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An Interactive Illustration of Farm Program Provisions

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Abstract:

Explaining the details and the impacts of government program provisions to agricultural producers can be a challenge for extension educators. This paper introduces a visual interactive tool that demonstrates the calculations of government payments established in the 2002 farm bill. Additionally, the paper explains how the tool is created in Microsoft® Excel and may be used in other areas.

The 2002 farm bill ushered in a new set of complex government farm program provisions. Teaching the function, purpose, and impacts government farm program provisions can often be challenging. This has been no more evident than over the last year as extension educators have taught producers the calculation of the counter-cyclical payment rate. This paper introduces a visual interactive tool that clearly demonstrates the complex calculations of government payments established in the 2002 farm bill. Additionally, the paper explains how the tool is created and may be used to teach a variety of topics both in the classroom and in extension programming.

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Leading up to and upon the passage of the 2002 Farm Bill, extension educators across the country began their educational efforts to explain the provisions of the new bill. A number of efforts focused on assisting producers with the options of updating base acres and farm program yields.

The illustration in this paper was developed to address another issue. While the 2002 farm bill in a sense brought back a target price, many producers remained confused because the new counter-cyclical payment system is different from the deficiency payments made prior to the 1996 farm bill. The interaction of the national price, loan rate, direct payment rate, and target price is a bit complex and difficult to explain. An additional point of confusion is the fact that counter-cyclical payments, like direct payments, are decoupled from current production. While decoupled, the calculation of the counter-cyclical payment is a function of the loan rate, which is a coupled program provision. One audience of particular interest is the peanut producer, for whom the 2002 farm bill provisions are completely new. Producers needed a clear explanation of the relationships between their various sources of revenue, and drivers of those revenue sources.

The illustration, developed in Microsoft® Excel, is an interactive graphical presentation of the counter-cyclical payment rate, direct payment rate, and loan deficiency payment rate calculations. Also shown graphically are the total receipts from four different sources: market, loan deficiency, direct, and counter-cyclical payments. The user is able to manipulate variables such as market price, yield, and planted acres and simultaneously observe the impact on market receipts and government payments. The demonstration not only shows the calculation of the farm program payments, but also illustrates the decoupled nature of the direct and counter-cyclical payments. The illustration can be viewed for cotton, wheat, sorghum, corn, rice,

soybeans, peanuts, barley, and oats. The Interactive Illustration of Farm Program Provisions, IIFPP, was developed in Microsoft® Excel with standard visual tools available in Excel. The illustration is pictured below in figure 1, and the file may be downloaded from:

