



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

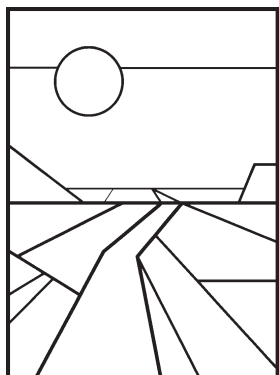
Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



PURDUE AGRICULTURAL ECONOMICS REPORT

AUGUST 2007

Indiana Farmland Values & Cash Rents Jump Upward

Craig L. Dobbins, Professor and Kim Cook, Research Associate

What a difference a year can make. Last year at this time, there were questions about whether or not farmland values were nearing a top. There are no such discussions this year. This year the question is “How high might farmland values and cash rent go?”

State-wide Land Values

Higher corn and soybean prices brought about by the increased demand for these crops are being translated into higher farmland values and cash rents. The June 2007 Purdue Land Value Survey found that farmland values in all areas of the state took a sharp turn upward. On a state-wide basis, the average value of bare Indiana cropland ranged from \$2,991 per acre for poor quality land to \$4,407 per acre for top quality land (Table 1). Average quality Indiana cropland had an estimated average value of \$3,688 per acre. For the 12-month period ending in June 2007, this was an increase of 19.2%, 16.6%, and 16.9%, respectively for poor, average, and top quality land. One needs to go back to 1977 to find a larger annual increase in Indiana farmland values.

Land quality was measured in the survey by asking survey respondents

** The median is the middle observation in data that have been arranged in ascending or descending numerical order.*

to provide an estimate of long-term corn yields. The average reported yield was 112, 144, and 175 bushels per acre, respectively for poor, average, and top quality land. State-wide, the value per bushel for different land qualities was very similar, ranging from \$25.15 to \$26.80 per bushel. On a per bushel basis, the most expensive land is the poor quality land with a value of \$26.80 per bushel. Top quality land was the least expensive at \$25.15 per bushel.

The average value of transitional land, land moving out of agriculture, increased 4.5% this year. The average value of transitional land in June 2007 was \$9,520 per acre. However, there is a very wide range of values for transitional land – from twice its agricultural value to more than ten times its agricultural value. These values are strongly influenced by what the land is transitioning into and its location. Due to the wide variation in estimates for transitional land, the median value* may give a more meaningful picture than the arithmetic average. The median value of transitional land in June 2007 was \$7,500 per acre.

Survey respondents indicated the value of rural recreational land, land used for hunting and other recreational uses, is \$3,873 per acre across Indiana. This average is more than average quality farmland. But as with transitional land, there is a wide range of values for rural recreational

land. The June values reported for recreational land varied from \$975 to \$10,000 per acre. The median value for rural recreational land in June was \$3,500 per acre.

State-wide Rents

One important contributor to the value of farmland is the annual rent that can be obtained from ownership. State-wide, cash rents increased \$10 to \$16 per acre (Table 2). The largest dollar increase in rent was for top quality land. The smallest dollar increase in rent was for poor quality land. The estimated cash rent was \$171 per acre on top quality land, \$139 per acre on average quality land, and \$110 per acre on poor quality land. This was an increase in rental rates of 10% for poor quality land, 9.4% for average quality land, and 10.3% for top quality land. Again, this is the largest annual increase in cash rent since 1977. State-wide, rent per bushel of estimated corn yield ranged from \$0.97 to \$0.99 per bushel.

Cash rent as a percentage of value continued to decline. For top quality farmland, cash rent as a percentage

In This Issue

Indiana Farmland Values & Cash Rents Jump Upward	1
Food Inflation Perks Up With BioFuels	9

Table 1. Average estimated Indiana land value per acre (tillable, bare land) and per bushel of corn yield, percentage change by geographical area and land class, selected time periods, Purdue Land Values Survey, June 2007¹

Area	Land Class	Corn bu/A	Land Value					Land Value/Bu			Projected Land Value	
			June 2006	Dec 2006	June 2007	Change		Amount 2006	Amount 2007	Change 6/06-6/07	Dec. 2007	Change 6/07-12/07
			\$/A	\$/A	\$/A	%	%	\$	\$	%	\$	%
North	Top	181	3,773	4,134	4,438	17.6	7.4	21.63	24.57	13.6	4,524	1.9
	Average	145	3,082	3,370	3,623	17.6	7.5	21.95	25.04	14.1	3,738	3.2
	Poor	112	2,383	2,818	2,971	24.7	5.4	22.26	26.51	19.1	3,083	3.8
Northeast	Top	173	3,469	4,106	4,396	26.7	7.1	21.12	25.36	20.1	4,485	2.0
	Average	143	2,936	3,479	3,696	25.9	6.2	21.71	25.84	19.0	3,810	3.1
	Poor	110	2,382	2,945	3,089	29.7	4.9	22.69	28.06	23.7	3,157	2.2
W. Central	Top	177	4,027	4,402	4,663	15.8	5.9	23.41	26.39	12.7	4,806	3.1
	Average	147	3,456	3,759	4,006	15.9	6.6	24.36	27.27	11.9	4,136	3.2
	Poor	114	2,777	3,014	3,215	15.8	6.7	24.81	28.24	13.8	3,296	2.5
Central	Top	177	4,067	4,416	4,723	16.1	7.0	23.65	26.69	12.9	4,933	4.4
	Average	147	3,430	3,761	3,966	15.6	5.5	24.14	26.93	11.6	4,103	3.5
	Poor	117	2,794	3,071	3,219	15.2	4.8	25.03	27.50	9.9	3,312	2.9
Southwest	Top	177	3,684	4,016	4,161	12.9	3.6	21.29	23.51	10.4	4,232	1.7
	Average	145	2,928	3,150	3,296	12.6	4.6	20.85	22.79	9.3	3,338	1.3
	Poor	111	1,986	2,344	2,429	22.3	3.6	18.78	21.93	16.8	2,430	0.0
Southeast	Top	162	3,206	3,331	3,404	6.2	2.2	19.52	21.02	7.7	3,432	0.8
	Average	132	2,711	2,860	2,910	7.3	1.7	20.35	22.06	8.4	2,950	1.4
	Poor	99	2,233	2,455	2,522	12.9	2.7	22.29	25.38	13.9	2,542	0.8
Indiana	Top	175	3,770	4,155	4,407	16.9	6.1	22.14	25.15	13.6	4,525	2.7
	Average	144	3,162	3,485	3,688	16.6	5.8	22.69	25.61	12.9	3,796	2.9
	Poor	112	2,509	2,846	2,991	19.2	5.1	23.27	26.80	15.2	3,064	2.4
	Transition ²		9,113	8,579	9,520	4.5	11.0				9,896	3.9
	Rural Recreation ³		3,059	3,612	3,873	26.6	7.2				3,918	1.2

1 The land values contained in this summary represent averages over several different locations and soil types. If a precise value is needed for a specific property, this value can be determined by a professional appraiser.

