

Commodity Program Decisions: As Simple as 1,2,3?

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2002 Risk and Profit Conference
August 15-16, 2002
Manhattan, KS

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Introduction

The Farm Security and Rural Investment Act of 2002 was signed into law in May after a long, contentious debate. Rather than pointing agricultural policy in a new direction like the Freedom to Farm legislation did in 1996, the commodity support program of the 2002 Farm Bill essentially combines aspects of the previous two farm bills in establishing farm policy for the next six years. Furthermore, unlike the 1996 Farm Bill which simplified commodity program decisions, the 2002 Farm Bill requires participants to analyze a complicated series of program options prior to enrollment. This paper will describe the commodity programs in the 2002 Farm Bill and discuss the decision making process that will be required of agricultural producers prior to program sign-up. In addition, this paper will introduce some decision making tools that producers can use to determine which program options will reap the maximum benefits for their operations.

The Safety Net

The new commodity support program sounds simple in concept as a three-part safety net. The safety net includes the marketing loan program and fixed payments that were an essential part of the 1996 Farm Bill as well as target prices and counter-cyclical payments that were the basic elements of the 1990 Farm Bill.

As an underlying support, covered commodities have a marketing loan program that operates just as the marketing loan has operated in the past. The primary change is an adjustment in most national average loan rates. The soybean loan rate is decreased while most other commodities are increased, including an increase in the rate for grain sorghum to a level on par with corn (Table 1). Under the legislation, most marketing loan rates are scheduled to drop in 2004. As with the current marketing loan program, producers can receive benefits in the form of loan deficiency payments or marketing loan gains. Producers can also hold the commodity loan to maturity and forfeit the commodity to the government or avoid forfeiture by using generic certificates to repay the commodity loan without being subject to payment limitations of \$75,000 per individual per year.

The direct, or fixed payments that were introduced in the 1996 Farm Bill also continue under the new Farm Bill. The direct payment rates will be constant over the six-year life of the program (Table 1). The direct payments are scheduled to be paid out in two installments, with the first half available as early as December of the year prior to harvest and the remainder paid out the following October (in the year of harvest). For the 2002 fixed payment, the payment amount will be calculated under new program provisions. Then, the amount of fixed payments already made to producers under the existing Farm Bill for the 2002 crop year will be subtracted

from the new fixed payment for 2002, with the balance scheduled to be paid to producers after sign-up. The fixed payments are subject to a limit of \$40,000 per individual per year.

The new part of the safety net is a counter-cyclical payment based on a target price (Table 1). The counter-cyclical payment will mimic the old target-price/deficiency payment system, except for the new counter-cyclical payment being decoupled from production. When the price drops below the target price, farm income is supported with counter-cyclical payments. The counter-cyclical payment is equal to the target price minus the direct payment minus the higher of the market price or loan rate. The direct payment makes up the guaranteed portion of the counter-cyclical payment and is paid even if market prices exceed the target price. As with marketing loan rates, the target prices are not constant over the life of the new program, but in fact, are scheduled to increase in 2004.

The schedule for counter-cyclical payments is tied to the marketing year for each commodity. The first 35 percent of the estimated counter-cyclical payment is available as an advance payment to producers in October of the year of harvest (after sign-up for the scheduled October, 2002 payment). In the following February, the second 35 percent is available, bringing the total advance payments up to 70 percent. The remaining balance of the actual counter-

Table 1. Loan Rates, Direct Payment Rates, and Target Prices for Covered Commodities

	Loan Rates		Direct (Fixed) Payment Rates	Target Prices	
	2002-2003	2004-2007	2002-2007	2002-2003	2004-2007
Corn (bu)	\$1.98	\$1.95	\$0.28	\$2.60	\$2.63
Sorghum (bu)	\$1.98	\$1.95	\$0.35	\$2.54	\$2.57
Barley (bu)	\$1.88	\$1.85	\$0.24	\$2.21	\$2.24
Oats (bu)	\$1.35	\$1.33	\$0.024	\$1.40	\$1.44
Wheat (bu)	\$2.80	\$2.75	\$0.52	\$3.86	\$3.92
Soybeans (bu)	\$5.00	\$5.00	\$0.44	\$5.80	\$5.80
Minor oilseeds (lb)	\$0.0960	\$0.0930	\$0.0080	\$0.0980	\$0.1010
Rice (cwt)	\$6.50	\$6.50	\$2.35	\$10.50	\$10.50
Upland cotton (lb)	\$0.5200	\$0.5200	\$0.0667	\$0.7240	\$0.7240
Peanuts (ton)	\$355.00	\$355.00	\$36.00	\$495.00	\$495.00
Extra-long staple cotton (lb)	\$0.7977	\$0.7977	—	—	—
Graded wool (lb)	\$1.00	\$1.00	—	—	—
Non-graded wool (lb)	\$0.40	\$0.40	—	—	—
Mohair (lb)	\$4.20	\$4.20	—	—	—
Honey (lb)	\$0.60	\$0.60	—	—	—
Small chickpeas (cwt)	\$7.56	\$7.43	—	—	—
Lentils (cwt)	\$11.94	\$11.72	—	—	—
Dry Peas (cwt)	\$6.33	\$6.22	—	—	—

