

Crop and Livestock Land Use Analyzer: A Tool to Compare Land Use Alternatives

Due to rolling terrain and highly variable soil characteristics, land in some regions of Iowa has a variety of possible uses related to agriculture as well as conservation and recreation. Landowners and operators must take a long-range view when making decisions about the highest and best use of their land. Their primary agricultural alternatives are:

- Harvested crops, including corn, soybeans, small grains and forages
- Pasture to support livestock enterprises, such as cow/calf, stocker cattle and sheep flocks
- Long-term retirement such as the Conservation Reserve Program (CRP)

The figure below shows the mix of pasture and CRP uses in Iowa, and how they changed from the 2007 Census of Agriculture to the 2012 Census. Total pastureland declined by 21 percent in five years. Most of the decline came in “tillable” pasture land, that is, land that could be converted from pasture to harvested crops without improvements. CRP acres also decreased, by 36 percent.

Landowners have several considerations that will influence their choices of land use:

- Potential for long-term profits from crop production
- Profit potential from production of forages to support livestock production
- Potential soil loss and nutrient runoff and the cost of controlling it

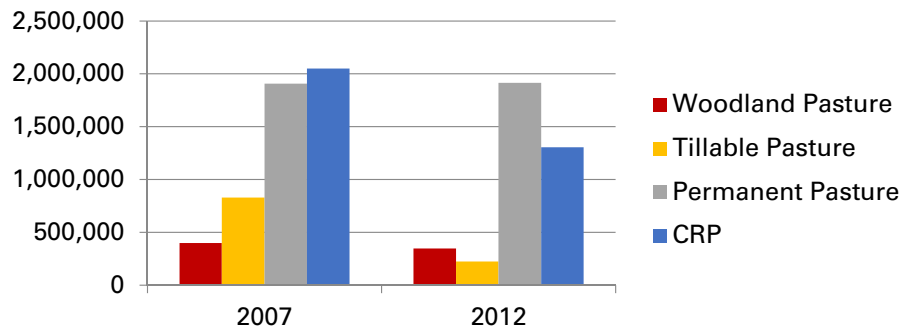
- Long-term soil productivity
- Wildlife habitat and other conservation concerns

Extension specialists from Iowa State University (ISU) with collaboration from representatives from the Natural Resources Conservation Service (NRCS) and the Farm Service Agency (FSA) have developed a decision tool to help landowners compare the potential long-term effects for each of the alternatives listed above for their individual land holdings. This tool is available to the public on the Ag Decision Maker website (www.extension.iastate.edu/agdm) as well as the Iowa Beef Center website (www.iowabeefcenter.org/).

Harvested Crops

The land use analysis tool compares up to three different crop rotations that can include corn, soybeans, oats, alfalfa or alfalfa-grass hay, and a fall-seeded cover crop. Up to three types of pasture can also be compared, as well as enrollment in the CRP. Livestock enterprises include beef cow-calf and summer grazing of stocker cattle. Besides estimating annual costs and returns, a summary of hay and pasture production and requirements is provided, annual labor requirements are estimated,

Figure 1. Acres in Pasture and CRP, Iowa



Source: 2012 Census of Agriculture. U.S. Department of Agriculture

and potential soil loss resulting from each combination of crops and livestock is calculated.

Naturally, a considerable amount of data must be inputted to come up with these results. First, annual budgets for each crop and livestock enterprise are provided, but the user can change any of the costs, prices or production values. Second, a data base of all Iowa soil series is stored. When the user specifies the county and number of each soil series on the farm, and the number of acres it contains, the tool retrieves data about potential yields, CSR2 values, slope and erosion class.

Conservation Structures

The user can also specify any of several permanent conservation structures, and the cost of installing each of them. Possible structures include diversion barriers, field borders, grassed waterways, contour buffer strips, riparian buffer strips, grass backed terraces, narrow base terraces, and water/sediment basins. The initial costs of installing these structures are estimated and amortized over their expected lives. Annual maintenance costs are also considered, as well as possible reductions in harvested crop area.

Land Conversion

Finally, there may be costs for converting land from its current use to a different use. If pasture or CRP land is being converting to crops, this could entail breaking up sod, spraying herbicides, clearing land and laying out terraces. If land is being converted to livestock use, investments in fences, ponds and water systems may be necessary. Pastures may need to be reseeded or renovated.

The estimated initial costs of these conversions are amortized over their expected useful lives. All of this information is arranged in a series of worksheets that contain example data, but allow the user to input his or her own values, as well.

Price Assumptions

Converting land from one use to another is a long-term decision. Thus, selling prices for crops and livestock should be based on long-term forecasts, not predictions for the coming season. It is especially important that the prices assumed for the various crops and livestock are in reasonable proportion to each other, so as not to bias the results. Links to long-term price forecasts made by the Food and Agriculture Policy Research Institute (FAPRI), based at the University of Missouri, for the period 2014 through 2022 are embedded in the decision tool. In addition, table 1 shows estimated price ratios based on annual market prices observed from 2005 through 2014.

Conservation Reserve Program

The Conservation Reserve Program (CRP) has been an option for Iowa landowners for many years. Potential payments have been adjusted over the years to make CRP contracts competitive with crop production. In recent years some landowners with expiring CRP contracts have opted to return the land to crop production or pasture, to take advantage of favorable commodity prices, rather than re-enroll it. Currently land must have been planted to crops four out of six years during the period 2002-2007, and have an erosion index of 8 or higher to qualify for CRP enrollment. Landowners must submit a contract offer. Each parcel receives an Environmental Benefits Index

Table 1. Ratio of Commodity Prices to the Price of Corn

Crops		Livestock	
Corn, \$ per bushel	1.00	550-lb. steer Calves, \$ per hundredweight	34.8
Soybeans, \$ per bushel	2.41	750-lb. steer Calves, \$ per hundredweight	30.3
Oats, \$ per bushel	0.69	Cull cows, \$ per hundredweight	16.5
Alfalfa hay, \$ per ton	32.6		
Alfalfa-grass hay, \$ per ton	22.6		

score, which is used to rank the bids. The highest ranked parcels are accepted until funding is exhausted. The decision tool contains a database with the average CRP payments currently being paid in each county. In addition, partial grazing and haying of CRP acres can be included in the analysis.

USDA Programs and Multiple Peril Crop Insurance

Converting pasture or CRP land to row crops has some implications for eligibility for USDA programs. “Sodbuster” rules require landowners who break out land that was not in tilled crops during 1980-1985 to be in compliance with an approved conservation plan in order to remain eligible for USDA farm commodity programs, including premium subsidies for multiple peril crop insurance. “Newly broken” land cannot be added to a farm’s base acres for USDA programs. CRP acres cannot be added unless they were

previously included in the farm’s base acres. For purposes of MPCCI crop insurance coverage, “newly broken” acres receive an actual production history (APH) yield equal to 65 percent of the county T-yield, until an actual yield history is established. Former CRP acres start with an APH yield equal to 100 percent of the county T-yield.

Summary

Balancing profits and conservation in a long-term land use decision requires careful budgeting and reliable data. The new land use decision aid can help producers organize the relevant information and compare alternatives. Landowners and producers are encouraged to input their own values into the decision tool to develop a comprehensive evaluation of options on their own land.

Visit the [Ag Decision Maker](#) website to access the Decision Tool, [Crop and Livestock Land Use Analyzer](#).

... and justice for all

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