2 Transition land is land moving out of production agriculture.

3 Rural recreation land is land located in rural areas used for hunting and other recreational uses.

of farmland value was 3.9%. For average and poor quality farmland, cash rent as a percentage of farmland value was 3.8% and 3.7%, respectively. Over the 32-year history of

the survey, rent as a percentage of farmland value has averaged 6.0%. The cash rent as a percentage of value in 2007 continues the downward trend in that began in 1987. It is

important to remember that the rent used in this calculation is the gross rent. Subtracting ownership expenses such as real estate taxes, maintenance, management, etc. from the gross rent will make the net rent as a percent of land value even lower.

Purdue Agricultural Economics Report is a quarterly report published by the Department of Agricultural Economics, Purdue University.

Editor

Gerald A. Harrison
Purdue University
Department of Agricultural Economics
403 W State Street
West Lafayette, IN 47907-2056
E mail: harrisog@purdue.edu
Phone: 765 494 4216 or
toll free 1 888 398 4636 Ext. 44216

Editorial Board

W. Alan Miller
Christopher A. Hurt
Philip L. Paarlberg

Layout and Design

Cathy Malady

Circulation Manager

Linda Klotz
Agricultural Economics Department
www.agecon.purdue.edu
PAER World Wide Web
www.agecon.purdue.edu/extension/pubs/paer/
Cooperative Extension Service Publications
www.ces.purdue.edu/extmedia/
Subscription to PAER
Paper copies of the PAER are \$12 per year (payable to Purdue University). Electronic subscriptions are free and one may subscribe at: www.agecon.purdue.edu/contact/contact.asp

Area Land Values

Survey responses were organized into six geographic regions of Indiana (Figure 1). As in the past years, there are geographic differences in land value changes. This year Northeast Indiana reported the strongest percentage increases in land value. Bare farmland in these areas was estimated to have increased by 25.9% to 29.7% (Table 1). The increase in value in the North, West Central, Central, and Southwest were also strong. For most of the productivity levels, the rate of increase ranged

Purdue University Cooperative Extension Service, West Lafayette, IN

Purdue University is an Equal Opportunity/Affirmative Action employer.

from 12.6% to 17.6%. The exceptions to this were the changes in the value of poor quality land in the North and Southwest with changes of 24.7% and 22.3%, respectively. The increase in farmland values in the Southeast was more modest, ranging from 6.2% to 12.9%.

The highest average farmland values are in West Central and Central Indiana. While the Central Indiana top and poor quality farmland values are slightly higher than those in West Central Indiana, average quality land values are slightly higher in West Central Indiana. Land value per bushel of estimated long-term corn yield (land value divided by bushels) is the highest in the Central and West Central regions, ranging from \$26.39 to \$28.24 per bushel. This was followed by the Northeast, ranging from \$25.36 to \$28.06 per bushel and the North, ranging from \$24.57 to \$26.51. The Southwest and Southeast had the lowest land values per bushel and ranged from \$21.02 to \$25.38 per bushel.

Area Cash Rents

All areas of the state reported an increase in cash rent for all land qualities (Table 2). The strongest percentage increases were in the North and Northeast, ranging in value from 12.3% to 14.9%. This was followed by Central and West Central Indiana with changes of 7.6% to 10.9%. The changes in the Southwest and Southeast ranged from 3.2% to 8.7%.

Cash rents are the highest in the West Central region, followed by the Central region. Cash rent per bushel in West Central Indiana ranges in value from \$1.06 to \$1.12 per bushel. In the Central region, these values ranged from \$1.01 to \$1.04 per bushel. Per bushel rents in these two regions are the highest in the state. Cash rents in the North are similar to those in Central and West Central Indiana. Cash rents in the North range from \$114 to \$180 per acre and \$1.00 to \$1.02 per bushel. The per bushel rent in the Northeast and Southwest ranged from \$0.89 to \$0.95. The lowest per bushel cash rents continue to be in

Table 2. Average estimated Indiana cash rent per acre, (tillable, bare land) 2006 and 2007, Purdue Land Value Survey, June 2007

Area	Land Class	Corn bu/A	Rent/Acre		Change '06-'07 %	Rent/bu. of Corn		Rent as % of June Land Value	
			2006 \$/A	2007 \$/A		2006 \$/bu.	2007 \$/bu.	2006 %	2007 %
North	Top	181	158	180	13.9	0.91	1.00	4.2	4.1
	Average	145	128	145	13.3	0.91	1.00	4.2	4.0
	Poor	112	101	114	12.9	0.94	1.02	4.2	3.8
Northeast	Top	173	141	162	14.9	0.86	0.93	4.1	3.7
	Average	143	114	128	12.3	0.84	0.89	3.9	3.5
	Poor	110	89	100	12.4	0.85	0.91	3.7	3.2
W. Central	Top	177	169	187	10.7	0.98	1.06	4.2	4.0
	Average	147	143	157	9.8	1.01	1.07	4.1	3.9
	Poor	114	118	127	7.6	1.05	1.12	4.2	4.0
Central	Top	177	164	181	10.4	0.95	1.02	4.0	3.8
	Average	147	136	149	9.6	0.96	1.01	4.0	3.8
	Poor	117	110	122	10.9	0.99	1.04	3.9	3.8
Southwest	Top	177	158	168	6.3	0.91	0.95	4.3	4.0
	Average	145	126	134	6.3	0.90	0.93	4.3	4.1
	Poor	111	92	100	8.7	0.87	0.90	4.6	4.1
Southeast	Top	162	124	128	3.2	0.75	0.79	3.9	3.8
	Average	132	97	102	5.2	0.73	0.77	3.6	3.5
	Poor	99	75	78	4.0	0.75	0.78	3.4	3.1
Indiana	Top	175	155	171	10.3	0.91	0.98	4.1	3.9
	Average	144	127	139	9.4	0.91	0.97	4.0	3.8
	Poor	112	100	110	10.0	0.93	0.99	4.0	3.7

the Southeast, ranging from \$0.77 to \$0.79 per bushel.

Rural Home Sites

Respondents were asked to estimate the value of rural home sites with no accessible gas line or city utilities and located on a black top or well-maintained gravel road. The median value for five-acre home sites ranged from \$7,000 to \$10,000 per acre (Table 3). Estimated per acre median values of the larger tracts (10 acres) ranged from \$6,000 to \$9,000 per acre.

