PURDUE UNIVERSITY

Purdue Agricultural Economics Report

April 2012

Why Farm Land Assessments Will Continue to Rise

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Introduction

Property taxes on farm land have been rising and will continue to rise in the future. This is because the "base rate" of farm land, which is the statewide starting point for farm land assessed values, has been rising and will keep rising. But now, for the first time in decades, the "soil productivity factors" might rise as well. This could make the increase in farm land taxes even larger.

The assessed value of farm land is the product of the base rate, the soil factor, and (for some acreage) an "influence factor." Farm land assessments in Indiana start with a base rate, which is a dollar amount per acre. This same starting point is used for all acreage in Indiana. The base rate is set by the state's Department of Local Government Finance (DLGF), the agency that oversees the operation of the property tax in Indiana. The base rate was $1,290 per acre for taxes payable in 2011. It will be $1,500 for taxes in 2012, and, the DLGF recently announced, it will be $1,630 for taxes in 2013. The rising base rate is the primary reason why farm land taxes have been increasing.

For each acre the base rate is multiplied by a soil productivity factor. The soil factor measures the productivity of the soil for growing corn, based on corn yields by soil type. For several decades the soil factors have varied from 0.5 to 1.28. That is, for 2012 taxes, the base rate times the soil factor could vary from $750 (0.5 x $1,500) to $1,920 (1.28 x $1,500). For taxes in 2013, however, the DLGF has announced new updated soil factors. The range for the new factors is 0.5 to 1.66. In 2013, then, the range of the base rate times the soil factor would be $815 (0.5 x $1,630) to $2,706 (1.66 x $1,630). The change in the soil factors would have caused an additional increase in farm land assessments for 2013 taxes. The Indiana General Assembly has required the DLGF to postpone the use to the new soil factors until 2014, however.

Some acreage is adjusted by an influence factor, which reduces the assessment for features that limit the productivity of the land. All influence factors are percentage subtractions from assessed value. For example, land that floods two to four years in every 10 receives a 30% influence factor. The assessed value of the acreage is reduced by 30%. Land that floods five or more years in 10 receives a 50% influence factor.

The farm land assessment provides the basis for setting the property tax bill. Farm land receives few deductions, so usually the full gross assessed value of the land is multiplied

In This Issue

by the tax rate for the taxing district in which the land is located. A taxing district is defined by the combination of local government units that serve the area. It will include the county, township, and school corporation, and possibly a city or town, library district or other special district. The tax rates of the overlapping local governments sum to the tax rate of the district. That summed rate is multiplied by the assessed value to determine the tax bill. The tax rates are expressed in dollars per $100 assessed value, so they can be read as percentage rates.

