

18. Hands-On: Using Excel Effectively

Rich Llewelyn

<rvl@ksu.edu>

Rich Llewelyn is an Extension Assistant in the Department of Agricultural Economics at K-State. Raised on a farm near Riley, KS, he is a three-time graduate of K-State with a B.S. degree in Agronomy, and a Masters and PhD in Agricultural Economics. He then spent 13 years teaching economics and working with urban and rural community development in East Java, Indonesia before returning to Kansas in 2006 to work with the AgManager.info website and departmental conferences, including the Risk and Profit conference. He has also taught the "Price Analysis and Forecasting" course for undergraduate students and uses Excel in class as well as for a multitude of uses.

Abstract/Summary

The ability to use Excel spreadsheets allows users to have the capability to benefit from the many Excel calculators and tools publicly available. This two-hour workshop will provide hands-on Excel training. The workshops will use laptop computers to allow participants to create their own spreadsheets. Various spreadsheets will be created which will teach the following skills: creating appropriate mathematical formulae and using the correct functions, linking between sheets, using absolute and relative references, formatting, copying, look-up tables, and what-if analysis. In addition, a portion of the session will introduce several of the Excel tools on the AgManager.info website.



Kansas State University

Using Excel Spreadsheets Effectively

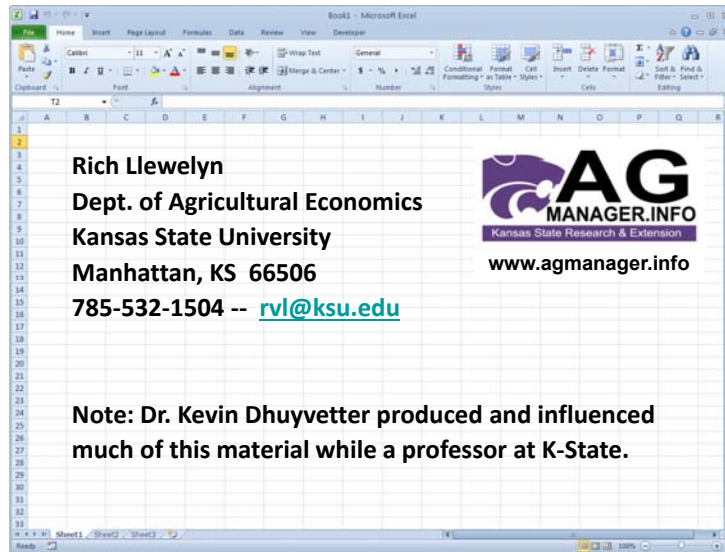


Using Excel for:
• Estimating Machinery Costs
• Budgeting and Enterprise Analysis
• Calculating Principal and Interest Payments
• Analysis of Livestock Economics

As well as:
• Tips and Tricks for Using Excel
• Other Decision Tools on AgManager.info

Kansas State University
Department of Agricultural Economics

Using Excel Spreadsheets Effectively MAST 2015-2016



Types of software applications...

- Word processor
- Accounting
- Spreadsheet
- Communications
- Presentations
- Statistical/numerical
- Database
- GIS
- Publishing
- Adobe acrobat (PDF)
- Other

Types of software applications...

It is important to have the right software/tool for the job at hand...

... however, the capabilities of many software programs often overlap, so it generally will not be necessary to have every type of software program.

Spreadsheets – the world runs on spreadsheets!

Major spreadsheets available

- Excel (Microsoft)
- Lotus (IBM)
- Quattro Pro (Corel)

All three have similar capabilities and are “reasonably” compatible.