Farmland Supply & Demand

To assess the supply of land on the market, respondents were asked to provide their opinion of the amount of farmland on the market now compared to a year earlier. The respondents indicated either more, the same, or less land was on the market than one year ago. Only 15.9% of the 2007 respondents indicated more land was on the market now compared to year-ago levels (Figure 2). The remaining 84.1% of the respondents indicated the amount of land on the market

Table 3. Median value of five-acre and ten-acre home sites

Area	Median value, \$ per acre							
	5 Acres or less for home site				10 Acres & over for subdivision			
	2004 \$/A	2005 \$/A	2006 \$/A	2007 \$/A	2004 \$/A	2005 \$/A	2006 \$/A	2007 \$/A
North	6,000	7,250	7,000	8,100	5,000	6,000	7,000	8,000
Northeast	6,000	6,500	7,000	8,000	5,000	5,000	6,000	9,000
West Central	6,000	6,000	7,500	8,000	5,000	6,000	7,500	8,000
Central	8,000	10,000	10,000	10,000	7,900	8,500	10,000	9,000
Southwest	5,000	5,000	5,000	7,000	5,000	5,250	7,000	6,000
Southeast	6,000	7,000	7,000	9,000	5,000	6,000	6,250	6,750

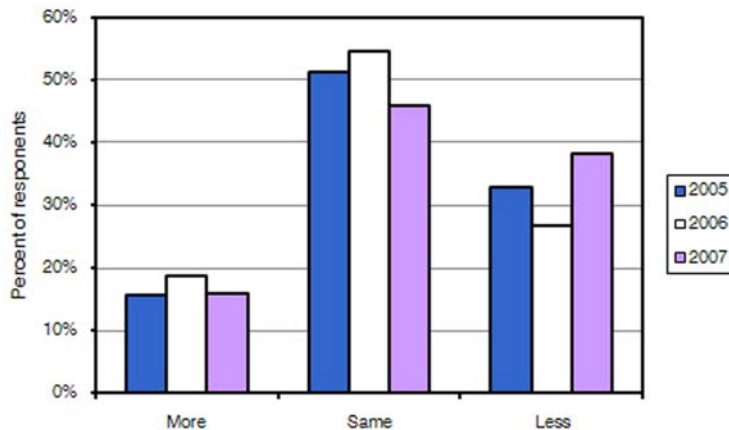
Figure 1. Purdue Land Value Survey Geographic Regions



at the current time was the same or less than a year ago. Compared to 2005 and 2006, more respondents

indicated that there was less land on the market and fewer indicated that

Figure 2. Percentage of respondents indicating more, the same, or less land on the market compared to previous year



there was the same amount or more land on the market.

Respondents were also asked to provide their perceptions about the changing sources of demand for farmland. One of the sources of demand for farmland is farmers. Respondents indicated if the demand from farmers had increased, remained the same or decreased when compared to a year earlier. The number of respondents indicating an increased demand from farmers had declined steadily since 2004, when 61.5% of the respondents indicated increased interest on the part of farmers. Last year just over 40% of the respondents indicated an increase in demand from farmers. This year, a total of 75.3% of the respondents indicated increased farmer demand (Figure 3). Only 21.7% of the respondents indicated that farmer demand remained the same. Respondents indicating a decline in farmer demand decreased to 3.0%.

Demand for rural homes is another use of farmland. The demand for rural homes continues to be strong. Approximately 56% of the respondents indicated that there was increased demand for rural residences. While the number of respondents indicating increased demand remains high, the number reporting increased demand has steadily fallen over the last three years (Figure 4). For the same time period, the number of respondents indicating that demand for rural residences is the same or decreasing has risen.

Nonfarm investors are another group that contributes to the demand for farmland. Respondents were asked to indicate if they perceived an increase, the same, or a decrease in demand from individual investors as well as organized investment efforts such as pension funds. Over the past few years, stock market returns have been improving. In addition, higher interest rates have provided increased competition for investor's dollars. These changes may be reducing the demand for farmland from these sources. However, in the 2007 survey, 48% of the respondents indicated an increase in demand from individual investors

(Figure 5). A similar pattern occurred in demand for farmland from pension funds. In 2007, 27.5 % of the respondents indicated an increased demand from pension funds. This was an increase from 16.6% of the respondents in 2006.

Expected Grain Prices, Interest Rates, & Inflation

Making a farmland purchase is a long term commitment. As a result, expectations regarding crop prices over the next few years can have a strong influence on farmland values. Given the developments with ethanol and other biofuels, it is likely that these expectations have sharply changed. In order to gain insight into crop price expectations, respondents were asked to estimate the annual average on-farm price of corn and soybeans for the period 2007 to 2011. As expected, this year saw a large increase in the five-year average price of corn and soybeans. On average, survey participants expect corn prices to be \$3.43 per bushel and soybean prices to be \$7.31 per bushel, estimates that are well above the 15-year average (Table 4).

Long-term interest rates have important implications for real estate markets. Increases in long-term interest rates have been forecast for a number of years. While long-term interest rates have increased from their lows of a few years ago, they continue to be modest. Survey respondents don't seem to be expecting much change in long-term interest rates. The average estimate of 7.6% in 2007 was the same as the average in 2006. This is well below the long-term interest rate expectations in the 1990s, a period that saw a steady upward climb in farmland values.

There was very little change in inflation expectations. On average, survey respondents estimate annual inflation over the next five years will be 3.3%, just 0.1% above the average estimate in 2006.

Market Influences

To obtain a more complete picture of the strength that various influences exert on farmland values, survey respondents were asked to assess

Figure 3. Percentage of respondents indicating increased, same, or decreased demand from farmers

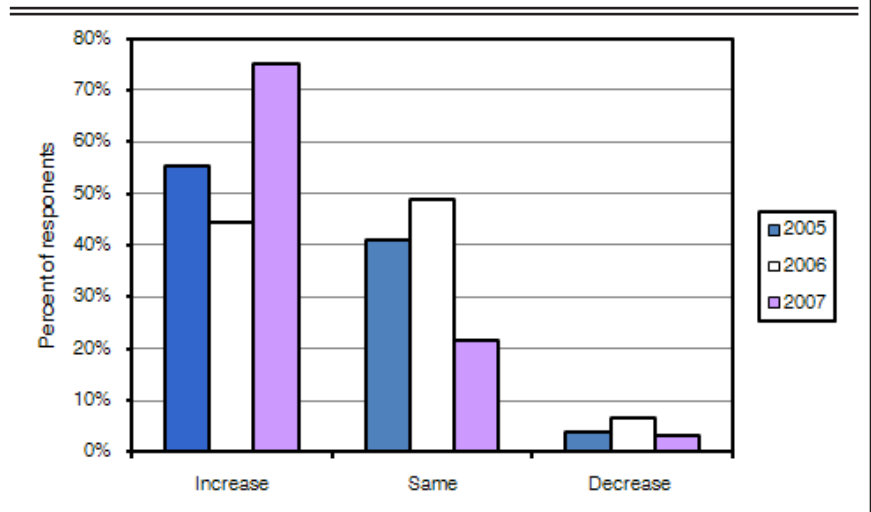


Figure 4. Percentage of respondents indicating increased, same, or decreased demand for rural residences

