

PURDUE AGRICULTURAL ECONOMICS REPORT

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2002 Farm Bill: Down on the Farm

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Note: The explanations contained in this article are based on the authors' interpretation of the Farm Bill language and historical Farm Bill implementation rule experiences. As such, all materials contained in this document are subject to change, based on USDA's interpretations of the law. Check with your local FSA office for updates.

This article will help clarify some of the decisions that crop producers need to make to assure full benefit from

** The term producer is used as a generic term for the individual or entity entitled to a payment (direct or LDP under the 96 law) such as an operator owner, operating tenant, and a share lease landlord.*

this Farm Bill's various support mechanisms.

How Does the New Farm Bill Determine Support Levels for Program Crops?

The new, six year (2002-2007), Farm Bill has three basic types of commodity program payments. All three types of payments are available for corn, soybeans, wheat, cotton, rice, grain sorghum, barley, oats, peanuts, other oilseeds, small chickpeas, and lentils. The payments are Direct Payments (formerly known as AMTA payments), Counter-cyclical Payments (CCP), and Loan Deficiency Payments (LDP). Each type of payment uses a different formula to compute the payment the farmer will receive.

Direct Payments: Direct payments are fixed payments that are based on the producer's* historical production base. These payments were introduced in the 1996 Farm

Bill and are received by a producer regardless of commodity price levels or what is planted on the farm. Most all producers received these direct payments (known as AMTA or "Freedom to Farm" payments) since 1996. Producers (such as those who did not follow a required conservation plan) that have not been receiving these payments are eligible to sign up for the new farm bill payments if they have been planting any program crops over the last four years. The payment rates per unit of production for corn, soybeans, and wheat are shown in Table 1. These rates are multiplied by the farm's base acres, direct payment yield, and a 0.85 adjustment factor to calculate total direct payments for a crop year.

Counter-cyclical Payments: Counter-cyclical payments accrue to producers when market prices fall below a certain level, known as a target price. The target prices for corn, soybeans, and wheat are provided in Table 1. The payments are made based on a historical production level much like direct payments. However, the rate per

Table 1. Loan Rates, Direct Payments and Target Prices

	Loan Rate		Direct Payment	Target Price	
	2002-2003	2004-2007		2002-2003	2004-2007
Corn (bu.)	\$1.98	\$1.95	\$0.28	\$2.60	\$2.63
Soybeans (bu.)	\$5.00	\$5.00	\$0.44	\$5.80	\$5.80
Wheat (bu.)	\$2.80	\$2.75	\$0.52	\$3.86	\$3.92
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	\$0.02	\$1.40	\$1.44
Minor Oilseeds (lb.)	\$0.10	\$0.09	\$0.008	\$0.098	\$0.101
Cotton (lb.)	\$0.52	\$0.52	\$0.067	\$0.724	\$0.724
Rice (cwt.)	\$6.50	\$6.50	\$2.35	\$10.50	\$10.50

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yield unit is not fixed. Instead, the rate per yield unit will depend upon the United States 12-month market average price.

As an example, the target price for soybeans is \$5.80 per bushel. To determine the CCP rate subtract the direct payment rate of \$0.44 per bushel to get an effective CCP target price of \$5.36 per bushel. Next, the higher of the US marketing-year price or the loan rate, listed in Table 1, is subtracted from the CCP target price to get the final CCP payment rate. If the US marketing-year price for soybeans is \$4.75 per bushel, and the loan rate (listed in table 1) is \$5.00 per bushel, the final CCP payment rate is \$0.36 (\$5.36-\$5.00) per bushel. Thus, the maximum CCP rate for soybeans is \$0.36 per bushel since the loan rate keeps the CCP rate from being any larger. If on the other hand the US marketing-year average price for soybeans is \$5.25 instead of \$4.75, the counter-cyclical payment would be \$0.11 (\$5.36-\$5.25) per bushel. Thus, as the market price rises above the loan rate, the total CCP will fall. Once the US average market-year price rises above \$5.36, there will no longer be a CCP.