cyclical payment less advance payments is made following the marketing year for each commodity (July for wheat, October for corn, grain sorghum, and soybeans). If the remaining balance is negative, producers will have to repay the amount of overpayment. The counter-cyclical payments are subject to a limit of \$65,000 per individual per year.

Regardless of market price, the fixed payment is guaranteed. When the market price drops below the target price less the direct payment, a counter-cyclical payment will be made. When the market price falls as far as the loan rate, the counter-cyclical payment will reach its maximum. When the market price drops below the loan rate, the counter-cyclical payment will not get any larger, but the marketing loan will make up for further price declines via the loan deficiency payments and marketing loan gains. Using the payment rates in Table 1 for 2002-2003 as an example, a counter-cyclical wheat payment will be made whenever the market price for wheat falls below \$3.34 (\$3.86 target price minus \$0.52 direct payment). The further the wheat price drops below \$3.34, the larger the counter-cyclical payment, up to a maximum of \$0.54 per bushel (\$3.86 target price minus \$0.52 fixed payment minus \$2.80 loan rate). Tables 2 and 3 show the minimum commodity prices that result in no counter-cyclical payments (target price minus direct payment) and the maximum counter-cyclical payment possible (target price minus fixed payment minus loan rate).

Table 2. Minimum Commodity Prices That Result in No Counter-Cyclical Payments

Crop	2002-2003	2004-2007
Corn (bu)	\$2.32	\$2.35
Sorghum (bu)	\$2.19	\$2.22
Barley (bu)	\$1.97	\$2.00
Oats (bu)	\$1.376	\$1.416
Wheat (bu)	\$3.34	\$3.40
Soybeans (bu)	\$5.36	\$5.36
Minor Oilseeds (lb)	\$0.09	\$0.093
Rice (cwt)	\$8.15	\$8.15
Upland Cotton (lb)	\$0.6573	\$0.6573

The basic framework of the safety net hides the complexity involved in program participation and enrollment decisions. Each part of the safety net is based on a uniquely different payment base, requiring program participants to make a multi-part decision during sign-up.

Table 3. Maximum Counter-Cyclical Payments for Program Commodities

Crop	2002-2003	2004-2007
Corn (bu)	\$0.34	\$0.40
Sorghum (bu)	\$0.21	\$0.27
Barley (bu)	\$0.09	\$0.15
Oats (bu)	\$0.026	\$0.086
Wheat (bu)	\$0.54	\$0.65
Soybeans (bu)	\$0.36	\$0.36
Minor Oilseeds (lb)	\$0.00	\$0.00
Rice (cwt)	\$1.65	\$1.65
Upland Cotton (lb)	\$0.1373	\$0.1373

As with the existing program, marketing loan benefits are paid only on actual production. On the other hand, fixed payments are based on 85 percent of the selected acreage base and existing payment yields. The counter-cyclical payments will be based on 85 percent of the selected acreage base in similar fashion to the fixed payments, but the payment yield may be updated in some scenarios. These complex payment formulas will require producers to make a corresponding set of complex decisions at program sign-up.