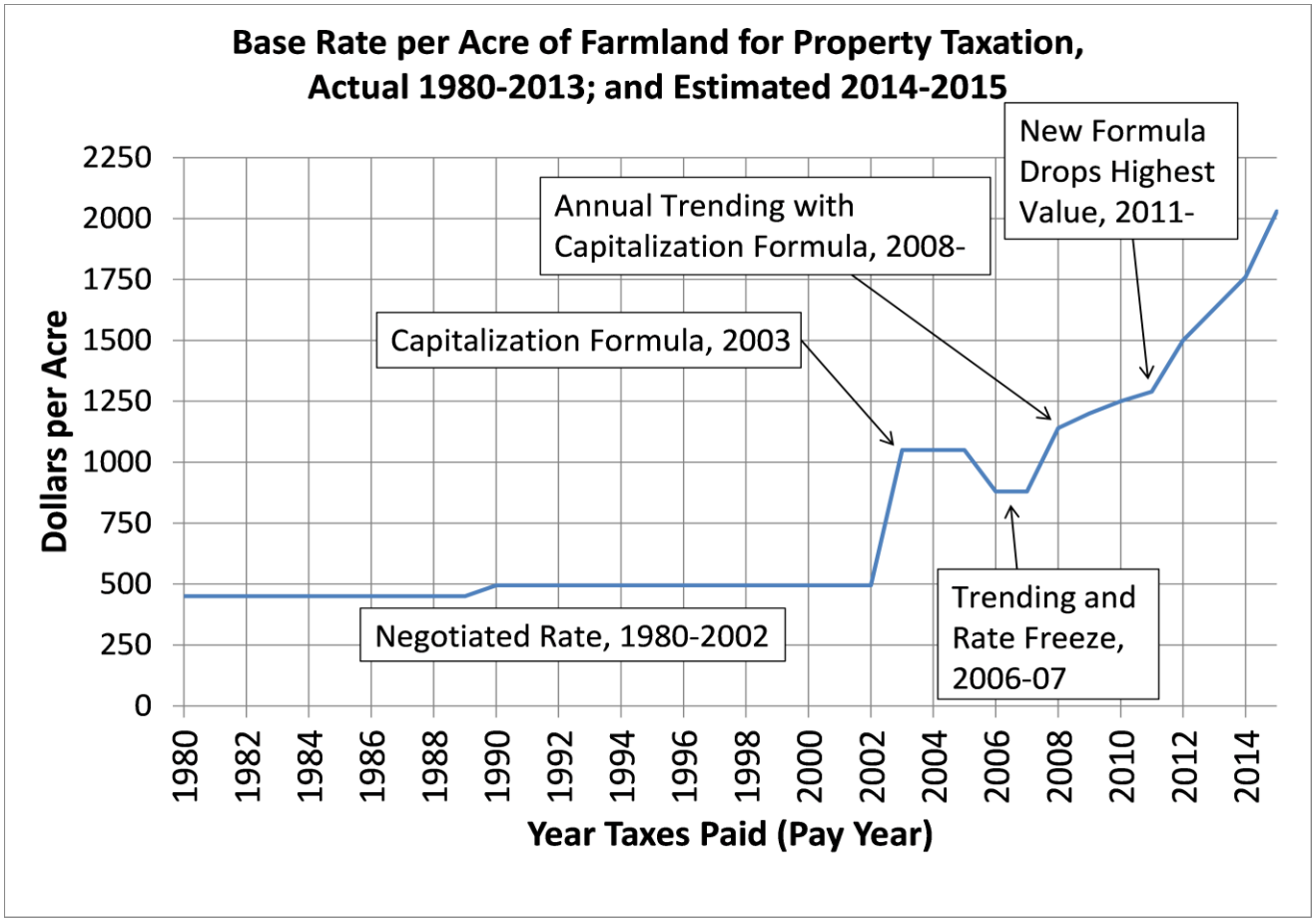
Some counties have adopted local income taxes for property tax relief. Counties have the option of delivering tax relief to homeowners only, to homeowners and rental housing owners, or to all property owners. If the county distributes the relief to all property owners, farm land owners will receive a tax credit. A credit is a percentage reduction in the tax bill. The local units lose this property tax revenue, but it is replaced dollar-for-dollar with revenue from the local income tax.

Finally, some farm land benefits from the new tax caps, also called "circuit breaker caps." Farm land tax bills are limited to 2% of the gross assessed value of the farm land. That's the assessment before deductions, (though farm land gets few deductions). If the tax bill exceeds 2% of the gross assessed value, a tax cap credit is applied to reduce the tax bill to the cap level. Farm land cannot be eligible for tax cap credits if the district tax rate is less than $2 per $100 assessed value. As it happens, most rural areas have tax rates less than $2, so very little farm land benefits from the tax caps.