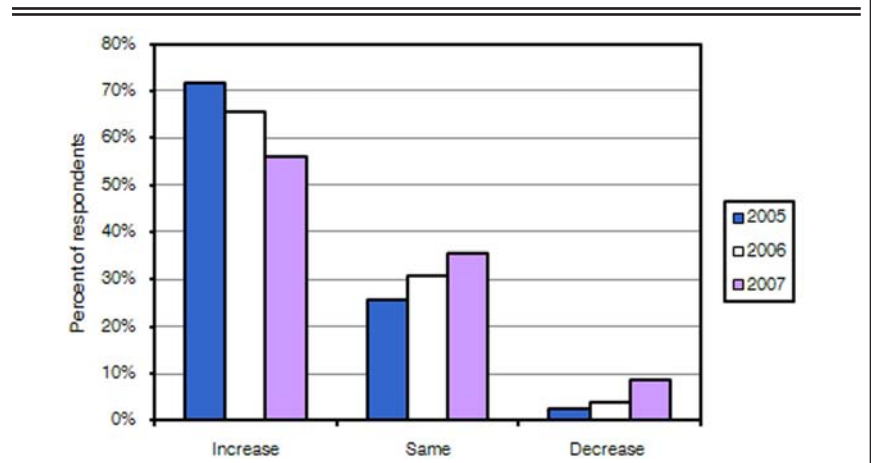


Figure 5. Percentage of respondents indicating increased, same, or decreased demand by individual nonfarm investors

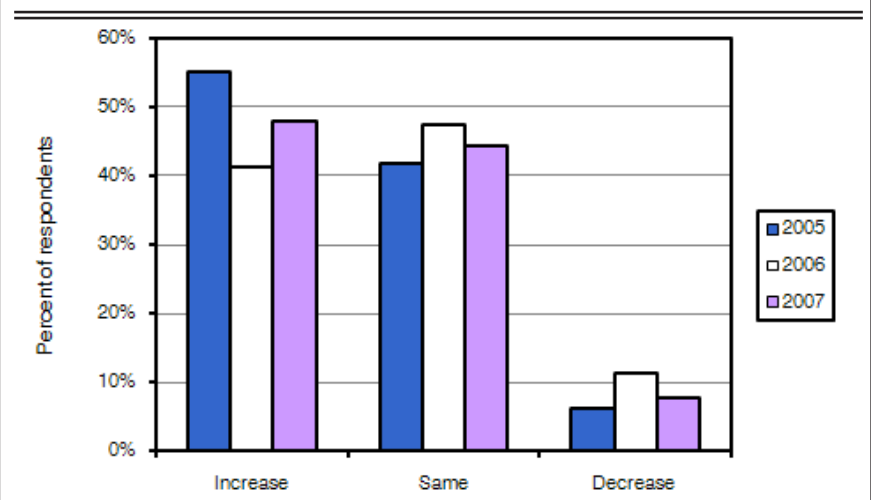


Table 4. Projected five-year average corn and soybean prices, mortgage interest, and inflation

Year	Prices, \$ per bu.		Rate, % per year	
	Corn	Beans	Interest	Inflation
1993	2.35	5.96	8.7	3.8
1994	2.48	6.18	8.9	3.8
1995	2.50	6.02	9.2	3.9
1996	3.01	6.63	9.1	3.7
1997	2.72	6.81	9.0	3.4
1998	2.54	6.34	8.6	3.1
1999	2.31	5.57	8.4	2.9
2000	2.28	5.56	9.1	3.2
2001	2.12	5.07	8.1	2.9
2002	2.10	4.97	7.6	2.7
2003	2.27	5.42	6.5	2.3
2004	2.54	6.40	6.9	2.8
2005	2.36	6.25	7.0	2.9
2006	2.48	6.11	7.6	3.2
2007	3.43	7.31	7.6	3.3
Average	\$2.50	\$6.04	8.2%	3.2%

the influence of 11 different items on farmland values. These items included:

1. Current net farm income
2. Expected growth in returns to land
3. Crop price level and outlook
4. Livestock price level and outlook
5. Current & expected interest rates
6. Returns on competing investments
7. Outlook for U.S. agricultural export sales
8. U.S. inflation/deflation rate
9. Current inventory of land for sale
10. Current cash liquidity of buyers
11. Current U.S. agricultural policy

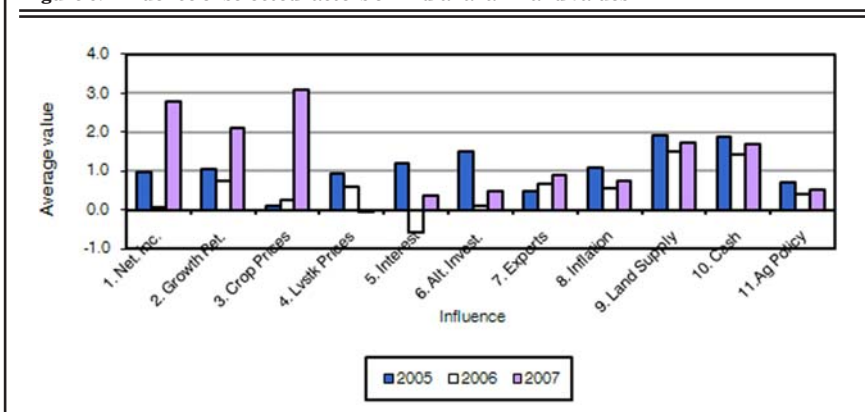
Respondents were asked to use a scale from -5 to +5 to indicate the effect of each item on farmland values. A negative influence would be given a value from -1 to -5, with a -5 representing the strongest negative influence. A positive

influence was indicated by assigning a value between 1 and 5 to the item, with 5 representing the strongest. An average for each item was calculated.

In order to provide a perspective on the changes in these influences, data from 2005, 2006 and 2007 are presented in Figure 6. The horizontal axis of the chart indicates the item in the above list. For this three year period, most of the items listed had positive influences. In 2005, all of the items had a positive average. In 2006, only current and expected interest rates were negative. In 2007, livestock prices and outlook was slightly negative. The major positive influences in 2007 included current net farm income, expected growth rate in returns, and crop prices and outlook. This is a sharp contrast to 2006 when current net farm income and crop prices and outlook provided only a small positive influence. This change indicates how quickly markets and expectations about markets can change. Last year we made the following observation "Over this three year period the most notable changes in market influence are the reduction in the positive influence of current net farm income, crop prices," This year net farm income and crop prices are the dominant positive forces.