Commodity Program Enrollment Decisions

A sequential decision-making process awaits producers at program sign-up. Each FSA farm number is considered separately, meaning participants could make different program decisions for each farm number. Given the complex set of decisions to be made, each farm number could be considered through the following set of steps:

1. **Decide whether to participate in commodity programs.** In 1996, this was the only decision for producers to make. As with the 1996 Farm Bill and previous programs, conservation compliance is necessary for program participation. However, producers did not have to participate in previous farm programs in order to be eligible to sign up for this one.
2. **If the decision is to participate in the program, then decide which acreage base to use.** A producer can update the acreage base for all covered commodities to the average of total planted and prevented planted acreage for the 1998 through 2001 crop years. Alternatively, a producer can keep the current program acreage base that was used to calculate fixed payments under the existing Farm Bill and simply add oilseed acres, subject to acreage constraints.

Under the new program, oilseeds now receive fixed and counter-cyclical payments in addition to other commodities. Previously, oilseeds only received marketing loan benefits and did not have an acreage base and payment yield. Thus, regardless of the option producers make about acreage and yield updates, they can add oilseeds to the calculation provided they grew any oilseeds during the 1998 through 2001 crop years.

To establish an oilseed acreage base, a producer can count the average of the total planted and prevented planted acreage for the 1998 through 2001 crop years for each oilseed. All years are included in the average, including years of zero acreage. This calculation is done separately for each oilseed crop (soybeans, sunflowers, etc.)

If producers elect the first option above and update the acreage base for all covered commodities, they calculate the average acres for all crops for 1998-2001 in the same fashion as that done above for oilseeds.

If producers elect the second option, they can add their average oilseed acreage calculated above, limited to the difference between their total acreage of all covered commodities for 1998-2001 and their existing program acreage base. Producers can add additional oilseed acres above this difference up to the average acres calculated above, but they must reduce one of the other crop bases on a one-for-one basis for each acre of oilseeds added above the limit.

On some farms, the existing program acreage base may exceed the average total acreage of covered commodities for 1998-2001 (due to the conversion of acreage to non-program crops including alfalfa, grass, etc.). On these farms, producers can choose not to add oilseeds and instead keep their entire existing program acreage base, provided they have at least that amount of acreage in agricultural use. If producers still want to add oilseeds to the base in this situation, they would first have to give up all of the excess base acreage and then give up one acre of existing base for each acre of oilseeds added to the base.

Finally, some farms have an established history of double-cropping, where a producer has a crop of wheat and a second crop such as soybeans, sorghum, or sunflowers on the same acre in a given year. In these cases, the total acreage of covered commodities for the farm will include both the primary and the secondary crop. As such, both crops will be eligible for direct and counter-cyclical payments.

To illustrate the acreage decision, consider a 100-acre farm with an existing program acreage base of 50 acres of wheat, 30 acres of corn, and 20 acres with no program base. If that 100-acre farm averaged 50 acres of corn and 50 acres of soybeans over the 1998-2001 period, the producer could elect to use the current average acreage or “new” base and establish an acreage base of 50 acres of corn and 50 acres of soybeans. Alternatively, the producer could keep the “old” 50-acre wheat base and 30-acre corn base and add 20 acres of soybean base to reach the 100 acre maximum base. The producer could add additional soybean acres up to the 50-acre soybean average for 1998-

2001, but would have to reduce either the wheat or corn base on a one-for-one basis for each soybean acre added above 20.

3. **If the decision is to use the “new” acreage base, then decide which payment yield to use.** If producers choose to use the “new” acreage base, there are three options for selecting the payment yield. However, even if a producer chooses to keep the “old” base, there are yield calculations to make. If the “old” base is kept, the producer must keep the existing payment yields (“old” yields) and establish an equivalent “old” yield for any oilseeds added to the base.

To establish an oilseed program yield, producers take the average yield per *planted* acre for the years of 1998-2001, excluding any year in which the oilseed was not planted. For any year in which the farm yield is less than 75 percent of the four-year county average yield, a yield equal to 75 percent of the four-year county average yield per *planted* acre will be substituted.

In some counties, four-year average county yields per planted acre are available for both irrigated and non-irrigated production. In those counties, the yield calculation is more complex. The farm’s average yield per planted acre for each year is still a straight-forward calculation based on total acres and total production across both irrigated and non-irrigated systems, resulting in a blended yield. However, the relevant average county yield must also be a blended yield of both irrigated and dryland production. The blend is based on the proportion of irrigated and dryland acres on that farm (not the county).