The History of the Base Rate

Figure 1 shows the history of the base rate since 1980. Property is assessed in one year and taxed the next. Taxes are often identified as (for example) "2011 pay-2012," meaning the assessed value set in 2011 was the basis for tax bills in 2012. The years in Figure 1 are "pay-years," the years when the taxes were paid. From before 1980 through taxes in 2002, the base rate was negotiated by agricultural interests (such as the Farm Bureau) and officials from the State Board of Tax Commissioners, the predecessor

Figure 1



of the DLGF. Base rates were revised only in years of statewide reassessments—for taxes in 1980, 1990, and 1996. For 1980 through 1989 the base rate was set at $450 per acre. In 1990 the base rate was increased to $495 per acre, and it was left at $495 for the 1996 reassessment. It remained at that level until pay-2003.

In December 1998 the Indiana Supreme Court found the state's assessment system to be unconstitutional, because assessments were not based on objective measures of property wealth. For most property, this was interpreted to mean that assessments had to be based on market values, meaning the predicted selling prices of property. The court allowed farm land to be assessed at its use value, meaning its value for production of crops, not including its potential value for residential or business development.

The court's requirement for objective measures of property wealth still applied to the use value of farm land, so the Tax Board and then the DLGF developed the base rate capitalization formula. The formula uses objective data on prices, yields, costs, and interest rates in a capitalization formula. Income capitalization is a recognized method for measuring wealth.

The initial formula set the base rate at $1,050 per acre for taxes in 2003. The base rate had been $495, so it more than doubled, and this caused farm land property taxes to rise substantially with the 2003 reassessment. Tax bills on farm land and buildings increased an average of 15.5% statewide. Farm land tax bills increased much less than assessed values because most other assessed values increased with the reassessment. This reduced tax rates. Higher farm land assessments times lower tax rates still produced tax bill increases for farm land owners.

The court decision implied a need for annual adjustments of assessed values to keep them close to objective measures of property wealth between statewide reassessments. This is known as "trending." Farm land is trended with annual changes in the base rate. The DLGF simply inserts new data on yields, prices, costs, and interest rates into the capitalization formula to come up with an updated value. Trending started for farm land for taxes in 2006, and the base rate dropped to $880. Legislative action held the base rate at $880 for taxes in 2007 as well.

It was in pay-2008 that the big increases in the base rate began. A look at the base rate capitalization formula shows why.

The Base Rate Capitalization Formula

The base rate capitalization formula divides the rent or net income earned from a farm acre by an interest rate, to get the amount that a "rational" investor would pay for that acre. Versions of the income capitalization method are used in most states to estimate farm land assessed values. The general form of the method is:

Capitalized Value = Net Income from Agriculture / Capitalization Rate.

For example, for 2008 the DLGF estimated that a landowner could earn an average of $165 per acre in rent or as an operator growing corn or beans. The Chicago Federal Reserve reported several farm-related interest rates that averaged 6.56%. The net income divided by the interest rate is $2,508.

Imagine an auction for an acre that earns $165. Suppose the first bid is $1,000. Earnings of $165 on an investment of $1,000 give a rate of return of 16.50%. That's much higher than the 6.56% return that can be earned on investments generally. The bid rises to $2,000, a rate of return of 8.25%, which is still high. At a bid of $2,508 the rate of return is no better or worse than other

Table 1

Calculation of the Base Rate for an Acre of Farmland

Assessment Year 2011; Tax Year 2012

	NET INCOMES			MARKET VALUE IN USE		
Year	Cash Rent	Operating	Cap. Rate	Cash Rent	Operating	Average
2003	106	71	6.29%	1,685	1,129	1,407
2004	104	135	6.35%	1,638	2,126	1,882
2005	110	59	7.22%	1,524	817	1,170
2006	110	74	8.18%	1,345	905	1,125
2007	122	184	7.94%	1,537	2,317	1,927
2008	140	189	6.56%	2,134	2,881	2,508
				Average Market Value in Use		**$1,500**

investments. A rational investor would not bid more.

Note that this is a calculation of the "use value" of the farm land because it considers only the income that can be earned from growing and selling crops. Potential income from residential or commercial uses is excluded.