Loan Deficiency Payments:

LDP payments are available when the posted county price, on a chosen day, is below the loan rate for that county. These payments are made based on a producer's (farmer's) current production of that crop. To receive the payments, the farmer must be in possession of the harvested crop on the day chosen to exercise the LDP payment. That is, the farmer must first harvest the crop, select a date to exercise the LDP payment, and prove possession of the crop. If possession of the crop is transferred before exercising the LDP, no payment will be allowed.

A LDP calculation requires knowledge of the posted county price and the loan rate for the county where the farmer's crop is sold. The posted county price, loan rate and current LDPs are on the Farm Service Agency's web page at: <http://www.fsa.usda.gov/dafp/psd/ldp/ldpratecldp.asp?pstate=IN>.

National average loan rates for corn, soybeans, and wheat are provided in Table 1. Using the national average wheat loan rate of \$2.80 as an example, if the posted county price of wheat was \$2.40 on the day a producer elected to take the LDP payment, then the LDP payment would be \$0.40 per bushel. The \$0.40 per bushel would be paid on every certified bushel of the farmer's production for that year. If a producer chose to sell the crop on that same day for \$2.40 then the farmer's price for wheat would be the \$2.80 per bushel loan rate. In essence, the loan rate combined with the LDP works much like a put option. If exercised properly, the LDP option can guarantee that a producer will receive a price no lower than the loan rate.

Loan deficiency payments and marketing assistance loans have been available since the 1996 Farm Bill was enacted. The 2002 Farm Bill maintains or raises the loan rates for all commodities except soybeans, which is lowered from \$5.26 nationally to \$5.00. In addition, the Secretary of Agriculture is instructed, under the 2002 Farm Bill, to examine the determination of county-level loan rates and posted county prices.

Thus, some county-level loan rates may change more or less than the published national average loan rates in the 2002 Farm Bill. Finally, loan rates for corn and wheat will be lowered from their original levels after the 2003 crop year, as shown in Table 1. The lower loan rates will be offset, somewhat, by increases in the target prices used to compute the CCP.

How are Base Acres and Payment Yields Determined?

Under the new Farm Bill, producers have the option to update their "base acres." Base acres are the historical acres planted to a program crop used in determining the amount of direct and CCP payments a producer receives. Generally, farms have corn base acres, referred to as a contract acres base (CAB) under the 1996 Farm Bill, and some may also have wheat base acres, also called contract acres.

Under the new Farm Bill, those base acres can be updated to reflect the farm's average plantings over the 1998 to 2001 crop seasons. In addition, a producer can now sign-up for soybean base acres, which have not been available in past farm programs. To update base acres a producer needs to present planted and prevented planted acres on a farm, for all crops, in each of the four years 1998 to 2001, to the county FSA office. The new base acreage for each crop will be the average plantings for each crop over this four-year period, including a zero for any year that the particular crop was not planted. The 2002 Farm Bill offers a producer four specific options in regards to base acres and yield updates, the list below gives a brief summary of these options. The following paragraphs will then expand on these summaries.

Option 1: Make no changes.

Option 2: Make no changes, except add soybean base to fully base acreage.

Option 3: Maximize soybean base through base acreage trading.

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Option 4: Update base acres and update yields (3 sub-options for Option 4)

- A: Update base acres, but keep old yields.
- B: Update base acres, update yields by 70% rule.
- C: Update base acres, update yields by 93.5% rule.

Option 5: Swap selected PFC acres for additional soybean base.

The farmer may choose not to update base acreage for crops that already contain a base and can add soybean acres up to the maximum of the average soybean acres planted from 1998 through 2001 up to the total amount of cropland. For example, if a producer has 100 acres of land that currently has 55 acres of corn base. A producer has been planting 50 acres of corn and 50 acres of soybeans every year from 1998 through 2001. This producer can either update his corn base to 50 acres and add soybean base of 50 acres or leave his corn base at 55 acres and add 45 acres of soybean base. A producer cannot have 55 acres of corn base and 50 acres of soybean base since this will exceed the total crop acreage of 100 acres. If a producer has been planting a non-program crop such as popcorn or tomatoes then those acres will not count toward the historical plantings. For instance, say a producer has 100 acres of land that currently has 55 acres of corn base. A producer has been planting 50 acres of corn, 40 acres of soybeans, and 10 acres of popcorn every year from 1998 through 2001. This producer can update his acres to 50 acres of corn and 40 acres of soybeans. Notice that a producer actually loses the 10 acres planted to popcorn. If a producer decides to maintain current bases, but add soybean base, a producer can add the 40 acres of soybean base due to his/her historical plantings.