As an example, consider four-year average county yields of 50 bushels/acre for irrigated soybean production and 35 bushels/acre for dryland soybean production. If two-thirds of the soybean acreage in the county was dryland and one-third was irrigated, the overall average county yield would be 40 bushels/acre. But, the relevant average county yield to be used as a basis for the substitute must be a ratio of the irrigated and non-irrigated acreage on the farm. If on the farm, two-thirds of the soybean acreage was irrigated and one-third was non-irrigated, then the relevant average county yield would be 45 bushels/acre (the weighted average of one-third of the acreage at 35 and two-thirds of the acreage at 50).

If the producer raised the crop under only one system (irrigated or non-irrigated), then the relevant county average yield would come from the specific four-year average county yield for that practice (irrigated or non-irrigated). In many counties however, separate yields will not be available and the relevant county average yield is simply the composite county average yield for both practices, even if the producer has both irrigated and non-irrigated production.

There are also questions about county average yields for the different practices of regular versus double-crop production (such as soybeans, sorghum, or sunflowers following

wheat). Yield expectations are generally lower for double-crop production relative to regular, full-season production, yet published county average yields combine both practices. FSA may determine appropriate or assigned yields that are different than the published county average yields in those counties where double-cropping has been present.

As a basic example, consider a farm with average soybean yields per planted acre of 20 bushels/acre in 1998; 50 bushels/acre in 1999; no planted acres in 2000; and 55 bushels/acre in 2001. This farm is in a county with only a single composite average county yield available of 40 bushels per planted acre. To calculate the average yield, the producer takes the higher of the farm yield or 75 percent of the average county yield for each year in which the crop was planted. For 1998, the producer counts the higher of 20 bushels/acre or 75 percent of 40 bushels/acre, which equals 30 bushels/acre. Thus, the producer would count a yield for 1998 of 30 bushels/acre. In similar fashion, the producer would count a yield of 50 bushels/acre in 1999, nothing in 2000 (since planted acreage equals zero), and 55 bushels/acre in 2001. The resulting average yield for the farm is equal to 45 bushels/acre (the average of 30, 50, and 55).

After working through all of these rules and considerations, the producer will end up with an average farm yield that is a “new” yield representative of the 1998 through 2001 production period. To adjust this yield relative to other program commodities for which payment yields were frozen in 1985, the average farm yield is adjusted by the ratio of the national average yield for the oilseed for 1981 through 1985 by the national average yield for the oilseed for 1998 through 2001. Based on U.S. production numbers for soybeans, the “new” soybean yield calculated above of 45 bushels/acre must be multiplied by 78 percent to produce an “old” soybean yield of 35.1 bushels/acre that is equivalent to other commodity payment yields. The appropriate ratio for other oilseeds may be different, as is the case for sunflowers, where the ratio has been set at 80 percent.

While the above example used soybeans, the same payment yield update options and formulas exist for all crops. For soybeans, the calculation of the “old” yield comes from the “new” yield, but if a producer has “new” yields and acreages for other crops for which there is no “old” yield on the farm (such as if a producer now grows corn, but did not do so when acreage bases were established under the previous farm programs), FSA will assign an “old” yield for the specific crop based on “old” yields for similar farms in the county. Once the “old” yields and “new” yields are determined, a producer can choose any of the three options for payment yields described above, but must make the same decision for all commodities.

As noted above, producers have three options to update payment yields if they update their base acreage to the “new” base. The first option for payment yields is simply to keep the “old” yields. This option would appear to be attractive only if average farm yields actually declined between 1981-1985 and 1998-2001. The next two options allow producers to partially update yields.