Table 1 shows the calculation of the $1,500 base rate done for pay 2012. This is a version of a table published by the DLGF. The method capitalizes cash rent net incomes and estimated operating net incomes for each of six years and then averages the two results to get an average market value in use for each year. The cash rent data originates with the Purdue Land Value Survey. The operating net incomes are estimated from corn and soybean yield and price numbers, less fixed and variable costs. The base rate calculation uses data for six years to smooth out wide fluctuations in the base rate. The highest value of the six is dropped, and the remaining five are averaged and rounded to the nearest ten. The result is the base rate, which the DLGF calls "average market value in use."

Table 2. Data Used to Calculate Base Rate of a Farm Land Acre

Data Year	Net Incomes: Cash Rent	Net Incomes: Operating	Cap. Rate	Market Value In Use: Cash Rent	Market Value In Use: Operating	Annual Average
1999	99	36	8.77%	1,129	410	770
2000	101	60	9.56%	1,056	628	842
2001	102	61	8.00%	1,275	763	1,019
2002	105	20	7.02%	1,496	285	890
2003	106	71	6.29%	1,685	1,129	1,407
2004	104	135	6.35%	1,638	2,126	1,882
2005	110	59	7.22%	1,524	817	1,170
2006	110	74	8.18%	1,345	905	1,125
2007	122	184	7.94%	1,537	2,317	1,927
2008	140	189	6.56%	2,134	2,881	2,508
2009	139	116	6.17%	2,253	1,880	2,066
2010	141	162	5.96%	2,366	2,718	2,542
2011	162	204	5.56%	2,914	3,669	3,291

Table 3. Base Rate Calculations

Tax Year	Data Range: First	Data Range: Last	Base Rate	Percent Change
2006	1999	2002	$880	-16.2%
2007	2000	2003	$880	0%
2008	1999	2004	$1,140	29.5%
2009	2000	2005	$1,200	5.3%
2010	2001	2006	$1,250	4.2%
2011	2002	2007	$1,290	3.2%
2012	2003	2008	$1,500	16.3%
2013	2004	2009	$1,630	8.7%
2014	2005	2010	$1,760	8.0%
2015	2006	2011	$2,030	15.3%

2006: Base rate reduced from $1,050; First year of annual trending; Last year of 4-year average.

2007: Base rate set by statute, not formula; 4-year average would have been $1,040, an 18.2% increase.

2008: First year of 6-year average; increase from $1,040 would have been 9.6%.

2009-2010: Base rates were set by DLGF based on 6-year average formula.