Historical acres of soybeans may not be what were actually planted by a producer when options 2 or 3 from the USDA are chosen. Soybeans are required to use the lesser of historical acres or total farm acreage minus base acres for all crops. For example, say a producer has 100 acres of land that currently has 60 acres of corn base and 10 acres of wheat base. Historically a producer has been planting 50 acres of corn and 50 acres of soybeans. This producer can only update his soybean acreage to 30 acres because there are only 30 unbased acres available even though they have been historically planting 50 acres of soybeans.

The decision to update base acres will depend upon the amount of current base acres for each crop and historical program yields. As will be explained next, the decision to update base acres will depend in part on a producer's desire to update payment yields for CCP payments.

Payment yields are used, in combination with base acres, to determine direct and counter-cyclical payment amounts. For direct payments, the payment yield is the same yield currently used to compute AMTA payments under the 1996 Farm Bill. This yield is based on the farm's average yield for the crop from 1981 through 1985. In the case of soybeans, the direct payment yield is determined by taking the average soybean yield for the farm from 1998 through 2001, excluding years when no soybeans were planted, and multiplying by 0.78. (0.78 is the ratio of the average national soybean yield from 1981 through 1985 relative to the average national soybean yield from 1998 through 2001.)

Counter-cyclical payment yields are a bit more confusing. If the farmer chooses to update base acres, then the farmer may also choose to update payment yields for computing a CCP. The updated yield is based on the farm's average yield for the crop from 1998 through 2001. For any year the crop was not planted, no yield is recorded. Any year that the farm's yield is more than 75 percent

below the county-average yield, a producer can use 75 percent of the county average yield instead of the actual yield. Once the average for the 1998 through 2001 crop yield for the farm is determined, a producer can choose one of the following methods to determine the payment yield for CCP payments:

- 1) Use the direct payment yield plus 70 percent of the difference between the 1998 through 2001 average yield and the direct payment yield.
- 2) Use 93.5 percent of the 1998 through 2001 average yield.

For example, if the farm has a 120 bushel direct payment yield for corn and the average over the 1998 through 2001 period is 150 bushels, a producer would have the following choices:

- 1) $120 + (150-120)*0.70 = 141.0$
- 2) $150 * 0.935 = 140.3$

In this case, the farmer would choose option 1. However, there are cases when option 2 would be the better choice. Whichever method is used, that method must be used for all crops on that specific farm. That is, a producer cannot update yields for corn using option 1 and update yields for soybeans using option 2. Both crops must use the same option for updating yields. In addition, a producer cannot update yields unless they also update base acres. This may be a problem if the farm currently has substantial corn base. The 2002 Farm Bill parameters favor corn over soybeans, so the farmer may have reason to want to keep old base acres rather than lowering base acres to increase payment yields for CCP payments. To help a producer determine whether or not to update acres and yields, a spreadsheet is available at the following website: <http://www.agecon.purdue.edu/ext/policy.asp>.

To use the spreadsheet the farmer needs to provide total crop acres for the farm, current farm program yield for corn and wheat (if applicable),

and the 1998 through 2001 acres planted and yields for corn, soybeans, and wheat (if applicable). The spreadsheet will then determine the best option for updating base acres and payment yields and provide these acres and yields to the farmer.

office for additional information on proper yield verification.

If the farmer has purchased or began farming a new farm the following documents are needed to update acres and yields. The preferred option is to obtain the

assumed for the example farm is contained in Table 2. The calculations of all three government payments are summarized in Worksheet 1. A blank worksheet is available at: <http://www.agecon.purdue.edu/ext/policy.asp>

Over the 1998 through 2001 period, the farm produced on average 812 acres of corn, 688 acres of soybeans, and 150 acres of wheat. The farm currently has 875 acres of corn base and 125 acres of wheat base which were established as contract acres during the 1996 Farm Bill. The farm also has current payment yields of 120 bushels for corn and 58 bushels for wheat, established in 1985. These yields will be used to compute direct payments. The farm averaged 150 bushels per acre for corn, 45 bushels per acre for soybeans, and 75 bushels per acre for wheat over the 1998-2001 periods. For the 2002 Farm Bill, this farm will choose to update its base acres and update yields for all CCP payments. The yields will be updated using rule 1, which takes 70 percent of the difference between the 1998-2001 average yield and the direct payment yield.