agecoext.tamu.edu/2002fb/iifpp.htm

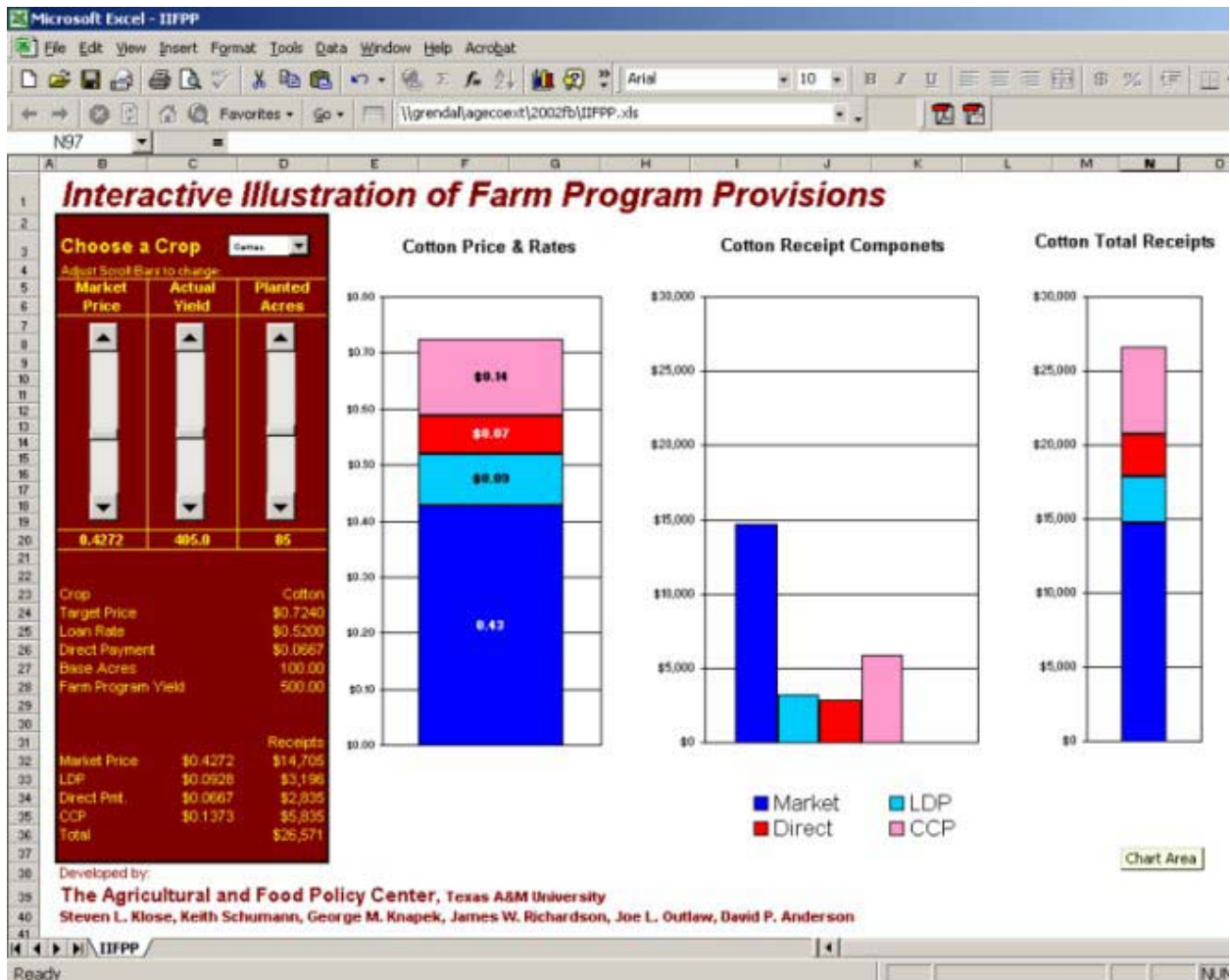


Figure 1. Image of IIFPP Spreadsheet

Microsoft Excel Functions Employed

A scroll bar may be inserted and used in any spreadsheet analysis or calculation. A major benefit of spreadsheet analysis is that it can actively recalculate. The instant recalculation

leads us to ask what-if questions by simply typing in different input variables, such as price or yield in an enterprise budget spreadsheet. A scroll bar can increase the efficiency of such analysis by automating the what-if process for a particular input. The scroll bar is linked to a particular cell and the movement of the scroll bar will increase or decrease the value in the cell. A standard spreadsheet calculation can then be made visually interactive by graphing various output variables. Finally, with the click of the mouse, the user can change an input variable and instantly observe the resulting impact

A drop-down control will allow a user to choose from a group of pre-selected labels. The user's choice will change the value in a specified cell. When the first choice in the list is selected the cell link value will be 1. The cell link value is 2 when the second choice is selected. The value in the cell link can then be used as a value or to identify groups of values to be used in the spreadsheet. In the IIFPP example, the drop-down control identifies a set of variables (target price, loan rate, direct payment rate, and farm program yield) relevant to various program crops. The use of the drop-down control tool allows you to build smaller, more efficient spreadsheets that are more user-friendly. In the IIFPP example, any of nine different crop examples may be demonstrated on one page with one set of graphs, as opposed to including nine sets of graphs and forcing the user to fumble through a large spreadsheet with many pages of examples.