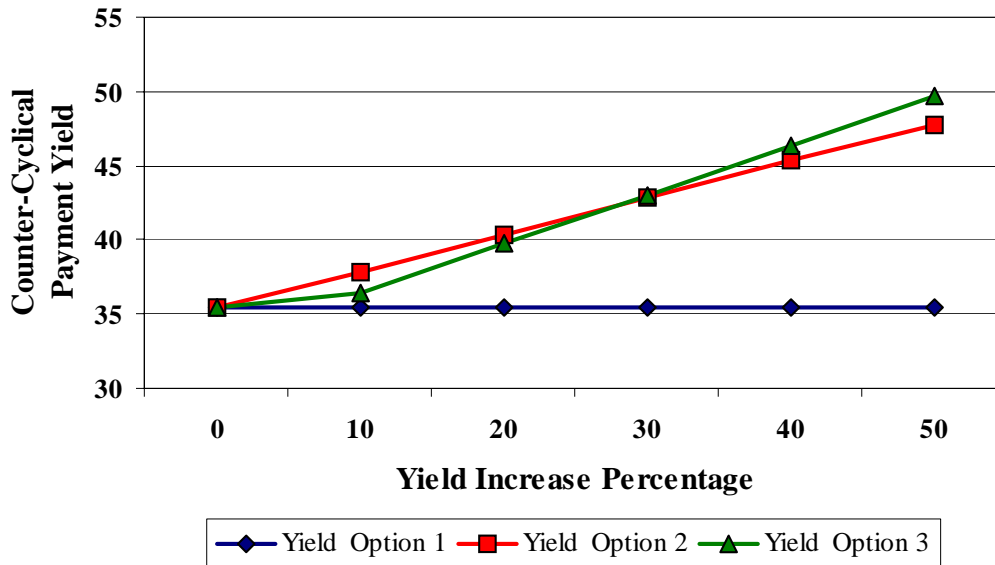
The second payment yield option uses both existing payment yields (“old” yields) and average farm yields per planted acre for all covered commodities for 1998 through 2001 (“new” yields). The average farm yields for each crop are calculated in identical fashion to the yields for oilseeds calculated above. Once these averages are calculated, then the updated yield is calculated as 70 percent of the difference between the “old” yield and the “new” yield added to the “old” yield. In the example above for soybeans, the partial update would equal 70 percent of the difference between 45 and 35.1 or 6.93 added to 35.1 for a total of 42.03 bushels/acre.

The third payment yield option uses only the “new” yields multiplied by 93.5 percent. In the same soybean example, the partially-updated payment yield would equal 93.5 percent of 45, or 42.08 bushels/acre.

As a simple rule of thumb, yield option 2 appears to be the preferred yield option for crops in which yields have increased less than 25% over the existing payment yields. However, if average crop yields have increased more than 25% from the existing payment yields, yield option 3 results in higher payment yields for counter-cyclical payments. Figure 1 shows the yields corresponding to all three yield options. Although this rule of thumb appears to hold for single crops, a combination of crops in the acreage base may not produce the same results. For example, while wheat yields on a farm may

Figure 1

Wheat Counter-Cyclical Yield Option Comparisons



have increased dramatically from the existing program yields on a farm, grain sorghum yields may not have increased. Consequently, the yields of both crops must be taken into consideration before making a decision to update yields since the yield update decision must be the same for all crops on the farm.

It is important to remember that all of these decisions are one-time decisions during sign-up that will remain in effect for the life of the new Farm Bill. In essence, there are four options available to producers under the above decisions if they decide to participate. First, producers can use their “old” acreage base plus “new” oilseed acreage and their “old” payment yields. Second, producers can use their “new” acreage base plus “old” program yields. Third, producers can use their “new” acreage base plus partially-updated yields based on “old” yields plus 70 of the difference between “old” and “new” yields. Fourth, producers can use their “new” acreage base plus partially-updated yields based on 93.5 percent of “new” yields.

Which of the four options is best for each individual producer could vary based on the producer’s preferences. A producer could decide to maximize the amount of guaranteed government payments (fixed payments). Or, a producer could attempt to maximize the amount of expected government payments (fixed and counter-cyclical payments). Alternatively, a producer concerned about risk could choose an acreage base and payment yield in an attempt to minimize farm income risk. Finally, a producer could be concerned about both risk and expected payments and examine the tradeoffs between the two in selecting an acreage base and payment yield.

These decisions will in part be determined by the relative yields and acres for the different crops in 1998-2001 compared to the existing crop acreage base and program yields and thus will vary from farm to farm. As noted earlier, the decision is complicated by the fact that the different parts of the safety net are tied to different acreages and yields. The direct payment is tied to the “old” acreage base plus oilseeds or the “new” acreage base as selected in step 2 above, but must be based on “old” payment yields. The counter-cyclical payment is tied to the same acreage base as chosen for direct payments in step 2, but is paid on the “old” or partially-updated payment yield as selected in step 3. The amount of marketing loan benefits are not affected by the base acreage and payment yield decisions because the loan program is tied only to actual production.

Understanding the acreage and yield choices and the payment bases for each part of the safety net are vital to determining expected payments under each of the four alternatives identified above. Tying these alternatives together with the producer’s preferences for maximizing payments or balancing expected payments and farm income risk makes the decision extremely complex.