Having developed the historical production base for the farm (base acres and payment yields) Worksheet 1 can be completed to determine the government payments the farm can expect to receive in a given year. We will use the 2002-03 direct payment rates, target prices, and loan rates to compute the payments. Assume the 12-month season average prices are: \$2.05 per bushel for corn, \$4.75 per bushel for soybeans, and \$2.85 per bushel for wheat.

The direct payments for corn for the farm would be \$23,191 (\$0.28 payment rate X 812 base acres X 120 bu. payment yield X 0.85 adjustment factor). The calculations for soybeans and wheat are identical to corn, resulting in direct payments of \$9,114 and \$3,845, respectively. Total direct payments are \$36,163 for this 1650 acre crop farm which is just under the \$40,000 payment limit set for direct payments. Direct payments per base acre are \$28.56, \$25.64, and \$13.26 for corn, soybeans, and wheat, respectively which will be the same every year throughout the life

“The 2002 Farm Bill continues the direct payment and loan deficiency payments system that was introduced in the 1996 Farm Bill.”

What are acceptable documents for verifying yields?

The local Farm Service Agency (FSA) will require verifying documentation from a producer, for updating yields. If the product was sold or stored off-farm one of the following items are required: LDP records, warehouse receipts, warehouse ledgers, load summaries, settlement sheets or scale tickets (weigh slips) supported by a sales document. If the product was fed or used on the farm one of the following documents is required: FSA measurements, FSA appraisals, Risk Management Association (RMA) appraisals, RMA measured production, LDP records and farm records for seed use. The FSA recognizes that this information could be difficult to locate by individual farm numbers, so producers will be allowed to commingle the entire crop and take an overall average to be used for all farm numbers. Please see your local FSA

records from the previous producer (tenant or operating owner or share lease owner). For feedgrains, the farmer may use either historical information from neighboring farms or 75% of the county average yield. For oilseeds the only options are to obtain the previous producer's records or use 75% of the county average yield.

FSA will not actually require verification at the time of enrollment in the program. However, *all* farm yield information will be verified at some point during the life of the Farm Bill. For more details concerning verifying yields go to your FSA office.

Can You Provide an Example of How All of These Payments May Come Together for a Farm?

A typical central Indiana farm will be used to illustrate the computations for the various payments available to crop farmers. Basic information

Table 2. Information for the Example Farm

	Corn	Soybeans	Wheat
Base Acres	812.44	687.56	150.00
Direct Program Yield (bu./ac.)	120.00	35.44	58.00
CCP Program Yield (bu./ac.)	141.00	42.31	69.73
Planted Acres	825	700	125
Harvested Yield (bu./ac.)	155	51	73
Marketing-Year Average Price	\$2.05	\$4.75	\$2.85
County Loan Rate	\$2.01	\$5.14	\$2.83
Posted County Price at Exercise Date	\$1.92	\$4.54	\$2.84

of the Farm Bill. These calculations illustrate the favorable position of corn relative to soybeans for direct payments.

Based on the assumed 12-month marketing-year prices, CCP payments for the example farm are \$26,290, \$8,901, and \$4,356 for corn, soybeans, and wheat, respectively. The per-base-acre payments are \$32.36, \$12.95, and \$29.04 for corn, soybeans, and wheat, respectively. These values again illustrate the relative benefits for each crop where soybean base benefits are maximized at the loan rate while corn and wheat benefits could still be higher if market prices fell from the current assumed levels to levels below the loan rate.