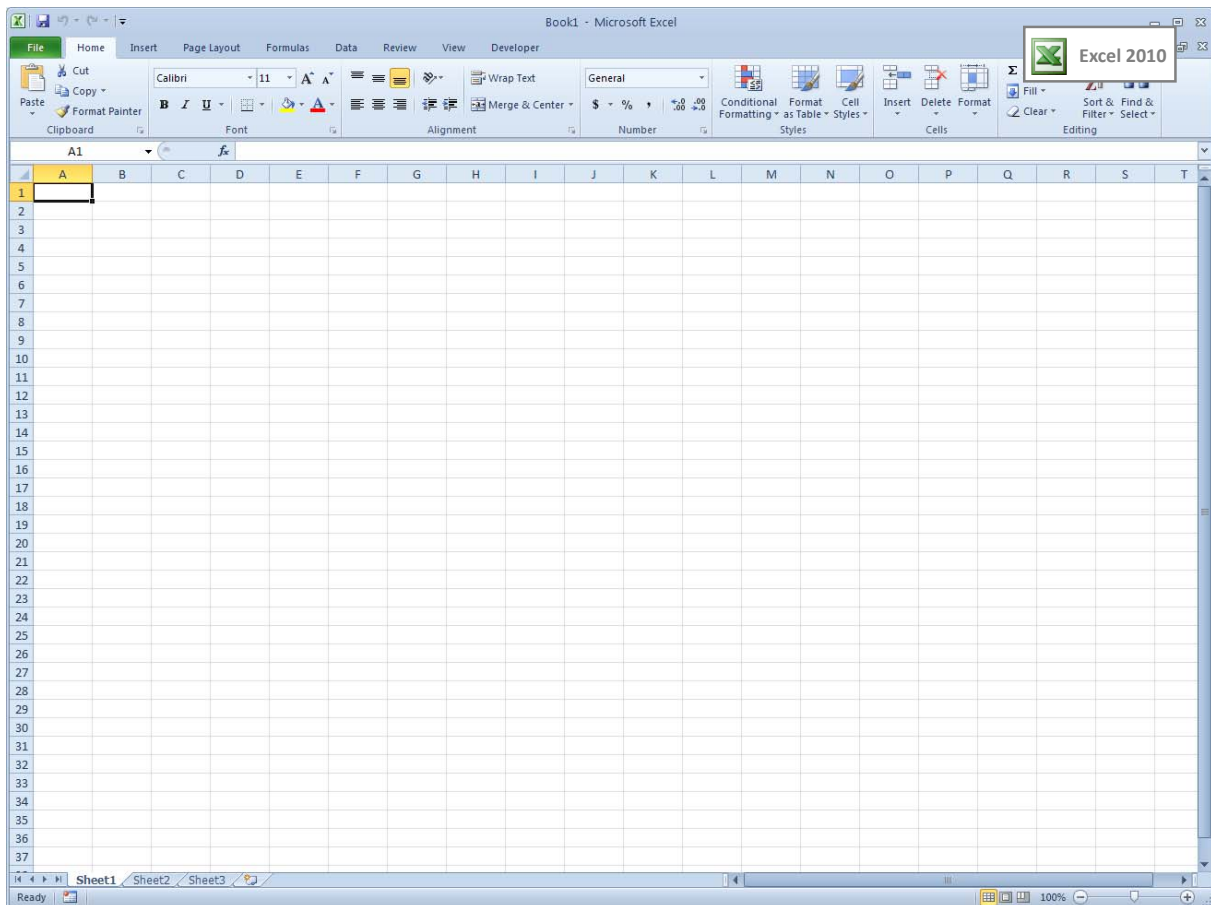
Spreadsheets...