The current inventory of land for sale and the cash liquidity of buyers are also viewed as important contributors to the strength of the farmland market by the 2007 respondents. The average value of these two influences has been fairly consistent during this three year period. In 2005 and 2006, these two items were the highest weighted influences. If the income and crop price picture had not changed in such a dramatic fashion since the last survey, these two items would again have the largest average weight. As in the past, the liquidity of buyers continues to be enhanced through the use of 1031 or tax free exchanges. Section 1031 of the IRS regulations provides a process by which sellers of real estate can reinvest the revenue back into real estate without paying capital gains tax. This is often advantageous to individuals selling farmland for development.

Figure 6. Influence of selected factors on Indiana farmland values



Expected Future Land Values

The sudden increase in crop prices has created increased uncertainty. As an industry, markets are working through how the new margin from crop production will be shared among market participants. Expectations about corn and soybean prices, interest rates, and the rate inflation expressed by survey participants indicate that there may be future increases in farmland values. This is also indicated by survey respondents when asked to project land values for December 2007 and in five years.

On a state-wide basis, Table 1 indicates that for the six-month period from June to December 2007, survey respondents expect farmland values to increase 2.4% to 2.9%. Generally survey respondents in the North, Northeast, West Central, and Central regions expect increases larger than the state-wide average. The strongest increase is expected in the Central region with increases ranging from 2.9% to 4.4%. The increases in the Southwest and Southeast regions are expected to be less than the state average, ranging from zero to 1.7%. If these expectations are used to project an annual increase in land values, they indicate a slowing in the rate of increase. This is expected given the large increase this year.

Respondents were also asked to project farmland values five years from now. Ninety-two percent of the respondents expect farmland values to be higher, no one expects farmland values to be the same, and 8% expect farmland values to be lower. For those expecting land values to increase, the average expected increase for the period was 13.2%. For those expecting land values to decline over the next five years, the average decline was 10.2%. Combining all responses provided an expected total increase in farmland values over five years of 11.4%. For the five-year period from 2001 to 2006, average quality Indiana farmland increased in value about 40%. If 2007 is included, there was almost a 55% increase in average quality farmland for the five-year period from 2002-2007.

Pasture Rent, Irrigated Farmland, & Grain Storage Rent

Occasionally we include extra questions in our survey to obtain information about a particular topic. This year, we asked about pasture rent, the value and cash rent of irrigated farmland, and the rental of on-farm grain storage.

Table 5. Pastureland: Number of Responses, Annual Cash Rent, and Carrying Capacity

Region	Number of responses	Annual rent (\$ per acre)	Carrying Capacity (acres per cow)
North	17	\$58	1.5
Northeast	17	\$68	1.4
West Central	22	\$54	1.7
Central	30	\$45	1.7
Southwest	17	\$46	1.8
Southeast	28	\$38	2.0
State	132	\$50	1.7

Table 6. Irrigated Farmland: Number of Responses, Estimated Market Value, and Annual Cash Rent

Region ⁴	Number of responses	Corn Yield (bu per acre)	Market Value (\$ per acre)	Cash Rent (\$ per acre)
North	26	194	\$4,308	\$217
Northeast	8	190	\$5,012	\$194
Southwest	12	200	\$4,002	\$189
State	52	195	\$4,360	\$208

⁴ There was an insufficient number of responses for the West Central, Central, and Southeast regions to report values for these regions.

Table 7. On-farm Grain Storage: Number of responses and annual per bushel rent

Region	Number of responses	Rent (\$/bu)
North	28	\$0.15
Northeast	36	\$0.16
West Central	44	\$0.16
Central	36	\$0.19
Southwest	16	\$0.15
Southeast	26	\$0.12
State	186	\$0.16

Final Comment

The Purdue Farmland Value and Cash Rent Survey indicates that over the past year Indiana farmland values and cash rents have made a significant jump upward. There is a limited supply of land for sale or rent. There is a strong demand from farmers, investors, and people desiring to live in the country. The liquidity of buyers appears strong. Favorable commodity prices, interest rates, and inflation rates are anticipated by survey respondents. In addition, most of the respondents

expect land values to increase over the next five years.

These items indicate that farmland values are likely to continue to move higher. Will these factors result in another sharp increase in farmland values next year? What events could dim the bright outlook for continued strong increases in farmland values?

- One possibility is an increase in production costs. Input suppliers may look at this period of the larger crop production margins as a time to increase prices.

- ▶ Another possibility would be an increase in long-term interest rates. Such an increase would influence the market capitalization rate**. If the capitalization rate were to increase from 3.8% to 4.8%, the capitalized value of the state-wide rent for average quality land in 2007 (\$139 per acre) would be \$2,896 per acre. This is \$762 per acre less value than when using a capitalization rate of 3.8%.
- ▶ Market participants may begin to view ownership of farmland as more risky than in the past. Agriculture has received important income support from commodity programs. Much of this support has been capitalized into farmland values. Currently corn, soybean, and wheat prices are well above the target prices established by this legislation. If the new Farm Bill does not provide the same level of down-side price protection as historical programs, the market may require a larger risk premium. This would again increase the capitalization rate and lower the capitalized value of current income.
- ▶ A sharp decline in crop prices. We have seen how quickly prices can rise. It is important to remember that they can decline as fast or faster. Farmers have responded quickly to the market signal that more corn needs to be produced. Increased supplies likely mean lower prices.
- ▶ A decline in oil prices and/or a change in energy policies designed to encourage biofuel production.

Efforts to reduced U. S. dependence on imported oil through the development of biofuels have linked the agriculture sector with the energy sector. High oil prices encourage the continued increase in biofuel production and the demand for corn and soybeans. Legislation has also provided incentives for encouraging the expansion of biofuel production. A reduction in either oil prices or the federal incentive would slow the growth in corn and soybean use as a source of biofuels.

- ▶ Continued weakness in the housing market. The slowing of the housing market means less demand from developers and thus fewer tax free exchanges influencing the farmland market. Research indicates that farmland values are influenced by both agricultural returns and the nonfarm factors.

There is debate about the exact size of the nonfarm influence, but it is important to recognize that in some areas of Indiana the nonfarm influence has been a major contributor to rising farmland values. As one considers what might happen to future farmland values, it is important to account for nonfarm influences.

- ▶ Finally, there could be some combination of the above items or some item that is not on the list.

It is difficult to know which events might occur. However, before undertaking a farmland purchase, preparing a list of what could go right and what could go wrong and developing subjective probabilities of their likelihood is an important part of sound business management.

Purdue Land Value and Cash Rent Survey

The Purdue Land Value and Cash Rent Survey is conducted each June. The survey was made possible through the cooperation of numerous professionals that are knowledgeable of Indiana's farmland market. These professionals include farm managers, appraisers, land brokers, agricultural loan officers, Purdue Extension educators, farmers, and persons representing the Farm Credit System, the Farm Service Agency (FSA) county offices, and insurance companies. Their daily work requires that they stay well informed about land values and cash rents in Indiana.

