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Weekly Farm Economics: Projected Corn-Soybean Returns Do Not Suggest Shift to Corn in Illinois: An Application of the Planting Decision Model

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Returns projected using default budgets in the *Corn-Soybeans Rotation Tool* indicate that corn-soybean rotations have higher projected returns than continuous corn, given that commodity prices are at current harvest-time bids. These projected returns do not suggest shifts in acres from soybeans to corn in Illinois. In this article, the *Corn-Soybean Rotation Tool* used to make these projections is described. Then, commentary on 2012 planting decisions is given.

Planting Decision Model

The *Corn-Soybean Rotation Tool* is contained within the *Planting Decision Model*, a FAST spreadsheet available for download from the *FAST section of farmdoc* (www.farmdoc.illinois.edu/fasttools). The Planting Decision Model is a Microsoft Excel spreadsheet that runs on Windows based machines having Excel 2003 or higher. Besides the *Corn-Soybean Rotation Tool*, the *Planting Decision Model* includes tools that:

- Evaluate corn, soybean, and wheat rotations. This tool is useful for farms with wheat in their rotations, such as farms in southern Illinois.
- Estimates yields and returns by planting date. If planting is delayed, this information is useful for determining whether to switch from corn to soybeans.
- Estimates returns from taking prevented planting payments from crop insurance. When planting is delayed beyond final planting dates contained in crop insurance policies, this tool estimates returns from taking prevented planting or from planting a crop, thereby providing an return estimates when make prevented planting decisions.
- Estimates returns from replanting corn. If an uneven stand of corn has emerged after planting, this tool will estimate returns from replanting the damaged stand or keeping the damaged stand till harvest.

Figure 1. *Corn-Soybean Rotation Tool* with Central Illinois High-Productivity Farmland Defaults.

Budget Input Default = Central Ill. -- High	Corn-After-Soybeans	Corn-After-Corn	Soybeans-After-Corn	Soybeans-After-Two-Years-Corn
Average yields (bu. per acre	198	188	56	58
Market price (per bu.)	$5.25	$5.25	$13.00	$13.00
Crop Revenue	$ 1,040	$ 987	$ 728	$ 754
Other Revenue 1	0	0	0	0
Other Revenue 2	0	0	0	0
Government Payments	24	24	24	24
Revenue per acre	$ 1,064	$ 1,011	$ 752	$ 778
Direct Costs	$ per acre			
Fertilizer and lime	$ 160	$ 170	$ 58	$ 58
Pesticides	45	51	31	31
Seed	103	103	63	63
Drying and storage	32	31	6	6
Crop insurance	18	18	12	12
Other Direct Expense	0	0	0	0
Total Direct Costs	$ 358	$ 373	$ 170	$ 170
Power Costs				
Machine hire/lease	$ 8	$ 8	$ 8	$ 8
Utilities	4	4	4	4
Machine repair	18	18	17	17
Fuel and Oil	17	17	11	11
Light Vehicle	2	2	1	1
Machinery depreciation	43	43	39	39
Other Power Expense	0	0	0	0
Total Power Costs	$ 92	$ 92	$ 80	$ 80
Overhead Costs				
Hired labor	$ 13	$ 13	$ 12	$ 12
Building repair and rent	5	5	4	4
Building depreciation	6	6	3	3
Insurance	10	10	10	10
Misc.	8	8	7	7
Interest (non-land)	13	13	12	12
Other Overhead Expense	0	0	0	0
Total overhead costs	$ 55	$ 55	$ 48	$ 48
Total non-land costs	**$ 505**	**$ 520**	**$ 298**	**$ 298**
Return to land and operator	**$ 559**	**$ 491**	**$ 454**	**$ 480**

The layout of the *Corn-Soybean Rotation Tool* is shown in Figure 1. The tool contains corn-after-soybeans, corn-after-corn, soybeans-after-corn, and soybeans-after-two-years-corn budgets. Each budget contains defaults for yields, prices, and non-land costs. Users can modify these items. Also,

default budgets are available for northern Illinois, central Illinois for farms with high-productivity farmland, central Illinois for farms with low-productivity farmland, and southern Illinois. Any time there is an Internet connection, these budgets can be updated with current values from the farmdoc website.

Figure 1 shows default budgets for central Illinois high-productivity farmland, with commodity prices modified to reflect current harvest-time bids. These budgets have corn and soybean prices of $5.25 and $13.00 per bushel, respectively. Yields are 198 bushels per acre for corn-after-soybeans, 188 bushels per acre for corn-after-corn, 56 bushels per acre for soybeans-after-corn, and 58 bushels per acre for soybeans-after-two-years-corn. Non-land costs are $505 per acre for corn-after-soybeans, $520 per acre for corn-after-corn, and $298 per acre for both soybean budgets. Operator and farmland returns then are:

- $559 per acre for corn-after-soybeans,
- $491 per acre for corn-after-corn,
- $454 per acre for soybeans-after-corn, and
- $480 per acre for soybeans-after-two-years-corn.

All corn budgets are projected to be more profitable than soybeans. However, planting all corn leads to all corn-after-corn in future years, which often has lower returns than rotations. As can be seen in the upper-right corner of Figure1, the *Corn-Soybeans Rotation Tool* reports calculates returns for three rotations:

- Corn-soybeans rotation which has a projected operator and land return of $506 per acre,
- Corn-corn-soybeans rotation which has a return of $510 per acre, and
- Continuous corn which has a return of $491 per acre.

Note that there is only a $4 per acre difference in returns from the corn-soybeans and corn-corn-soybeans rotations: $506 for corn-soybeans versus $510 for corn-corn-soybeans. Both rotations have higher returns than continuous corn.

Commentary on 2012 Planting Decisions

Table 1. Projected 2012 Rotation Returns by Region of Illinois.[1]

	Northern Illinois	Central Illinois high-prod	Central Illinois low-prod	Southern Illinois
	$ per acre			
Corn-soybeans	451	506	463	351
Corn-corn-soybeans	448	510	462	345
Continuous corn	416	491	432	319

[1] Projections made using default budgets in the Planting Decision Model using a $5.25 corn price and $13.00 soybean price

For high-productivity farmland in central Illinois, corn is projected to be more profitable than soybeans. However, planting all corn in 2012 could lead to lower returns in future years, as corn-after-corn has lower returns than rotations. More discussion of long-run rotation considerations is given here. Given these long-run considerations, it does not seem likely that central Illinois farmers will shift acres from soybeans to corn, particularly given substantial reductions in corn-after-corn yields relative to corn-after-soybeans yields that many farms experienced in recent years.

Central Illinois high-productivity farmland usually has returns that are more favorable to corn than other areas of the state. Table 1 shows rotation returns for northern Illinois, central Illinois with low

productivities farmland, and southern Illinois. In all cases rotations have higher returns than continuous corn.

Summary

The *Corn-Soybean Rotation Tool* is used to make projections of 2012 crop returns. Projected returns suggest that rotations are more profitable than continuous corn, suggesting that there will not be a shift in acres to corn in Illinois.