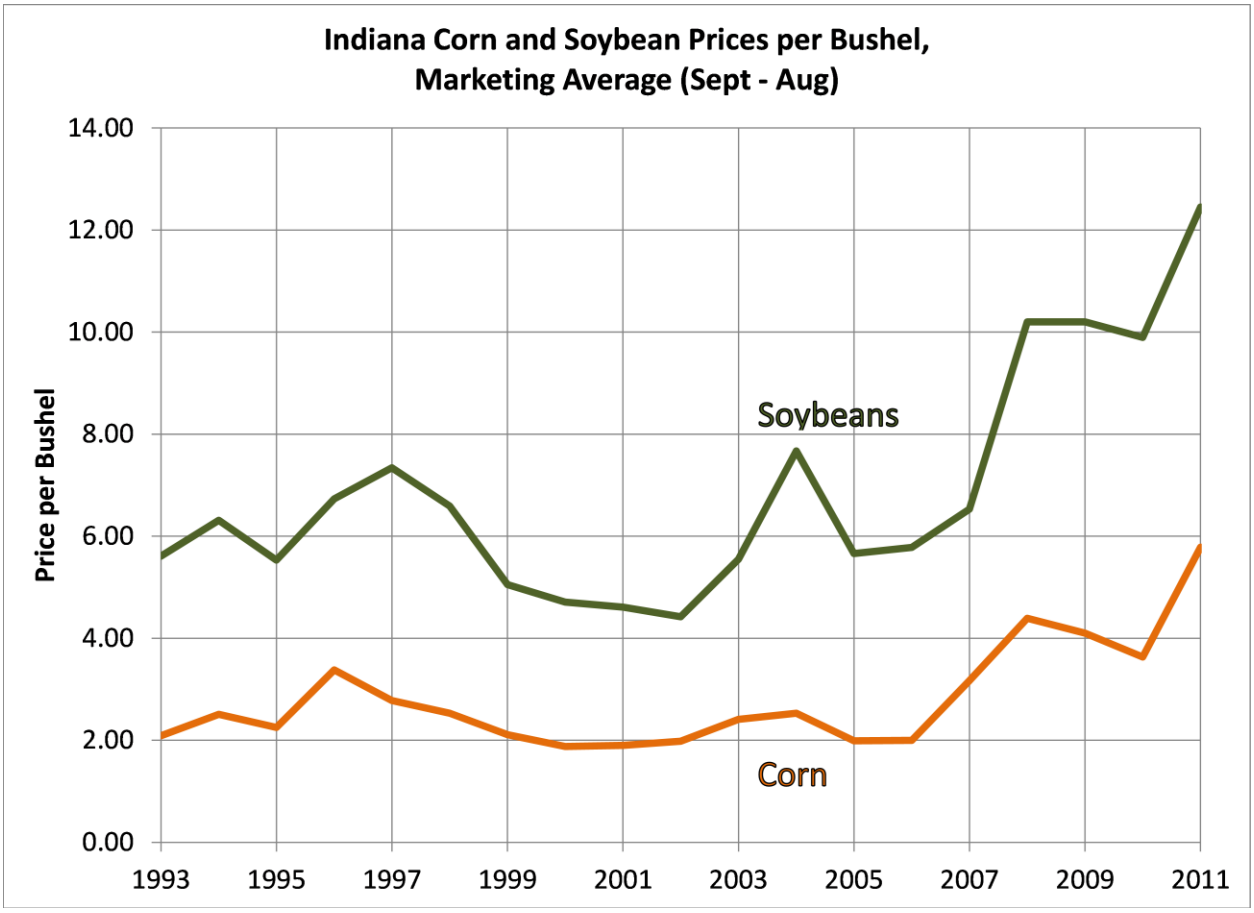
2011-2013: Base rates were set by DLGF based on 6-year average formula with highest year eliminated.

2014-2015: Base rate *estimates* based on existing data and 6-year average formula with highest year eliminated.

There is a four-year lag in the data used. The base rate for taxes in 2012 uses data only through 2008. The four-year lag emerged between 1998 and 2003, when the statewide reassessment was postponed after the Supreme Court's 1998 property assessment ruling. This means that the 2012 base rate is still influenced by income and capitalization rates from 2003, nine years before. The numbers for 2008 still will have an effect on the base rate in 2017.

The base rate is a six-year rolling average. Changes in annual values of the base rate occur because an earlier year is dropped and a later year is added to the calculation. Table 2 illustrates the effects of the rolling

Figure 2



average. The base rate for 2012 taxes used data from the years 2003 to 2008. The base rate for 2013 taxes will use data from 2004 to 2009. The base rate will change because the results for 2003 will be dropped, and the results for 2009 will entered.

As Table 2 shows, rents and operating incomes were lower in 2003 than they were in 2009. The capitalization rate was slightly higher in the earlier year, too. So the average of the rent and operating income capitalized values for 2003 was $1,407, while it was $2,066 in 2009.

Table 3 shows the result. The smaller 2003 value was dropped from the average, and the larger 2009 value was added, so the base rate increased.