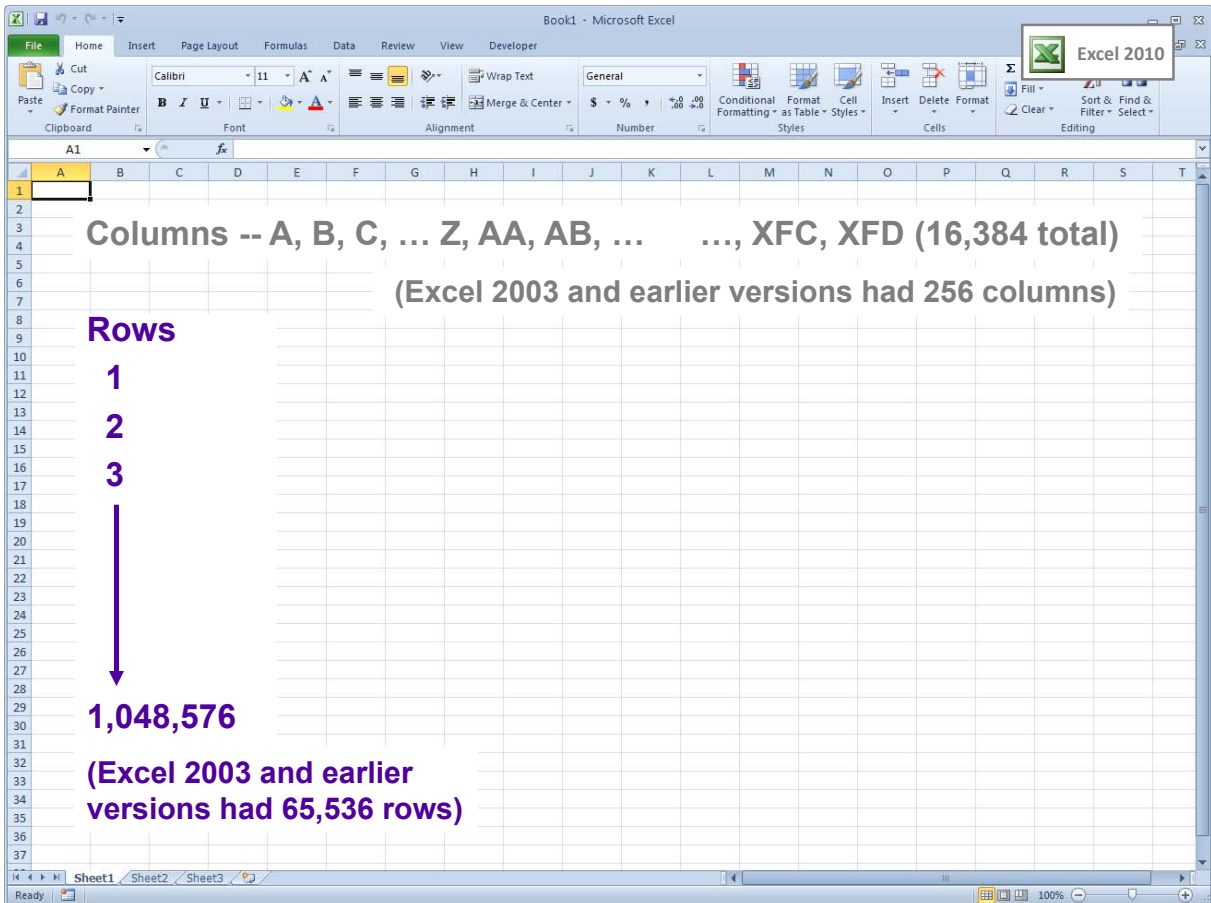
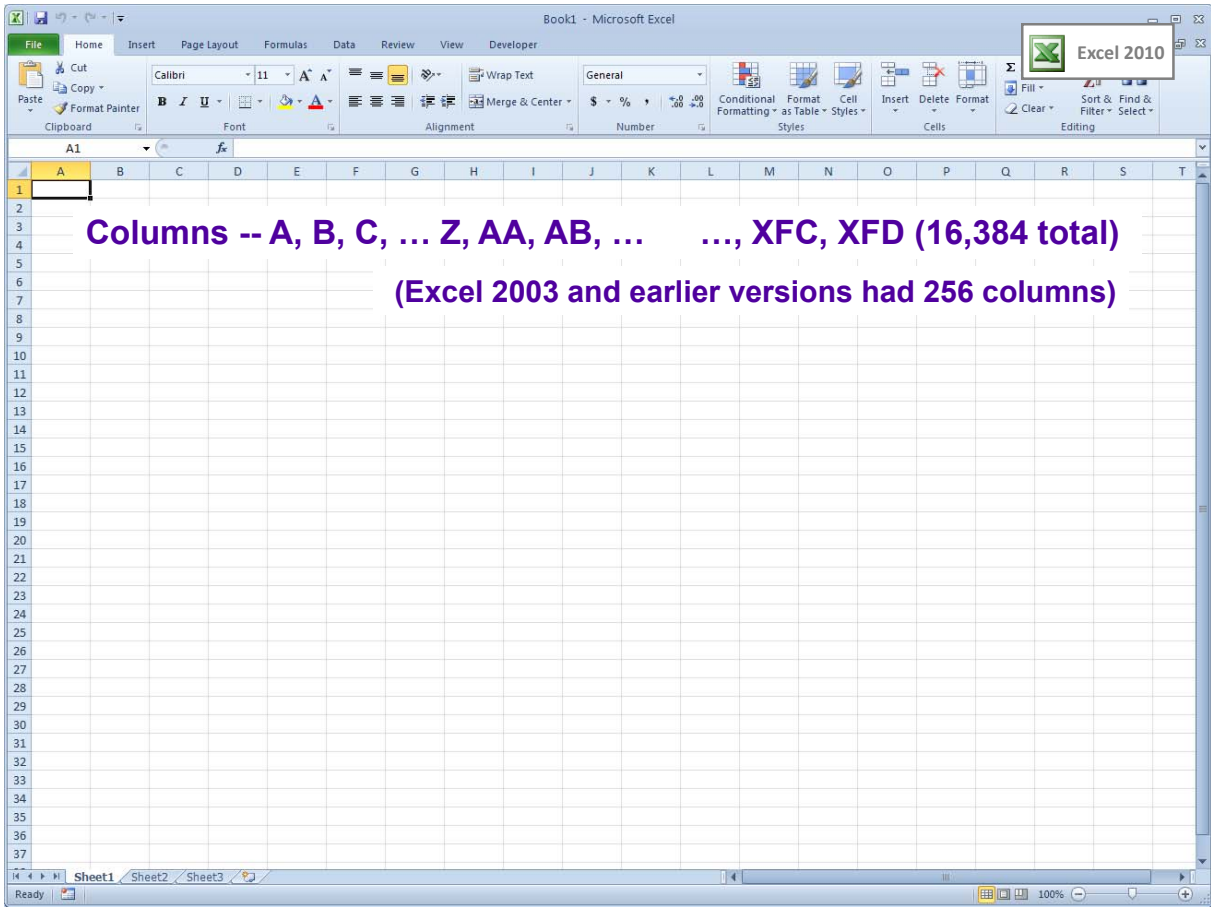
Replace calculator/worksheets

Very useful for ...