These professionals are asked to provide an estimate of the market value for poor, average, and top quality farmland in December 2006, June 2007, and the expected value for December 2007. They are also asked to provide an estimate of the current cash rent for each land quality. To assess the productivity of the land, respondents provide an estimate of long term corn yields. Respondents are also asked to provide a market value estimate for land transitioning out of agriculture.

Responses from 313 professionals are contained in this year's survey representing all but three Indiana counties. There were 51 responses from the North region, 57 responses from the Northeast region, 72 responses from the W. Central region, 64 responses from the Central region, 35 responses from the Southwest region, and 34 responses from the Southeast region. Figure 1 illustrates the counties in each region.

Appraisers accounted for 14% of the responses, farm loan professionals represented 59% of the responses, farm managers or farm operators provided 13% of the responses, and other professionals provided 14% of the responses.

The data reported here provide general guidelines regarding farmland values and cash rent. To obtain a more precise value for an individual tract, contact a professional in your area that has a good understanding of the local situation.

We express appreciation to Marsha Slopsema of the Department of Agricultural Economics for her help in conducting the survey.

** Income capitalization is a common method used to estimate the value of farmland. This approach to estimating farmland value divides an estimate of annual income by the capitalization rate. If estimated income (rent) is \$139 per acre and the capitalization rate (rent ÷ value) is 3.8%, this provides an estimated value of \$3,658 per acre.

Food Inflation Perks Up With BioFuels

Corinne Alexander, Assistant Professor and Chris Hurt, Professor

Using crops for fuel creates concerns over competition with food uses and raises the question of how far along that path the U.S. can move. The answer is complex and involves many U.S. and world food and energy markets. This includes not only the amount of crops that can be converted to biofuels, but the ability of the world's crop producers to increase supply. In addition, new technology and governmental energy policies regarding biofuels will be critical as well.

The purpose of this article is to examine how food prices may be impacted by the current biofuels surge. How much of an increase in food prices might be expected? Some have predicted dire consequences resulting in food shortages in parts of the world and surging food prices. Others, particularly those in crop production and the biofuels industry argue that with technologic advancements they can continue to be reliable suppliers of food while also providing a growing portion of the world's fuel.

A starting point is to review the historical record. The previous boom in crop values was in the 1970's. At that time, food prices exceeded the general inflation rate in the early stages of the inflationary period. As shown in Figure 1, food inflation exceeded the general inflation rate in 1972, 1973, and 1974 by an average of 3.5 percentage points. For these three years, the general inflation rate averaged 6.8 percent per year with food inflation leading the general inflation rate at 10.3 percent annually on average.

During the disinflation period from 1980 to 1982, food prices tended to lead the downward general inflation path. Annual average food inflation was 6.8 percent compared to a ten percent general inflation, a 3.2 percentage point lower inflation impact. Interestingly since that time, annual food inflation has not registered more than a 2.0 percentage point difference from the general

inflation rate. In fact in the last ten years, 1997 to 2006, average annual food inflation at 2.5 percent has been very close to the general inflation rate of 2.6 percent.

Less Impact on Consumers Today

The primary impact on food inflation from biofuels is from increases in the farm level values of the raw materials that go into producing our food supply. There are several reasons why a given increase in farm level prices will not have as large of an impact on consumer food prices as the early 1970's. First, the farmers' share of the consumers' food dollar has gone down. In the three years prior to the rapid food inflation, 1969-1971, the farmers' share of the consumer food dollar was 32 percent according to USDA. For the three years of rapid food inflation, 1972-1974, that rose to 35 percent. Today, the farmers' share of the retail food dollar is down to only 20 percent.

Second, the importance of food and beverages in the weighting of the Consumer Price Index (CPI) is smaller. Exact data for the early 1970's could not be found, but was 18.3 percent in 1980. Thus food may have been weighted around 19 percent in the early 1970's.

Today the weighting for the "food and beverages" category in the CPI is only 15.0 percent.

These two factors alone are substantial. This is illustrated in Table 1 which compares the impact of a 40 percent increase in farm level prices in the early 1970's (1969-1971) with the same farm level impact today (2004-2006) given the smaller farmers' share and smaller weighting of food in the Consumer Price Index (CPI). In the early 1970's, a 40 percent rise in farm level prices would result in a 12.8 percent increase in food inflation, and a 2.43 percent rise in general inflation. Today, the same 40 percent increase in farm level prices would only result in an 8 percent rise in food inflation and a modest 1.2 percent rise in general inflation.

In addition, the world is more global today. This means greater geographic diversification of crop and food production such that it may be more difficult, for say a drought, in the U.S. to have that hypothetical 40 percent price impact on farm level prices. This is illustrated in Table 2. Compared to the early 1970's (1972-1974), the portion of the world's corn, soybeans, and wheat raised in the U.S. has declined. In addition the portion of food we

Figure 1. Food Inflation Minus General Inflation

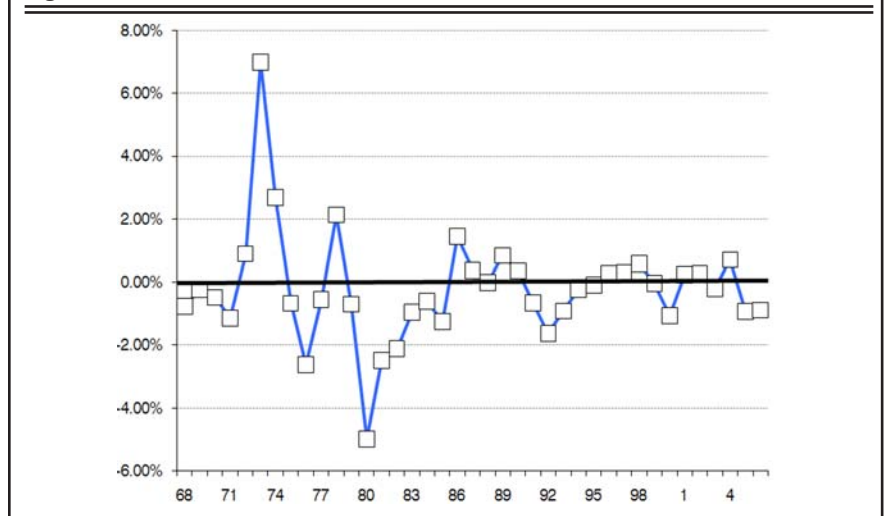


Table 1. Example of the Impact of a 40% Increase in Farm Product Prices on Food Inflation and Total Inflation: Early 1970's and Today

	Farm Prices Go Up	Farmers' Share	Food & Beverage Weight In CPI	Food Prices Rise	General Inflation Rises
Early 1970's	40.0%	32.0%	19.0%	12.80%	2.43%
Today	40.0%	20.0%	15.0%	8.00%	1.20%

Table 2. U.S. As a Percent of the World

	Early 1970's	Today
Corn Production	43.5%	40.3%
Soybean Production	77.2%	38.2%
Wheat production	12.9%	9.0%
Food Imports as % Receipts ¹	10.4%	25.6%

¹ Dollars of food imports as a percent of U.S. farm production value

import has increased in importance from about ten percent of U.S. farm production receipts in the early 1970's to over 25 percent in recent years (2004-2006).