The DLGF drops the highest value of the six years from the average. The Indiana General Assembly adopted this modification of the formula for taxes in 2011, to make the increases in the base rate somewhat smaller. Prior to 2011 all six years were included in the average. The 2008 value of $2,508 happens to be the highest for both the pay-2012 and pay-2013 base rate calculations. It is dropped from the average. For 2013 taxes the earlier 2003 figure of $1,407 leaves the average, and the newer 2009 figure of $2,066 enters. The base rate will increase from $1,500 for pay-2012 to $1,630 for pay-2013.

This modification in the formula has reduced the increases in the base rate. Had the old method of including all six years in the average been used for 2011, the base rate would have been $1,400 instead of $1,290. The base rate in 2012 would have been $1,670 instead of $1,500, and the base rate for 2013 would have been $1,780 instead of $1,630. The formula modification has reduced the base rate by 7% to 10%.

The base rate increases since 2008 are partly the result of falling interest rates. The Federal Reserve has reduced the interest rates it controls in an effort to lessen the effect of the Great Recession. The base rate increases also are the result of increases in rents and operating net income. These increases result mostly from rising commodity prices. Figure 2 shows corn and soybean prices that are used in the base rate formula. Prices increased in 2003 and 2004, and again in

2007, 2008, and 2011. The 2003 prices entered the base rate formula for taxes in 2007. The 2007 prices entered the base rate formula for taxes in 2011. Table 2 shows big increases in the capitalization calculations starting in 2007, with a capitalized value of $1,927. The increase in 2011, to $3,291, was also large. Higher commodity prices are a primary reason.

The DLGF has announced the base rate for taxes in 2012 as $1,500 and the base rate for 2013 taxes as $1,630. However, because of the four-year data lag, it is possible to predict the base rate for taxes in 2014 and 2015. The 2014 base rate will include data from 2010; the 2015 base rate will include data from 2011. We know the data for 2010 and most of the data for 2011 (see Table 2). We also know the base rate formula, so base rate predictions should be accurate.