LDP payments do not rely on historical planting bases or payment yields. Instead, LDP payments are based on current production levels and the posted county price at the time a producer chooses to exercise LDP's. In this example, a producer chose to exercise LDP's for corn when the posted county price was \$1.92. The county loan rate is assumed to be \$2.01 resulting in a payment of \$0.09 per bushel of corn produced for a total, in this example, of \$11,509. Similar calculations result in LDP's for soybeans of \$0.60 per bushel produced. The posted county price for wheat was not below the county level loan rate resulting in no LDP payments for the example producer's wheat production.

Summary

The 2002 Farm Bill continues the direct payment and loan deficiency payments system that was introduced in the 1996 Farm Bill. In addition, the new Farm Bill introduces a counter-cyclical payment to offset reductions in commodity prices. The new counter-cyclical payments will be paid on a historical production base consisting of base acres and payment yields that may be updated to reflect average production levels in 1998 through 2001. In addition, the new Farm Bill lowers the loan rate for soybeans and raises the loan rate for corn and wheat. To offset the lower loan rate for soybeans, a direct payment and counter-cyclical payment is introduced in the 2002

Farm Bill, requiring producers to create an historical acreage and yield base for soybeans. Finally, the new Farm Bill maintains the planting flexibility introduced in the 1996 Farm Bill. However, the introduction of base acres of soybeans reduces the flexibility that Indiana and other Cornbelt producers have to grow fruits and vegetables on some of their acreage without sacrificing current or future government payments.

Currently the USDA is finalizing most of the rules for implementing the new Farm Bill. Producers are now faced with several important decisions that affect the amount of support they receive from the government over the next six years. April 1, 2003 is the deadline for signing up acreage and yield update options. This article illustrates payment provisions in the 2002 Farm

Bill and has attempted to clarify some of the decisions that will need to be made over the next several months.

If you have further questions please contact the Department of Agricultural Economics at Purdue University (765) 494-4205.

Editor's note: *The author's deal with the direct and counter-cyclical payments as separate parts of the 2002 Farm Bill for clarity. Others, including the Farm Service Administration, present the same information under the heading of Direct and Counter Cyclical Payments (DCP) as though the two are one aspect of the 2002 Farm Bill. Every individual with an interest (tenant or owner) in farmland should be knowledgeable of the 2002 Farm Bill requirements and options. Accuracy of the law and regulations, and data with respect to an individual's*

Worksheet 1. Government Payments Calculator

	Crop #1	Crop #2	Crop #3	Total
Crop Name	Corn	Soybeans	Wheat	
Direct Payment Calculations				
1 Payment Rate (\$/bu.)	\$0.28	\$0.44	\$0.52	
2 Base Acres	812.44	687.56	150.00	
3 Direct Payment Yield	120.00	35.44	58.00	
4 Adjustment Factor	0.85	0.85	0.85	
Total Direct Payments (1) X (2) X (3) X (4)	\$23,203	\$9,114	\$3,845	\$36,163
Direct Payments per Base Acre	\$28.56	\$13.26	\$25.64	
CCP Payment Calculations				
5 Target Price	2.60	5.80	3.86	
6 Direct Payment Rate	0.28	0.44	0.52	
7 Effective Target Price (5) - (6)	2.32	5.36	3.34	
8 Marketing-Year Price	2.05	4.75	2.85	
9 Loan Rate	1.98	5.00	2.80	
10 Higher of (8) or (9)	2.05	5.00	2.85	
11 CCP Payment Rate (7) - (10)	0.27	0.36	0.49	
12 Base Acres (Same as (2) above)	812.44	687.56	150.00	
13 CCP Payment Yield	141.00	42.31	69.73	
14 Adjustment Factor	0.85	0.85	0.85	
Total CCP Payments (11) X (12) X (13) X (14)	\$26,290	\$8,901	\$4,356	\$39,548
CCP Payments per Base Acre	\$32.36	\$12.95	\$29.04	
LDP Calculations				
15 Planted Acres	825	700	125	1,650
16 Actual Yield (bu./ac.)	155	51	73	
17 County Loan Rate (\$/bu.)	\$2.01	\$5.14	\$2.83	
18 Posted County Price on Exercise Date	\$1.92	\$4.54	\$2.84	
19 LDP Rate (17) - (18), if less than 0 then put 0 here	\$0.09	\$0.60	\$0.00	
Total LDP Payment (15) X (16) X (19)	\$11,509	\$21,420	0	\$32,929
LDP Payments Per Planted Acre	\$13.95	\$30.60	0.00	
Total Payments	\$61,002	\$39,436	\$8,201	\$108,639
Total Payments per Planted Acre	\$73.94	\$56.34	\$65.61	\$65.84

farmland interest should be verified with the local Farm Service Administration county executive director.