- Budgeting (“what if analysis”)
- Data storage/analysis
- Financial/production reports
- Anything numbers oriented

Advantage: numerical visualization





Columns -- A, B, C, ... Z, AA, AB,, XFC, XFD (16,384 total)
(Excel 2003 and earlier versions had 256 columns)

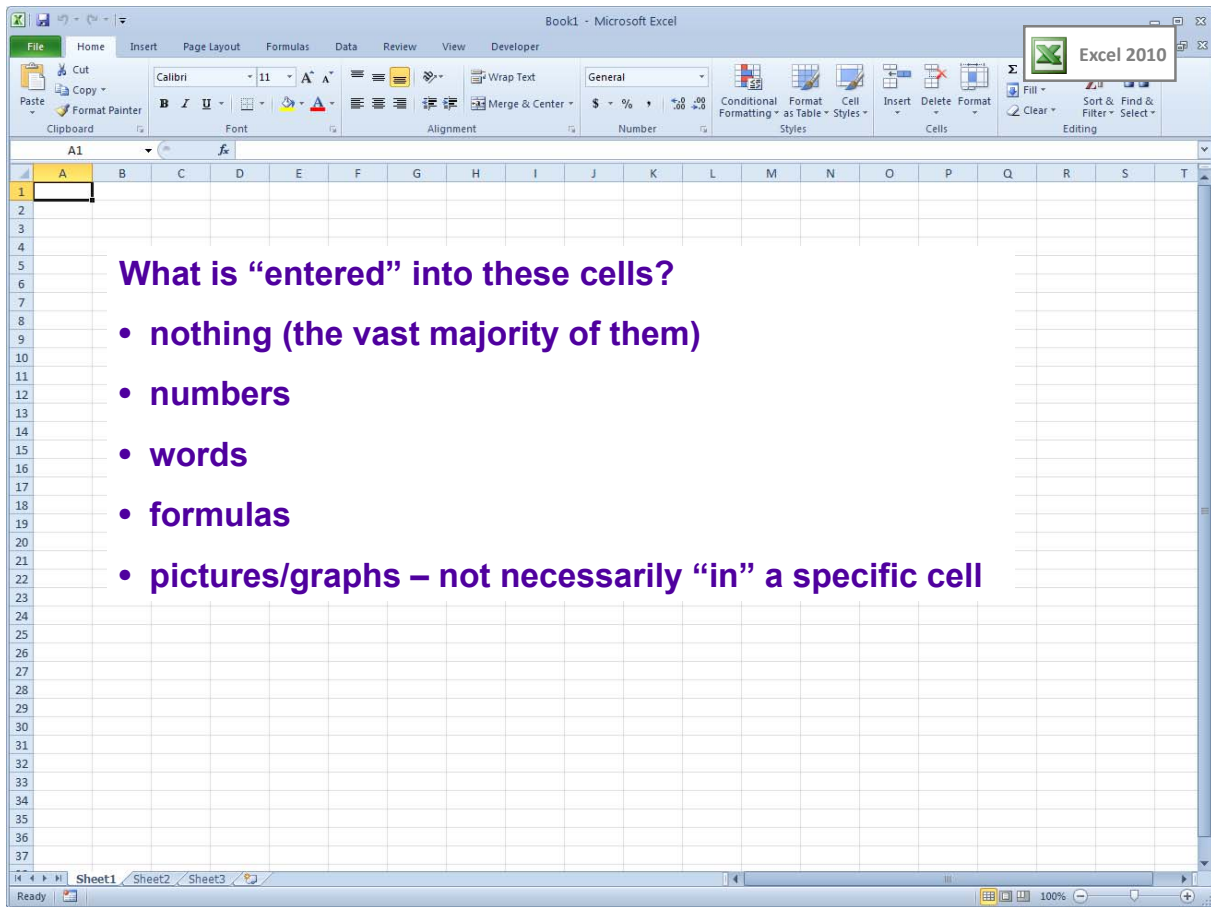
Rows
1
2
3
↓
1,048,576
(Excel 2003 and earlier versions had 65,536 rows)

Total unique cells in a sheet is
 $16,384 \times 1,048,576$
 $= 17,179,869,184$

The screenshot shows the Microsoft Excel 2010 interface. The ribbon includes File, Home, Insert, Page Layout, Formulas, Data, Review, View, and Developer. The ribbon tabs are Clipboard, Font, Alignment, Number, Conditional Formatting, Styles, Cell Styles, Insert, Delete, Format, Fill, Clear, Sort & Filter, and Editing. The worksheet grid shows columns A through T, with a tooltip for column XFD indicating 16,384 total columns. The row numbers 1 through 37 are visible on the left, with a tooltip for row 1,048,576 indicating the total number of rows. The status bar at the bottom shows 'Ready' and '100%' zoom.