Payment Limitations

As noted previously, specific payment limits apply to each of the three parts of the commodity program safety net. Marketing loan benefits, including loan deficiency payments and marketing loan gains, are subject to a \$75,000 limit per individual per year. However, forfeitures of commodities under loan to the government or repayments of loans with generic certificates remain available and not subject to the payment limit. The fixed payments are subject to a \$40,000 while the counter-cyclical payments are subject to a limit of \$65,000 per individual per year. Summed together, these three limits amount to a total of \$180,000 in payments per individual per year. These limits are in place for all covered commodities. Payments for peanut programs are covered under separate limits.

In addition to these payment limits, two other important features are present in the legislation. First, the existing three-entity rule is maintained for producers, meaning a producer can qualify for payments up to the full limit under one entity and can also qualify for payments up to half the limit under two additional entities. Summed together, this means that an individual can qualify for double the individual payment limit, or \$360,000 per year.

Second, the new Farm Bill does include a means test for farm program benefits. To qualify for payments, producers must have an average adjusted gross income over the previous three years of \$2.5 million or less or have at least 75 percent of the average adjusted gross income derived from farming, ranching or forestry operations.

Commodity Program Decision Making Tools

Due to the complexity of the commodity program options producers have in the 2002 Farm Bill, many decision making tools have been developed by agricultural educators and businesses to assist producers in making these decisions. K-State Research and Extension has developed two of these tools. The first tool is a Microsoft Excel computer spreadsheet and the second tool is a worksheet that producers can use to calculate commodity program payments by hand. Because of the volume of calculations necessary to fully analyze program alternatives, the computer spreadsheet would easily be the preferred tool. However, if a producer does not have access to a computer with Microsoft Excel, the worksheet can still be useful.

In order to use the decision making tools to evaluate the various alternatives available to program participants, some important information must first be collected. This information includes annual acreage of all program crops planted from 1998-2001 (“new” base), existing crop acreage base (“old” base), annual crop yields for program crops planted from 1998-2001 (“new” yields), and existing FSA crop yields (“old” yields). All this information must be collected for each *FSA farm number*. In addition to this information collected on an individual farm number basis, producers must also project national average market prices for each of their program crops for each year of the Farm Bill.

Both decision making tools follow the same decision evaluation process that was described above. The first step in the decision making process is to record “new” and “old” base acres. After this step is completed, producers may have a good insight regarding which acreage base they want to use, but because of the complexities involved, making the acreage base decision solely on number of acres may result in inaccurate conclusions. After acreage has been recorded, the next step is to record existing (“old”) yields and actual program crop (“new”) yields from 1998-2001. After the “new” yields are recorded, the next step is to calculate the two counter-cyclical yield update options described in part 3 of the *Commodity Program Enrollment Decisions* section of the paper. The formulas for calculating counter-cyclical yield options 2 and 3 are shown in equations 1 and 2, respectively:

$$((\text{New Yields} - \text{Old Yields}) * 70\%) + \text{Old Yields} = \text{Yield Option 2} \quad (1),$$

$$\text{New Yields} * 93.5\% = \text{Yield Option 3} \quad (2).$$

Again, counter-cyclical yields can only be updated if acreage base is updated. Fixed payment yields cannot be updated. Although counter-cyclical yields can only be updated if base acres are updated, it is still necessary to calculate counter-cyclical yields in order to determine if acreage should be updated. Finally, after acreage and yields have been recorded, the next step is to input projected market prices for the relevant program crops. To estimate counter-cyclical payments throughout the life of the Farm Bill, annual market prices for each relevant program crop are necessary. Because projecting commodity prices six years into the future is difficult to do, three price projection options are available to producers. The first option is to use projected market prices from the Food and Agricultural Policy Institute (FAPRI). The second option is to use projected prices from USDA. Finally, producers can use their own projected prices for calculating counter-cyclical payments.

After all the required inputs are recorded, the next step is to begin calculating program payments. The first payments to be calculated are fixed payments. In the Excel Farm Bill Spreadsheet, all payments are automatically calculated, so the user’s input is ended—unless additional scenarios are evaluated. Although input with the spreadsheet is ended when payments are calculated, a significant amount of work is required when calculating payments by hand.