While cash-rent landlords are not producers (don't directly share in payments) for Farm Bill payment purposes, they (or a knowledgeable, legal representative) should evaluate the 2002 Farm Bill provisions and options. The choices under this new law will impact the Farm Bill payments for their land. Rented parcels are often pooled to constitute a "farm" for a tenant/producer under price and income support

legislation and regulations. It is possible that a given landlord's parcel with a high corn base relative to tillable acres and high historic yields could be disadvantaged under a pooled arrangement.

Payment limitations in the 2002 Farm Bill may encourage producers to seek formal business reorganizations. The implications of various entities (corporations, partnerships, limited liability companies, ...) under the new Farm Bill should be checked with the rules of the Farm Bill before taking action. Lastly, individuals should be aware that

there is an appeal procedure for what may be adverse interpretations and rulings. If significant disputes arise, the affected individual may want to contact legal counsel who is an expert in these matters.

Note, there are farm bill decision calculators at other sites on the web including one from Texas A&M at <www.afpc.tamu.edu/models/base> and another by the University of Missouri at: www.fapri.missouri.edu/. Also, see the Farm Service Administration site at: <www.fsa.usda.gov/pas/farmbill/>.

Economics of Site-Specific Lime Management in Indiana

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Soil pH is the most spatially variable among the manageable characteristics of Indiana soils. It is not unusual for soil pH tests to vary from 4.5 to almost 8 within a field. The optimal range for most Indiana crops and soils is between 6.0 and 6.8. Liming for the field average pH can result in significant yield losses because some areas are overlimed and others receive too little. Site-specific lime application attempts to vary applications within fields so that pH in each area is corrected to the optimal range. Unfortunately, site-specific lime management, with intensive soil tests and variable rate applications, costs money. The study reported here estimated returns to alternative liming strategies based on representative soil test data from

fields in southwestern and east central Indiana. The crop response to liming was estimated from published trials on several experiment stations in the U.S. The goal was to determine if reduced lime application and yield gains from site-specific lime management could cover the extra costs.

In Indiana, variable rate application (VRA) of lime is often considered a good place to start site-specific management (SSM). In addition to the variability of soil pH, there are several factors that favor VRA lime.

- The equipment cost is modest because conventional lime spreaders can be retrofitted relatively inexpensively to do VRA.
- The optimal pH range is relatively narrow, and yields

decrease when the pH is too high. This is unlike phosphate and potassium, which do not usually show yield decreases because of overapplication.

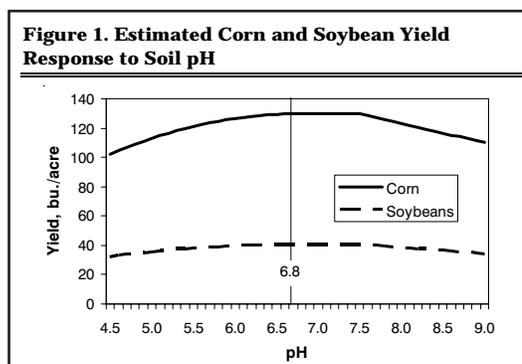
- Though lime itself is relatively cheap and plentiful in Indiana, liming fields can be an expensive exercise because of the large quantities of lime required to change pH.

Production Strategies

Two SSM lime strategies were studied. First, SSM using agronomic recommendations (SSM-Agronomic) was studied. This approach grid samples the field and applies the recommended rate of lime to the individual grid cells using the agronomic recommendation rules from the *Tri-State Fertilizer Recommendations*.

Second, SSM with the economic rule (SSM-Economic) was considered. This approach is similar to SSM-Agronomic, but uses the economic rule, marginal value product equal to marginal factor cost ($MVP = MFC$), to determine the recommended rate of lime to the individual grid cell. SSM-Economic requires information on the crop response to pH.