Multiple "sheets" (also referred to as "tabs" or "pages") can exist within a file – limited by available memory...

The screenshot shows the Microsoft Excel 2010 interface. The ribbon includes File, Home, Insert, Page Layout, Formulas, Data, Review, View, and Developer. The ribbon tabs are Clipboard, Font, Alignment, Number, Conditional Formatting, Styles, Cell Styles, Insert, Delete, Format, Fill, Clear, Sort & Filter, and Editing. The worksheet grid shows columns A through T. The status bar at the bottom shows 'Ready' and '100%' zoom. Three purple arrows point from the text to the sheet tabs at the bottom of the window, which are labeled 'Sheet1', 'Sheet2', and 'Sheet3'.

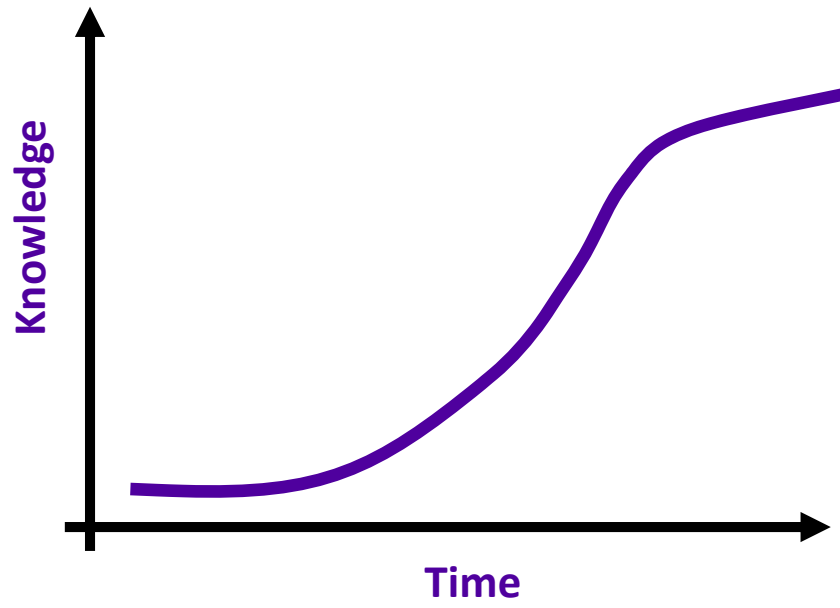


Spreadsheets...

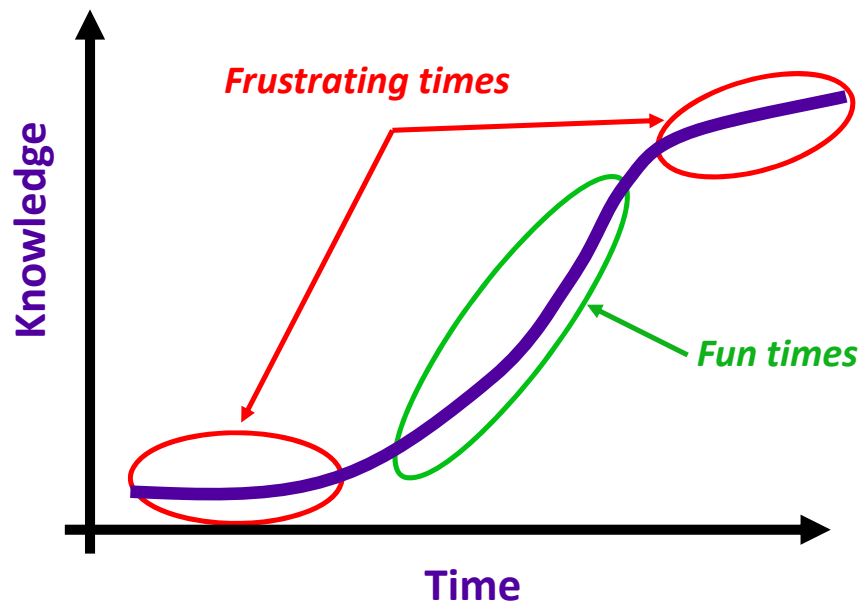
Don't limit your thinking!!!

The capabilities of spreadsheets are much greater than most people realize!

Hypothetical learning curve



Hypothetical learning curve



Spreadsheets...

You need to “invest” your time to make software productive.

Books, classes, videos, etc. are good references, but you still need to do the hands-on work if you really want to learn about the potential uses and value this tool brings to you.