What We Know So Far

In the past two years food inflation has been lower than the general inflation rate. The average general inflation rate for 2005 and 2006 was 3.3 percent and the average annual food inflation rate was just 2.4 percent, nearly one percentage point lower. Thus food has helped moderate the general inflation rate for the past two years. However, that has changed in 2007 as food inflation has turned higher and moved well above general inflation. Over the last year, grocery store prices, shown as "food at home"

in Figure 2, rose almost 4.5 percent between May 2006 and May 2007, more than double the 2006 inflation rate for that category. This food price increase is well above the 1995-2005 average annual food and beverage retail price increase of 2.5 percent and above the non-food inflation rate of about 2.5 percent. The USDA estimates that grocery store price increases will be in the 3 percent to 4 percent range for the rest of 2007, which is approaching twice the rate of core inflation. Restaurant prices ("Food Away" in Figure 2) are expected to increase at 3-3.5 percent for the rest of 2007, a slower pace than food at home because farm level commodities are a much smaller share of the restaurant expenditures compared with grocery store expenditures.

Rising prices over the last 12 months have been lead by 3 different food categories: fruits and vegetables, wheat products including bread, spaghetti and flour, and eggs. The cause of these price increases differs for each category. In the case of fruits and vegetables (typically the food category with the most volatile prices), price increases are the result of lower planted acreage, a January freeze in California, a cold wet February in Florida, and early spring weather damage in Mexico. In addition, honeybee colonies are threatened which may result in inadequate pollination for fruit and nut trees and vegetables such as melons, cucumbers, pumpkins and squash. These factors cannot be blamed on the biofuels demand surge.

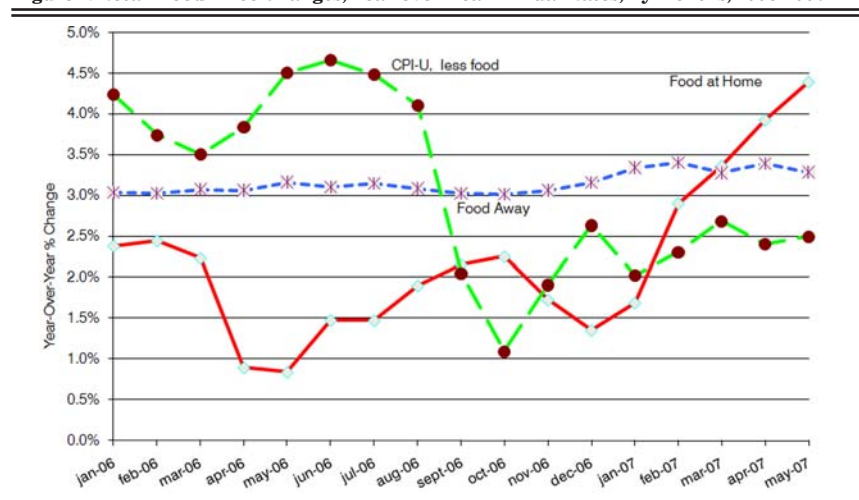
In the case of bakery products and other wheat products, price increases are the result of higher wheat prices due to very tight U.S. and world wheat supplies that resulted from poor 2006 wheat crops in the U.S., Canada and Australia. The 2007 U.S. crop was also impacted by excess moisture in the Great Plains region. Looking forward, wheat prices will likely remain elevated in order to compete with corn for acreage.

In the case of eggs, the recent dramatic price increases on the order of 20 to 30 percent are largely due to the higher price of corn. One reason the retail price of eggs is so influenced by the price of corn is that the farm share of the retail price of eggs is 53 percent, the highest of any food product. Other meat and poultry product prices will also be expected to increase over time as higher feed costs move toward consumers.

Food Inflation Outlook

There are two current studies that examine food inflation. The first is a study at The Center for Agricultural and Rural Development (CARD) at Iowa State University. This examines the impact of the biofuels surge on food prices. As with all studies, they have multiple assumptions that are critical to the results. They assume that corn prices move to \$3.40 per bushel and soybean prices to \$7.00 per bushel under a scenario of a 10 percent ethanol blend in gasoline by

Figure 2. Retail Food Price Changes, Year-over-Year Annual Rates, By Months, 2006-2007



2011. Results are for food inflation to be higher than they would have been without biofuels by 1.1 percent to 1.8 percent.

USDA has updated anticipated food inflation for 2007. This update is simply based on what may happen to food prices for the calendar year of 2007. It does not make any attempt to identify how food inflation is tied to biofuels. In this update, USDA now estimates food inflation in the U.S. will be three to four percent in 2007 and that is up from an annual inflation rate of 2.4 percent in 2006. Thus, this reflects an increase from 0.6 percent to 1.6 percent higher than in 2006.

We will add our evaluation of the impacts of higher farm prices on food prices. This analysis uses limited modeling, but assumes that the increased demand for biofuels is reflected in prices of basic grain and food commodities. This is particularly true on increases in corn, soybean oil, soybean meal, and wheat prices. These increased costs of basic commodities are assumed to be passed upward through the food system over time. In inflation terminology this is often called "cost-push" inflation. That is to say that some outside force causes grain prices to rise, and over time those higher prices go through the marketing system to food consumers. We assume the costs-push is dollar-for-dollar such that each \$1 increase in a basic grain value is pushed through to consumers as a \$1 increase in retail food costs. Price levels used for corn, soybeans, wheat, and soy products are shown in Table 3.

As a final summary of our methodology, we use the price and quantities from the May 11, 2007 USDA Agricultural Supply and Demand Estimates and use the 2005/2006 marketing year as a base for comparison. Estimates of the higher commodity food costs for the 2006/07 marketing year and the 2007/2008 marketing year are compared to 2005/2006. Finally, a drought scenario reflecting approximately a five percent reduction in average U.S. crop yields is

Table 3. Assumed Prices

	05/06	06/07	07/08	07/08 Drought
Corn (\$/bu.)	\$2.00	\$3.10	\$3.40	\$4.40
Soybeans (\$/bu.)	\$5.66	\$6.30	\$7.00	\$9.00
SoyMeal (\$/ton)	\$174.00	\$195.00	\$226.00	\$300.00
Soy Oil (cents/pound)	23.40	29.50	37.00	42.80
Wheat (\$/bu.)	\$3.42	\$4.27	\$4.65	\$6.20

examined as well for the 2007/2008 marketing year.