As previously mentioned, producers have two acreage base options when calculating fixed payments. They can use their existing base plus any oilseeds that were planted from 1998-2001, or they can update their entire acreage base based on 1998-2001 planted crops. Thus, fixed payment calculations for each option must be made. Equation 3 shows the formula for calculating fixed payments:

$$\text{Acreage Base} * \text{Payment Yields} * \text{Fixed Payment Rate} * 85\% \quad (3).$$

Payment yields for fixed payments are the existing FSA payment yields under the 1996 Farm Bill. Payment yields cannot be updated for fixed payment purposes.

Calculations for counter-cyclical payments are much more complicated. There are four options that producers have for calculating counter-cyclical payments. The first option is to use the existing FSA acreage and yield base for calculating payments. The second option is to use the updated “new” acreage base with existing payment yields. The third option is to use the updated acreage base and update yields with yield option 2. Finally, the fourth option to calculate counter-cyclical payments is to use the updated acreage base and update yields with yield option 3. Thus for each program crop, all four counter-cyclical payment options must be calculated.

The first step in calculating counter-cyclical payments is to calculate the updated counter-cyclical payment yields. The formulas for yield options 2 and 3 were shown in Equations 1 and 2. (Yield option 1 is the existing payment yields from the 1996 Farm Bill.) After yields have been calculated, the next step is to estimate counter-cyclical payment rates for 2002-2007. These payment rates must be estimated individually for each year of the Farm Bill. Equation 4 shows the counter-cyclical payment rate formula:

$$\begin{aligned} &\text{Target Price - (Higher of Loan Rate or 12 Month Average Market Price} \\ &\text{+ Fixed Payment Rate)} \end{aligned} \quad (4).$$

Following is an example counter-cyclical payment rate calculation for wheat. In 2002, the target price for wheat is \$3.86 per bushel, the loan rate is \$2.80 per bushel, and the fixed payment rate is \$0.52 per bushel. For this example, it will be assumed that the projected 12 month average market price for wheat is \$3.00 per bushel. Based on these prices, the projected counter-cyclical payment rate for wheat in 2002 would be: $\$3.86 - (\$3.00 + \$0.52) = \0.34 per bushel. Minimum commodity prices that result in no counter-cyclical payment are shown in Table 2. After estimating the counter-cyclical payment rate, the next step is to calculate the expected payment. The counter-cyclical payment formula in Equation 5 is identical to the fixed payment formula in equation 3.

$$\text{Acreage Base * Payment Yields * Counter-Cyclical Payment Rate * 85\%} \quad (5).$$

These counter-cyclical payment calculations must be made for each payment option, each year of the farm bill. So for this wheat example, there would be a minimum of 24 separate calculations.

Once the payment calculations for each year are made, they can be averaged over the life of the Farm Bill. Averaging the counter-cyclical payments will enable these payments to be added to fixed payments, resulting in average total program payments (not including marketing loan gains).

The final step in evaluating the commodity program alternatives is to summarize the fixed and counter-cyclical payments for each of the four acreage and yield base alternatives. To review, the four acreage and yield base alternatives are: existing acreage base plus oilseeds with existing yields, new acreage base with existing yields, new acreage base with counter-cyclical yield option 2, and new acreage base with counter-cyclical yield option 3. The Excel Farm Bill spreadsheet automatically summarizes and compares these four payment alternatives. In

addition, the spreadsheet compares this base scenario, to three other scenarios. The base scenario, which is based on the selected crop price projections, is compared to scenarios in which all crop market prices increase by 10%, all crop market prices decrease by 10%, and one scenario where counter-cyclical payments are maximized. This sensitivity analysis will give producers an indication of how government payments will be affected by crop prices.

Commodity Program Decision Analysis

From the description of commodity program decisions, it is clear that the new Farm Bill presents a complex sign-up decision for producers. An analysis of farms in the Kansas Farm Management Association may offer some insight into the optimal decisions for producers, although it primarily reinforces the need to carefully analyze each and every option.

A total of 331 farms in the Kansas Farm Management Association have certified continuous data sets for 25 years, from 1977 through 2001. This length of time is necessary, as the farm data provides a source of data to approximate yields from 1981 through 1985 which might be equivalent to the “old” yields used for support payments under previous farm programs. The continuous data set also allows us to determine crop acreage in 1995, the last year of base acreage production requirements. Using this acreage number, and adjusting for set-aside requirements in 1995 as well as total acreage changes on each farm since 1995, we can approximate the program acreage base, or “old” acreage. Finally, based on the farm data for 1998 through 2001, we can determine “new” acreage and “new” yields.