To evaluate profitability, the SSM strategies are compared to the whole



field management (WFM) strategy, considered here as the baseline case. WFM requires a composite soil test, resulting in an average pH for the field and a single rate for lime application, using the agronomic recommendation rule. This is the most common current practice in the state. The option of doing nothing is also reported for comparison purposes as the control case.

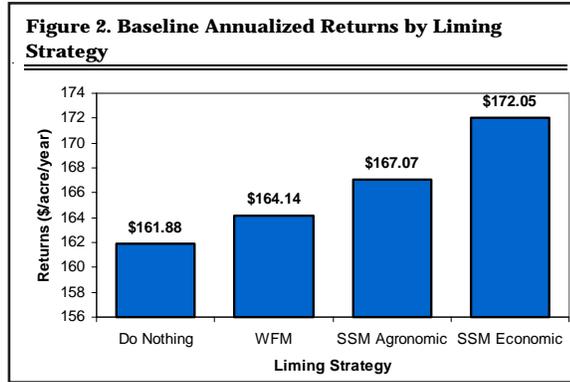
The methodology involves a spreadsheet model of a corn and soybean rotation over a four-year period. Four years is a typical soil sampling cycle. A spreadsheet model was used, because field trials to answer the question of VRA profitability for lime would take long-term field studies (at least four years and probably eight). By the time the studies were completed, many Indiana producers would have already made their decision about VRA lime. The spreadsheet model permits timely results that can help producers make those decisions.

The estimates of crop responses to lime are shown in Figure 1 as relative yields. The maximum yield of both corn and soybeans was obtained at a pH of 6.8. The negative effects on yields at high pH levels were modeled using a weed science rule of thumb of a 1% decline in yields for each one tenth (0.1) increase in pH over 7.5.

The spreadsheet model was used to estimate returns to alternative liming strategies for 22 fields in the east central and southwestern Indiana that had been grid soil sampled. The estimate assumes that lime is custom applied. The cost for VRA is \$3/a higher than uniform application. Because the corn and soybean rotation liming benefits vary from year-to-year, returns over the four-year period were annualized to provide a single measure of profitability for each liming strategy. An annualized value is the constant annual cashflow that has the same net present value as a series of irregular cashflows. The discount rate used in annualization was 10% annually.

Results

The average annualized returns for all study fields show that VRA lime



has substantial benefits (Figure 2). Under baseline conditions, the average benefit of SSM agronomic over WFM is almost \$3 per acre (Figure 2). This is greater than the \$2.26/a average gain in moving from a “do nothing” approach to WFM for these fields.

With more information about pH response, returns could be increased even further. The SSM economic strategy shows an annualized benefit of \$5.84/a over the SSM agronomic and \$7.91/a over WFM.

Because six of the fields in southeastern Indiana had information from 0.11-acre grids, it was possible to do a sensitivity analysis on grid size. With 1-acre grids, four of the fields require some lime.

The results with 2.5-acre grids are similar to those shown for the whole 22-field sample. SSM agronomic showed about a \$2.50/acre benefit over WFM (Figure 3). With a 1-acre grid, the cost of soil sampling more than wiped out the benefits of SSM agronomic. SSM economic shows much reduced benefits with the 1-acre grid.

Custom application fees for VRA vary widely. For this study, the baseline assumption was a \$3/acre additional fee for VRA. With a \$6/acre charge for VRA lime, annualized benefits drop slightly, but both SSM strategies continue to be more profitable than WFM (Figure 4). The decrease in the annual return is less than with the \$3 VRA cost because the fee is spread over the four years.