Random thoughts...

- Black swan phenomenon: $\frac{1}{3} + \frac{-4}{6} = \frac{-3}{9}$
- Always a better way
- No numbers in formulas
- Save/rename files (saving files off web)
- Multiple ways to do things
 - keyboard vs mouse
- Organizing data
 - rows vs. columns
 - multiple tabs and files

Random thoughts...

- **Mistakes? Outdated? Truth?**
- **Would a calculator/worksheet be the route to go?**
- **Formatting – how important is it?**
- **Documenting your thoughts and procedures with text in the spreadsheet**
 - text in cell, cell comment, color, etc.
- **Value in consistency across tabs/sheets**

Random thoughts...

The power of ones and zeros ...

An easy way to do conditional statistics using the sumproduct command, along with ones and zeros, to eliminate the need for repeatedly re-specifying formulas.

Before we get started...

Your use of spreadsheets...

What spreadsheet brand do you use?

Frequency/intensity of use

Examples of uses

Good experiences

Bad experiences

What are you wanting to learn today?

Other comments/questions

What are we going to do?

→ Create several new spreadsheets

Machinery cost estimates

Crop budgets and breakevens

Loan payment and sales of commodities

205-day adjusted weaning weights

What are we going to do?

Time to get to work!

Example 1 -- Machinery costs

- 1. Determine the total machinery costs per acre for each crop.**
- 2. Calculate the total acres of each operation for the farm.**
- 3. Estimate the costs per acre for each crop by machinery cost category.**
- 4. Estimate the total costs by category for each crop enterprise and the total for the farm.**
- 5. How would the total machinery costs for the farm change if the wheat were planted no-till (cost of drilling increases from \$12.40/acre to \$15.40/acre) and the three tillage operations were replaced with three herbicide applications?**

ExcelWorkshops(2015-2016)_Exercises_Complete [Compatibility Mode] - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER

A1 : Estimate of Per Acre and Farm Total Machinery Costs

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Estimate of Per Acre and Farm Total Machinery Costs												
2													
3	Breakdown of machinery costs by category						Crop acreage breakdown						
4	Fuel and oil		21.2%			Wheat		800					
5	Repairs		16.3%			Milo		400					
6	Labor		24.8%			Soybeans		400					
7	Depreciation		21.5%			Farm Total		1,600					
8	Interest		12.6%										
9	Insurance and shelter		3.6%										
10	Total		100.0%										
11													
12		Wheat			Milo			Soybeans			Farm		
13	Operation	\$/acre	operations		\$/acre	operations		\$/acre	operations		Total		
14	Chisel	\$12.99	1.0		\$12.99	0.0		\$12.99	0.0		800		
15	Disk	\$11.60	1.0		\$11.60	0.0		\$11.60	0.0		800		
16	Field cultivate	\$10.93	1.0		\$10.93	0.0		\$10.93	0.0		800		
17	Plant/drill	\$14.93	1.0		\$16.59	1.0		\$16.96	1.0		1,600		
18	NH3 app.	\$13.49	1.0		\$13.49	1.0		\$13.49	0.0		1,200		
19	Fertilizer app.	\$5.95	0.0		\$5.95	1.0		\$5.95	1.0		800		
20	Herbicide app.	\$6.01	1.0		\$6.01	2.0		\$6.01	3.0		2,800		
21	Insecticide/fungicide app.	\$6.06	1.0		\$6.06	0.0		\$6.06	0.0		800		
22	Harvest	\$39.18	1.0		\$53.12	1.0		\$37.14	1.0		1,600		
23	Total	\$115.19	8.0		\$101.17	6.0		\$78.08	6.0		11,200		
24													
25	Machinery Costs by Category	\$/acre	enterprise		\$/acre	enterprise		\$/acre	enterprise		Total		
26	Fuel and oil	\$24.42	\$19,536		\$21.45	\$8,579		\$16.55	\$6,621		\$34,737		
27	Repairs	\$18.78	\$15,021		\$16.49	\$6,596		\$12.73	\$5,091		\$26,708		
28	Labor	\$28.57	\$22,854		\$25.09	\$10,036		\$19.36	\$7,746		\$40,635		
29	Depreciation	\$24.77	\$19,813		\$21.75	\$8,701		\$16.79	\$6,715		\$35,228		
30	Interest	\$14.51	\$11,611		\$12.75	\$5,099		\$9.84	\$3,935		\$20,645		
31	Insurance and shelter	\$4.15	\$3,317		\$3.64	\$1,457		\$2.81	\$1,124		\$5,899		
32	Total	\$115.19	\$92,152		\$101.17	\$40,468		\$78.08	\$31,232		\$163,852		
33													
34													

Machinery costs | Crop budgets | Loan payment | 205-day weight | Date formulas | Cattle feeding budget

Example 2 – Crop budgets and breakeven yields and prices

1. Calculate your total cost per acre and the expected returns per acre on each crop for the coming year as well as the total costs for the 160 acres.
2. Given your costs, prices and government payment, calculate the yield where you would breakeven (i.e., net return = 0). Given the costs, yields, and government payment, calculate your breakeven price.
3. Identify the maximum amount you could pay for cash rent based on the costs, yields, prices, and government payments given (i.e., the returns over costs if you paid 100% of costs and received 100% of income).