The estimated impacts on food prices are illustrated in Table 4 and are allocated to various food subgroups. For 2006/2007, the total estimated impact on food costs is an additional increase of about \$15 billion or an additional 1.2 percent compared to 2005/2006. For 2007/2008, food costs would rise by an additional \$22 billion or 1.8 percent compared to the 2005/2006 base year. The composition of these increases is also important as nearly 50 percent of the food impact is in the animal sector.

If a weather event were to reduce national production of primary crops by five percent for the 2007 crops, the estimated impact on basic crop prices is for the farm level value to

increase from 30 to 35 percent compared to a normal yield. That magnitude of price increase is very large reflecting the current tight U.S. and world stocks situation such that even small reductions in production would stimulate much higher farm level prices.

Under the five percent reduced production scenario, estimated food prices would rise by an additional \$39 billion representing an additional 3.3 percent increase over 2005/2006 food expenditure.

Summary: Biofuels Will Add to Food Inflation

The dramatic increase in the use of crops for fuel is going to increase food prices, at least for the next several years. The magnitude of that increase however, may not be as large

Table 4. Rough Estimates of Higher Food Commodity Costs in 2006/07 and 2007/08 Marketing Years Compared to 2005/06, Purdue University²

Summary	06/07	07/08	07/08 Drought
	-----Million \$-----		
Poultry	\$2,649	\$3,866	\$7,349
Pork	\$1,882	\$2,578	\$4,687
Beef	\$1,923	\$2,565	\$4,569
Dairy	\$786	\$1,064	\$1,915
Other	\$48	\$65	\$117
Total Animals	\$7,289	\$10,138	\$18,637
Corn Sweeteners	\$825	\$1,061	\$1,819
Corn Starch	\$151	\$196	\$336
Corn Cereals	\$210	\$270	\$463
Non-Corn Grain Foods	\$166	\$255	\$534
Fats and Oils	\$1,207	\$2,659	\$3,794
Bakery Products	\$786	\$1,144	\$2,585
Total These Commodities	\$10,634	\$15,724	\$28,169
Other Foods: Added 40%	\$4,253	\$6,290	\$11,268
Total Commodity Impact	\$14,887	\$22,014	\$39,436
% of 2006 Food Expenditures	1.2%	1.8%	3.3%

² Based upon estimated feeding for animals and on balance sheets for corn, soybeans, wheat, sorghum, barley, and oats as reported in the USDA World Agricultural Supply and Demand Estimates, May 11, 2007.

as some expect. Probably the three most important reasons why the impact will not be as large as in past years are: 1.) the share of the retail food dollar contributed by the farm level commodity value has been sharply reduced to just 20 percent today; 2.) the importance of food in consumer budgets has continued to drop such that the “food and beverage” category in the Consumer Price Index (CPI) is now weighted at just 15 percent; and 3.) the sources of our food are more global and diverse than in the past.

Retail level food prices are expected to increase an additional 1.2 percent to 1.8 percent above their 2006 level due to higher farm-level grain and commodity prices partially attributable to the use of grains and oilseeds for biofuels. This will roughly parallel the calendar years of 2007 and 2008. This analysis is based upon the assumption that higher farm-level commodity prices are eventually passed to retail food consumers. Our assumption is that transfer is dollar for dollar. Not all of the current increased food inflation is attributable to increased use of crops for energy, as poor weather conditions have also contributed to poor world wheat crops in 2006, and to losses of some fruit and vegetable production in 2007.

For the past two calendar years of 2005 and 2006, food inflation at 2.4 percent had been lower than the general inflation rate of 3.3 percent for the Consumer Price Index (CPI-U). For 2007 and 2008, food inflation is expected to increase

and fall in a range from 3.5 percent to 4.5 percent. This means food inflation may outpace the general inflation rate which is expected to be about 3.2 percent in 2007 according to economists surveyed by the Philadelphia Federal Reserve Bank (<http://www.phil.frb.org/files/spf/survq207.html>).

Nearly one-half of the additional increase in food inflation will be experienced by the animal production sector. Meat, dairy, and poultry producers will experience higher costs feed. In the short-run, these producers will absorb much of the higher costs through reduced returns. However, over time as aggregate supplies of these products decline, higher feed costs will move through the food marketing system to retail consumers. The length of time for this adjustment can be fairly short for eggs, and multiple years for pork and beef.

The total additional costs of retail food is estimated at \$22 billion per year based on estimates for farm level grain prices for the 2007 crops compared to the very low valued 2005 crops. While it was not the objective of this study to sort out what portion of the 2007 crop price increases were due to biofuels, the dominant portion of corn and soybean price increase are, while wheat prices have also been impacted by adverse weather.

What if a poor growing season were to reduce U.S. crop production by five percent in 2007? The impact on food prices would be to push them up \$39 billion above their 2006 level, or an

additional inflationary pressure of 3.3 percent. This means annual 2008 estimated food inflation might increase to 5.7 percent.

In the long run, food will be able to compete successfully with the use of crops for fuel, but with higher food prices. The magnitude of that impact will depend on the ability of the world's crop producers to expand output, energy and biofuels technology, and global energy policy. Policy makers examining various biofuels alternatives are encouraged to consider broader implications including the impact on consumer food budgets.

References

- Food Costs Review: 1950-1997. AER #780.
 Economic Research Service, USDA, June 1999.
- Leibtag, Ephraim. “Food Price Outlook, 2007.”
 USDA. ERS, May 21, 2007 at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/consumerpriceindex.htm>
- Light, Jerry and Thomas Shevlin. “The 1996 Grain Price Shock: How Did it Affect Food Inflation?” Monthly Labor Review. Bureau of Labor Statistics, U.S. Department of Labor, August 1998.
- Tokgoz, Simla, Amani Elobeid, et al. Emerging Biofuels: Outlook of Effects on U.S. Grain, Oilseed, and Livestock Markets.” Staff report 07-SR 101, Center for Agricultural and rural Development, Iowa State University, May 2007. <http://www.card.iastate.edu/publications/synopsis.aspx?id=1050>
- Understanding the Impact of Higher Corn Prices on Consumer Food Prices. National Corn Growers Commissioned Study. March 2007. <http://www.ncga.com/ethanol/pdfs/2007/FoodCornPrices.pdf>

Contributors to this issue from the Department of Agricultural Economics:



Corinne Alexander
Assistant Professor



Kim Cook
Research Associate



Craig Dobbins
Professor



Chris Hurt
Professor