The recent boom in ethanol production and the planned expansion could significantly shift the demand for corn. One of the major questions is how high the market price for corn will have to rise to pull enough acres out of other crops and into corn to satisfy this new demand.

The total number of acres planted to the principal crops (corn, wheat, oats and hay) in Iowa has been relatively constant over the past 70 years. In 1930, there were 21,969,000 acres planted and in 2006 there were 24,625,000 acres. This is an increase of approximately 12%. The highest number of acres planted to the principal crops occurred in 1980, when there were 26,610,000 acres planted. The fewest number of acres planted occurred in 1940, when there were 20,381,000 acres.

The composition of those planted acres has changed dramatically. In 1930, corn occupied approximately half the planted acres (52%), oats almost a third (29%) and all hay (15%). The remainder of the acres was divided among the other crops (soybeans represented less than 1%). By 1970, corn still represented almost half the acres (48%), but oats had dropped to 12% and soybeans had increased to 26% of the acres. In 2005, corn still occupied almost half the planted acres (51%), but soybeans represented 41% and all hay 6%. Corn acres have consistently accounted for almost half the acres planted in Iowa for many decades, even with all the changes that have occurred.

Corn and soybeans, in 2005, occupied 92% of the crop land acres and the division between the two crops was 56% corn versus 44% soybeans. The percentage of acres in corn and soybeans has been increasing over the past several decades. Also, there has been a move towards a more equal division between the two crops.

Ethanol and the new demand for corn could change this pattern in Iowa. Corn based ethanol and the possibility for using corn stover for cellulosic ethanol provides a new market outlet for corn. This new demand raises several interesting prospects for Iowa agriculture. Corn has never accounted for more than 55% (in 1976) of the planted acres in the past 75 years. The acres devoted to corn and soybeans have been moving closer together over the past several years. These facts raise several questions: how high the market price will have to go to attract the corn acres (?); are there enough acres for all the corn in Iowa (?); and what will be the impacts of significant increases in corn prices on other sectors of the economy?

Inputs

The major inputs to consider when evaluating different rotations are the expected yields for first and second year corn, continuous corn and soybeans. There are several issues to consider when deciding upon which yield should be used for the different rotations. A Rotation Profitability Calculator has been developed to easily compare corn-soybeans, corn-corn-soybeans, and continuous corn rotations.

When deciding on a yield goal, you should use the expected yield, not the best yield that is possible. This should be for your situation and be sure to remember to use an average of the past several years. Most of Iowa has experienced favorable growing conditions over the past several years. Iowa’s average corn yield has been 162 bushels per acre since 2000. The average yield since 1995 is 152 bushels per acre. It is always tempting to use the highest yield but a realistic yield will give you a better comparison.

A question asked recently is whether or not there is still a rotation impact on corn yields. Many people feel that the new hybrids have eliminated the yield
difference. The research shows that under favorable conditions, with relatively high corn yields, the yield drag for second corn is lessened. But, with normal or adverse conditions there is a yield penalty for planting corn on corn. This difference varies considerably by site, year and level of fertilization. In general, a 10 to 15% yield drag appears to be common. Research has shown that even with stacked Bt and root worm traits there still is a yield difference between first and second year corn.

The relatively favorable growing conditions over the past few years may be why some feel the yield penalty is gone. Another reason may be that people are comparing corn yields beyond first and second year corn. Research shows that after the initial year the drag tends to level out. In other words, the difference between first and second year corn is much greater than the difference between more years of corn on corn.

The appropriate soybean yield is also important when comparing the returns to the rotations. Since 2000, on average, corn yields have been 3.6 times the soybean yields. From 1995, there has been 3.37 bushels of corn per bushel of soybeans, on average. Remember to use the most appropriate ratio of corn to soybeans for your situation.

In the associated decision tool, the land charge should be the cash rent or a suitable charge per acre. The remaining inputs are self-explanatory. Always be sure to use values that are appropriate for your situation.

Calculations
Costs in the spreadsheet are calculated at two levels. Drying, hauling and fertilizer costs are estimated based on the yield and the costs given. The other variable costs are those reported in Information File A1-20 / Iowa State University Extension Publication FM 1712, Estimated Costs of Crop Production in Iowa.

The spreadsheet shows the return to management under three alternative rotations. The return to management is after all costs, including the land charge, have been subtracted.