Due to limitations of the data, the analysis was confined to wheat, corn, grain sorghum, and soybeans. Although oats, rye, barley, and minor oilseeds may be important crops on some farms, there are a very small part of the overall production in Kansas, and thus would not substantially affect the results of the analysis. Finally, several of the 331 farms with 25-year data were excluded from the analysis, due to zero crop acres or perceived errors in yield information, leaving a total of 312 farms for analysis.

The results of the analysis are presented in Table 4 and Table 5. Given the four sign-up alternatives of old acres plus oilseeds and old yields, new acres and old yields, new acres and partially-updated yields using the 70-percent formula, and new acres and partially-updated yields using the 93.5-percent formula, we can analyze the expected returns from each alternatives. Table 4 ranks the alternatives according to which one returned the maximum total government payments, including fixed and expected counter-cyclical payments, using price projections from FAPRI’s July 2002 baseline projections (Table 6). As shown in the Table 4, each of the four alternatives appears to be the optimal decision for at least some producers. Analyzing the alternatives at the expected prices, 75 of the 312 farms would maximize expected government payments under alternative 1, 7 under alternative 2, 103 under alternative 3, and 127 under alternative 4. With the exception of alternative 2, the results are split across the alternatives. Alternative 2 uses new acres, but old yields, something that would be attractive primarily only to producers that have seen yield declines over time. Some individuals may have in fact seen poor crop conditions from 1998-2001 that would result in lower average payment yields, but the use

of the 75-percent county average yields as substitutes appears to have offset this concern for the most part, given that county yields in Kansas have generally trended upwards over time. The split among the rest of the farms between alternatives 1, 3, and 4 demonstrates the sensitivity of expected fixed and counter-cyclical payments to specific farm circumstances and price expectations.

Table 4. Number of Farms Maximizing Expected Fixed and Counter-Cyclical Payments Under Each Program Sign-Up Alternative Given Different Price Scenarios. (n=312)

Simulation	Old Acres+Oilseeds/ Old Yields	New Acres/ Old Yields	New Acres/ Updated Yields (70% Rule)	New Acres/ Updated Yields (93.5% Rule)
Number of Farms				
Average market prices less 10%	79	7	103	123
Average market prices (baseline)	75	7	103	127
Average market prices plus 10%	76	7	106	123

Table 5. Average Expected Fixed and Counter-Cyclical Payments Under Each Program Sign-Up Alternative Given Different Price Scenarios. (n=312)

Simulation	Old Acres+Oilseeds/ Old Yields	New Acres/ Old Yields	New Acres/ Updated Yields (70% Rule)	New Acres/ Updated Yields (93.5% Rule)
Average Dollars per Farm per Year				
Average market prices less 10%	\$30,359	\$28,875	\$33,428	\$33,080
Average market prices (baseline)	\$24,513	\$23,394	\$27,098	\$26,821
Average market prices plus 10%	\$16,639	\$15,833	\$18,334	\$18,145

Table 6. Average National Average Market Prices for 2002 - 2007 Crop Years (FAPRI, July 2002).

Crop	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
	Dollars per Bushel					
Wheat	\$2.95	\$2.93	\$3.04	\$3.07	\$3.15	\$3.23
Corn	\$2.03	\$2.04	\$2.10	\$2.15	\$2.19	\$2.23
Sorghum	\$1.91	\$1.91	\$1.97	\$2.02	\$2.06	\$2.09
Soybeans	\$4.44	\$4.68	\$4.83	\$4.96	\$5.07	\$5.21

Table 5 provides a similar analysis of the four program sign-up alternatives, reporting the average expected fixed and counter-cyclical payments per farm per year, again using baseline price projections from FAPRI (Table 6). At the average baseline price projection, the two program sign-up alternatives with partially-updated yields provide higher average expected payments per year, primarily due to additional counter-cyclical payments coming with higher counter-cyclical payment yields. However, note the sensitivity of the differences as prices change. If average market prices increase, expected counter-cyclical payments decrease and the advantage of partially updating yields decreases in turn.

Considering the limitations of the analysis and the data, no conclusion should be drawn that any one specific alternative will provide greater expected direct and counter-cyclical payments. Rather, the mixed results only reinforce the need for individual producers to analyze each farm number separately and completely to determine the optimal sign-up decision for the new commodity support program.