Conclusions

The results indicate that with either the SSM agronomic recommendations or the economic optimization, VRA of lime is profitable as a stand-alone technology on the Indiana fields studied. The overall results indicate that SSM-Agronomic provides an increased annual return by almost \$3/acre over WFM and that SSM-Economic provides an increased annual return of \$7.91/acre over WFM. Because of the extra cost of sampling, returns are higher on a 2.5-acre grid than on a 1-acre grid. Sensitivity testing indicates that SSM strategies for lime are more profitable

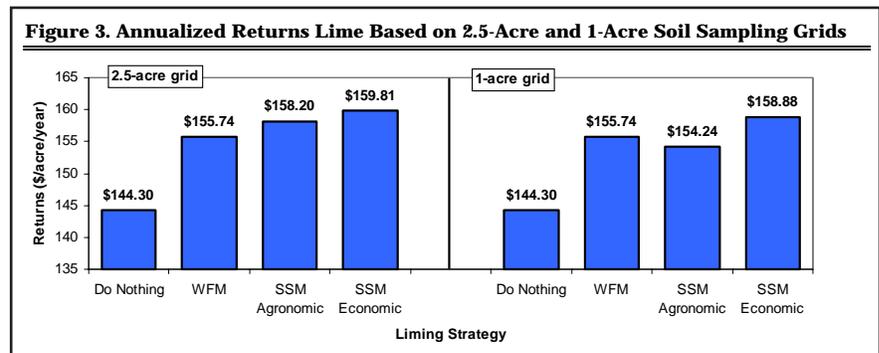
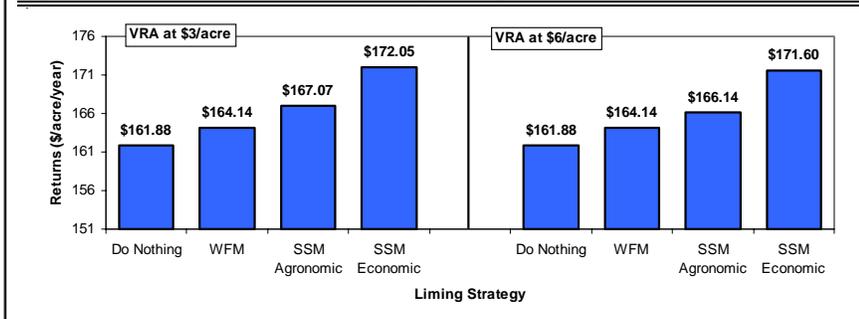


Figure 4. Annualized Returns from Liming Strategies with a \$6/Acre VRA Fee

than WFM over a wide range of prices and conditions.

For More Information:

Bongiovanni, R. and J. Lowenberg-DeBoer, "Economics of Variable Rate Lime in Indiana," *Precision Agriculture*, 2 (2000), p. 55-70.

Vitosh, M, J. Johnson and D. Mengel, *Tri-State Fertilizer Recommendations for Corn, Soybeans, Wheat and Alfalfa*, Michigan State University, Purdue University and Ohio State University, Extension Bulletin E-02567, 1995.

Indiana Farmland Lease Law

Gerald A. Harrison, Extension Economist, and member, Indiana Bar

Landlords may want to evaluate their land under the terms of the new Farm Bill before deciding on a leasing arrangement or rental rate for 2003 and beyond. Landlords and tenants may need assistance in interpreting the alternatives.

Farm program payments will not be issued to a producer for a farm until there is a new or continuing lease in the local FSA office. It may be wise to effectively terminate the existing lease. If a lease is not effectively terminated, the tenant may have a lease on the same terms as for the current year. A written notice is best and requires an expression of a termination of an existing lease, the identification of the existing landlord and tenant,

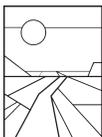
description of the land, date, and signature of the notice maker. An example of a termination notice is in the Indiana law at 32-7-1-4. Delivery of the notice is also important. The best proof of delivery may be a "sheriff's receipt." Generally, and especially where relationships are no longer cordial, a lawyer's assistance is recommended. A notice to terminate may be required especially in situations where there is an oral lease.

Generally, when a termination notice is required, the law says it must be delivered at least three months before the end of the "lease year." The year-end date for farmland leases is not in the law. By custom, it may be the day before March 1. But that may not be the

effective date in a specific situation. It is wise to get a termination notice out as early as possible to be sure the notice is timely. An early notice date gives the tenant time to make appropriate farm management decisions.

If a term lease is in force, rights and obligations exist between a beginning and an ending date, and needs no notice to terminate. But when in doubt, a notice should do no harm, or a meeting could be setup to review the lease and make necessary changes while there is time to make management decisions. If necessary information is not available, then flexibility could be added to the lease or the final lease could be put on hold.

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