ExcelWorkshops(2015-2016)_Exercises_Complete [Compatibility Mode] - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER

A1 : Returns from various crop enterprises on crop share rented acres

	Share	Wheat	Share	Milo	Share	Soybeans	Total*
1 Returns from various crop enterprises on crop share rented acres							
2							
3 Acres		80.0		40.0		40.0	160.0
4							
5	Share	Wheat	Share	Milo	Share	Soybeans	Total*
6 Seed	100.0%	\$16.00	100.0%	\$18.90	60.0%	\$61.60	\$3,514
7 Herbicide	100.0%	4.19	60.0%	49.30	60.0%	35.79	\$2,377
8 Insecticide/fungicide	66.7%	14.84	60.0%	0.00	60.0%	19.20	\$1,252
9 Fertilizer	66.7%	70.14	60.0%	83.36	60.0%	20.18	\$6,226
10 Lime	0.0%	5.00	0.0%	5.00	0.0%	5.00	\$0
11 Crop insurance	66.7%	5.17	60.0%	7.05	60.0%	6.26	\$595
12 Crop consulting	100.0%	0.00	100.0%	0.00	100.0%	0.00	\$0
13 Machinery costs	100.0%	115.19	100.0%	101.17	100.0%	78.08	\$16,385
14 Non-machinery labor	100.0%	15.00	100.0%	15.00	100.0%	15.00	\$2,400
15 Miscellaneous	100.0%	6.50	100.0%	6.50	100.0%	6.50	\$1,040
16 Total cost		\$216.98		\$225.40		\$185.40	\$33,790
17							
18 Yield	66.7%	56	60.0%	88	60.0%	36	n/a
19 Price	100.0%	\$5.10	100.0%	\$3.45	100.0%	\$9.05	n/a
20 Gov't payment	66.7%	\$4.00	60.0%	\$7.00	60.0%	\$0.00	\$381
21 Total income		\$193.07		\$186.36		\$195.48	\$30,719
22							
23 Net return to producer		-\$23.91		-\$39.04		\$10.08	-\$3,071
24 Breakeven yield		63.0		106.9		34.1	n/a
25 Breakeven price		\$5.74		\$4.19		\$8.58	n/a
26 Total returns over total costs		\$37.57		\$24.32		\$78.19	\$7,106
27 * Total for operator's share only							
28							
29							
30							
31							
32							

Print

Formulas are linked to Machinery costs tab

Machinery costs Crop budgets Loan payment 205-day weight Date formulas Cattle feeding budget

Example 3 – Determining loan payment and sales

1. Determine what the annual amortized payment is on your loan.
2. Identify the quantities of calves, wheat, and milo that will need to be sold to cover the entire loan payment.
Constraints – at least 20% of the income needed must come from each of the three commodities, but no more than 50% can come from any one commodity and your total sales should not exceed the total loan payment by more than \$2,000. Sales of wheat and milo must be in 500 bushel increments (i.e., 500, 1000, 1500, etc.).
3. Identify the value of your inventories prior to making sales as well as after sales are made. Also, identify what percent of total revenue comes from each commodity.

ExcelWorkshops(2015-2016)_Exercises_Complete [Compatibility Mode] - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER

A1 : fx Determining principal and interest payment and sales needed to cover loan payment

1	Determining principal and interest payment and sales needed to cover loan payment								
2									
3	Principal		\$150,000				<u>Loan payment</u>		
4	Interest rate		6.25%				\$35,851.98		
5	Years		5						
6									
7									
8		Beginning Inventory			Sales			Ending Inventory	
9		Quantity	Value/unit	Total value	Quantity	Value	%	Quantity	Total value
10	Steer calves	33	\$1,289.60	\$42,556.80	12	\$15,475.20	43.0%	21	\$27,081.60
11									
12	Wheat	8,500	\$5.10	\$43,350.00	2,000	\$10,200.00	28.3%	6,500	\$33,150.00
13									
14	Milo	13,000	\$3.45	\$44,850.00	3,000	\$10,350.00	28.7%	10,000	\$34,500.00
15									
16	Total			\$130,756.80		\$36,025.20	100%		\$94,731.60
17									
18	Sales of wheat and milo must be in 500 bushel increments								
19	Income from any one enterprise must be at least 20% of total, but no more than 50%								
20									
21	Calculating the value per head of the steer calves								
22		Weight	\$/cwt	\$/head					
23	Steer calves	620	\$208.00	\$1,289.60					
24									
25	Difference between sales and payment			\$173.22					
26									
27									
28									
29									
30									
31									
32									