Tips for implementation

Both the scroll bar tool and the drop-down control tool can be found in Microsoft® Excel 2000 by viewing the “forms” toolbar (from the main menu, select view-toolbars-forms). From the forms toolbar you can select the appropriate item and use the cursor to draw the tool anywhere in the spreadsheet. The controls for the tools may be found by clicking on the scroll

bar or drop-down box using the right mouse button and selecting format control. Next select the control tab inside the pop-up window. For the scroll bar you can change the minimum value, the maximum value, and the incremental step value. Excel will not allow you to use negative values or fractions for any of these controls. However, you may convert the value in subsequent cell locations. Suppose you wanted a scroll bar to control cotton price. Establish the following settings: Minimum Value=0, Maximum Value=100, Incremental Change=1, Cell Link=A1. The value in cell A1 will fluctuate between 0 and 100 as the scroll bar is moved. In another cell, the simple formula =A1/100 will yield a fluctuating value between 0 and 1. If you wish to be more precise, change your maximum value to 1000 and the cotton price formula to =A1/1000.

Another way to add flexibility to the scroll bar tool is to create a scroll bar that drives a percentage. Suppose you wanted to create a variable price that would range between 0 and 200 percent of a fixed price. Establish the following settings: Minimum Value=0, Maximum Value=200, Incremental Change=1, Cell Link=A1. Type a fixed price in cell A2, and in another cell type the formula =A1*A2/100. The result will be a value that ranges from 0 to 200% of the fixed price. The advantage of the percentage is that you may use any price level, from pennies per pound of cotton to dollars per ton of hay in the fixed price cell without changing the setup of the scroll bar.

Excel scroll bars may be either horizontal or vertical. However, vertical scroll bars increment toward the maximum number as the bar is moved down. The function of the scroll bar can be inverted, by adding another cell equal to the maximum minus the value in the cell linked to the scroll bar. For example, with the following settings: Minimum Value=0, Maximum Value=200, Incremental Change=1, and Cell Link=A1, cell A2 would contain: “=200-A1”.

On the forms tool bar, the drop down control box is call a “combo box”. The format

control of the drop down box allows you to change the input range, the cell link, and the number of drop down lines. The input range should be a set of choices listed in a single column. The IIFPP example uses the drop down control box to allow the user to select from a list of program crops. The cell link for the drop down box indicates which number commodity has been selected. A range of input values is then built containing key variables for each program crop. The cell link used in an “offset” function will select the appropriate target price, loan rate, etc. for the crop selected in the drop down box. More specifically: when the drop down box indicates that the third crop is selected, the cell link will contain the value of three. The offset function, using the cell link, will then select values from the third column of the table of input values.

Other uses for interactive tools

These and a variety of other interactive Excel tools may be very useful in developing teaching and demonstration software. Learning styles are quite different for many people, but visual demonstration generally simplifies complex problems. The IIFPP has been helpful in explaining the difficult calculations implemented in the 2002 farm bill. Specifically, the calculation of counter-cyclical payments, the unchanging direct payment, and the decoupled nature of both are more readily understood.

Dr. Mark Waller, extension economist at Texas A&M University has implemented the interactive scroll bar in a visual demonstration of the net gain or loss from an option position. The Black-Scholes model is used to create option premiums, and a graph illustrates the net gain/loss for a range of final futures prices. The user can, with scroll bars, change the key variables that drive the Black-Scholes model and observe the resulting change in the potential net gain or loss.

The scroll bar function may also be used to add a simplistic risky component to budgeting spreadsheets. Most farm or ranch planning budgets are critically dependent on assumptions of price and production. In fact, many farm managers are reluctant to develop formal budgets for their operation because of the uncertainty of price and yield factors. One of the more important functions of budgets is the ability to conduct what-if analyses and plan for the different possibilities that the future holds. An interactive scroll bar can simplify this type of analysis. An enterprise can be tested for sensitivity to price and yield changes. The process may also be helpful in cash flow budgeting. Of particular interest in the cash flow setting is the sensitivity of the bottom line cash flow position to varying assumptions for prices and yields.

Results and Conclusions

Any direct results of the IIFPP tool are subjective in terms of its capacity to teach the basic components of the 2002 farm bill provisions. Empirical experiences in using the tool to describe and teach the calculations of farm bill provisions have all been positive. Several producers have commented that they better understood the workings of the various program payments after they saw the visual demonstration of the calculations.

The IIFPP has been made available on the Internet since June of 2002. A more objective impact of the interactive tool can be measured by tracking the number of times it has been accessed over the Internet. The tool has been downloaded over 3400 times over the June 2002-January 2003 period. Hopefully, another result of the development of the IIFPP and this paper will be the increased use of such tools by extension and classroom educators.