rent	Dhuyvetter and Dumler	Download	PDF		
Title	**Author**	**Excel**	**Corresponding Paper (PDF)**	**Web Dashboard**	**Audio (MP3) or Video (WMV)**
LAND LEASING AND PURCHASE DECISION TOOLS					
KSU-Lease	Dhuyvetter and Kastens	Download	Download		
KSU-Landbuy	Dhuyvetter and Kastens	Download	PDF		WMV MP3
KSU-Lease: Flex rent dashboard	Dhuyvetter and Kastens			View	
FlexRent	Dhuyvetter and Kastens	Download	Download		

Challenges to ABC

- Predicting obsolescence, econ deprec
- Estimating inflation in capital replacement costs & technology change
- Which pricing strategy is right?
  - Cover actual costs + margin, or
  - Cover replacement costs + margin
- Capturing indirect OH/support costs essential to specific equip operations

Conclusions

- Critical information for making incremental decisions - expansion
- Identifies when it's best to in-source vs. outsource
- Sets accurate base for pricing in custom work & trade relationships
- Can be reasonable alternative to cost center tracking & allocation approach

Resources

- Machinery Cost Calculator – Alb Ag
  www.agric.gov.ab.ca/app24/costcalculators/machinery
- AG Manager Information – Kansas St
  www.agmanager.info/farmmgt/machinery
- Machinery Cost Calculator – Iowa State (William Edwards)
  www.extension.iastate.edu/agdm/crops/xls/a3-21_35machfinancing.xls