Machinery costs Crop budgets **Loan payment** 205-day weight Date formulas Cattle feeding budget

Example 4 – Calculating 205-day adjusted weaning weights

1. Calculate the age at weaning (days) for each calf, ADG, 205-day weight, and 205-day weight adjusted for age of dam and sex of calf and index.
2. Calculate the average, minimum, maximum and range for all date, age, and weight variables. Also, calculate the percent of calves that are steers.
3. Construct a graph that compares the actual versus the 205-day adjusted weaning weights for your calves.

ExcelWorkshops(2015-2016)_Exercises_Complete [Compatibility Mode] - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER

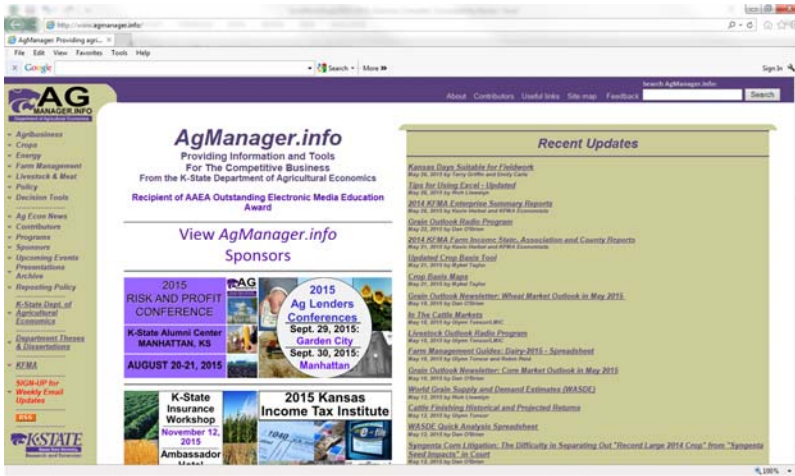
A1 : Calculating 205-day adjusted weaning weight of beef calves

Calculating 205-day adjusted weaning weight of beef calves															
Weaning date		10/15/15													
Calf ID	Date of birth	Birth weight	Sex M=1, F=0	Age of dam	Weaning weight	Age at weaning	ADG	205 day wt.	Dam adj.	205-day Adj. WW	Index	Age of			
												dam	Male	Female	
10-1	02/19/15	93	1	6	610	238	2.17	538	0	538	0.961	2	60	54	
10-2	03/18/15	78	1	2	575	211	2.36	561	60	621	1.109	3	40	36	
10-3	03/18/15	81	0	2	540	211	2.18	527	54	581	1.043	4	20	18	
10-4	03/24/15	85	1	5	585	205	2.44	585	0	585	1.045	5	0	0	
10-5	03/29/15	68	0	7	510	200	2.21	521	0	521	0.936	6	0	0	
10-6	04/02/15	74	0	4	505	196	2.20	525	18	543	0.975	7	0	0	
10-7	04/02/15	83	1	12	520	196	2.23	540	20	560	1.000	8	0	0	
10-8	04/02/15	69	1	8	490	196	2.15	509	0	509	0.910	9	0	0	
10-9	04/11/15	76	0	3	505	187	2.29	546	36	582	1.046	10	0	0	
10-10	04/15/15	73	1	6	495	183	2.31	546	0	546	0.975	11	20	18	
												12	20	18	
												13	20	18	
												14	20	18	
												15	20	18	
Average	03/26/15	78.0	0.60	5.5	534	202	2.25	540	18.8	559	1.000				
Minimum	02/19/15	68.0	0.00	2.0	490	183	2.15	509	0.0	509	0.910				
Maximum	04/15/15	93.0	1.00	12.0	610	238	2.44	585	60.0	621	1.109				
Range	55	25.0	1.00	10.0	120	55	0.29	76	60.0	112	0.199				
Average for male calves										559.9					
Average for female calves										556.8					
Comparison of Actual and 205-Day Adj. Weaning Weights															
700 _____ 1.15															

Machinery costs | Crop budgets | Loan payment | 205-day weight | Date formulas | Cattle feeding budget

Example 5 – Creating a Print Macro

1. Record the macro using the Macro Recorder in the Developer tab.
2. Use a button with the macro: "Insert" on the Developer tab, select a button and locate it on the spreadsheet. Record the macro.
3. Use the button to print the spreadsheet.



For more information
and to see use our many
decision tools go to
www.AgManager.info



Rich Llewelyn
785-532-1504
rvl@ksu.edu