Figure 3

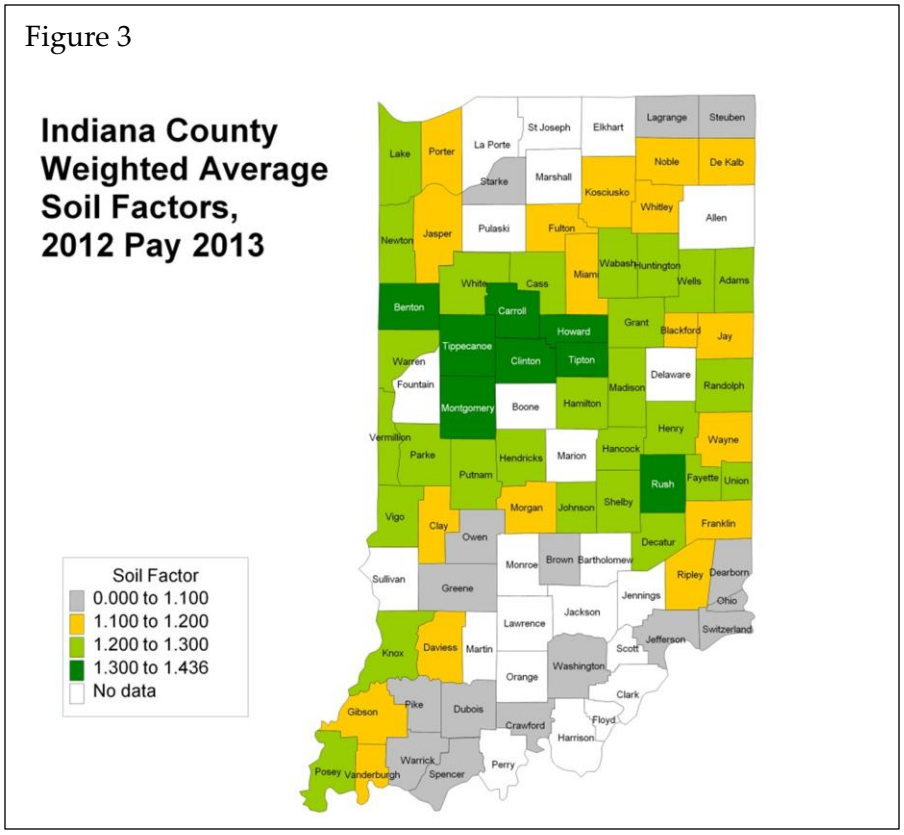


Figure 4

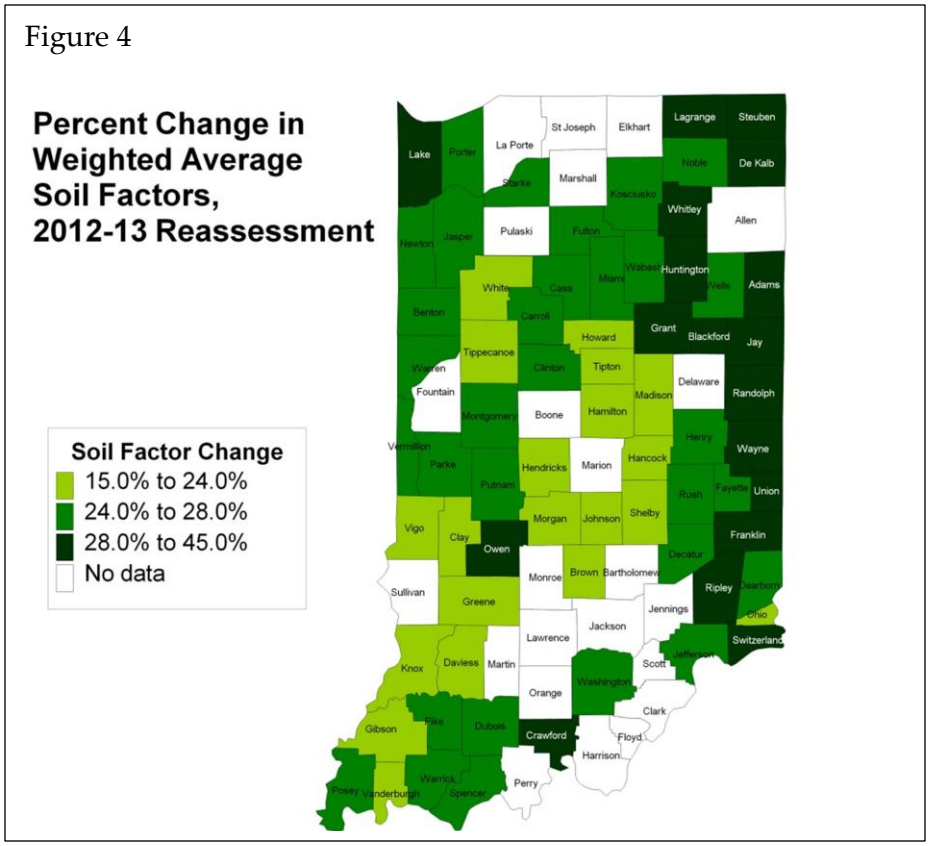


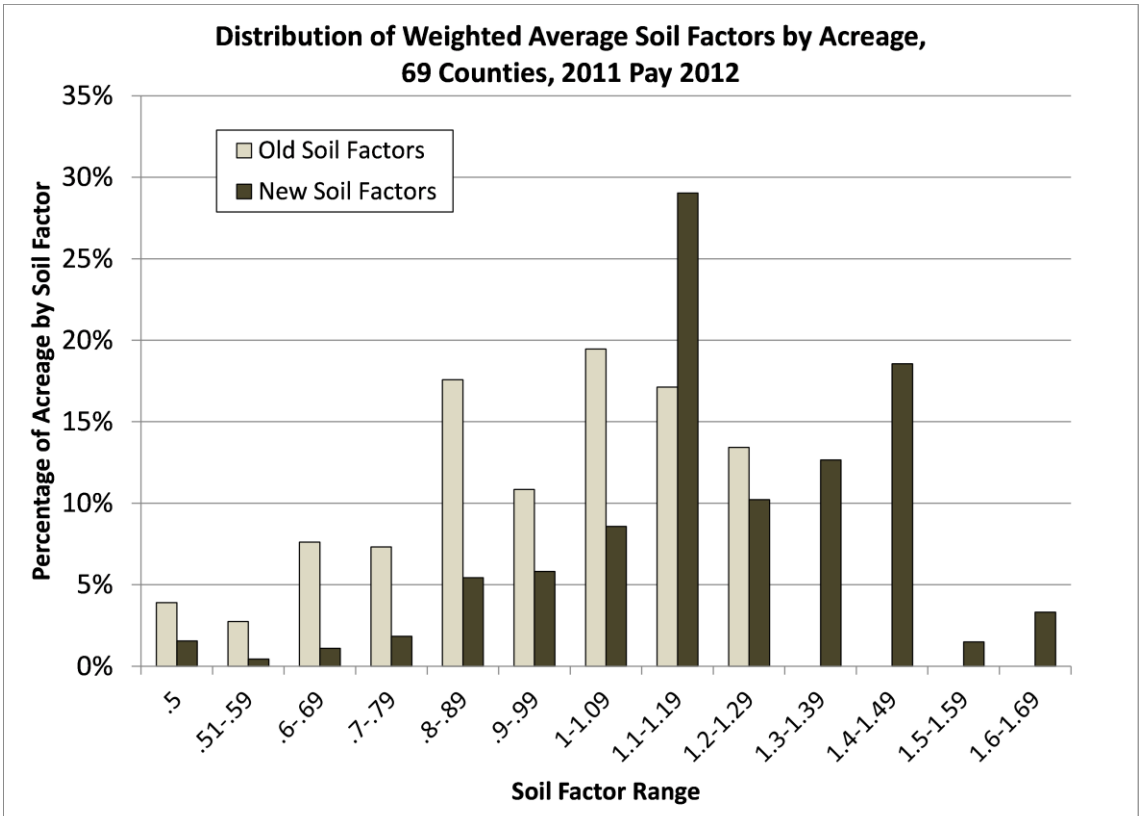
Table 3 shows the predicted base rates for 2014 and 2015. For 2014, the base rate is likely to rise by 8.0% to $1,760. For 2015, the base rate is likely to rise another 15.3% to $2,030.

The Fed has pledged to hold interest rates low at least through the end of 2014. Low interest rates from 2014 would enter the base rate formula for taxes in 2018 and remain in the formula through 2023. The high prices of 2007 will remain in the base rate formula through 2016; the high prices of 2011 will still be affecting the base rate in 2020. Farm land owners should expect the base rate to remain high through the end of this decade, at least.

Soil Productivity Factors

The base rate provides the statewide average assessment per acre. But some acreage is more valuable, some is less valuable. According to the 2011 Purdue Farmland Value Survey, in June 2011 the highest valued

Figure 5



land in Indiana was in the West Central region, with a top land value of $7,443 per acre. The lowest valued land in Indiana was in the Southeast region, with a poor land value of $2,895 per acre.

For farm land assessments to reflect property wealth, as the Supreme Court requires, farm land assessments must vary with land values across the state. The soil productivity factors provide this variation. Each acre of farm land in Indiana has been assigned a soil type, and the soil types have been assigned productivity factors. According to the DLGF's 2011 assessment guidelines, these factors are based on properties of the soil, such as slope, moisture holding capacity, organic matter content, and several other properties that affect corn yields. The factor is multiplied by the base rate as part of the calculation of assessed value.

Indiana is undertaking a statewide reassessment, which will be completed for taxes in 2013 (pay-2013). As part of this effort, the DLGF requested new soil productivity factors from the U.S. Department of Agriculture's Natural Resources Conservation Service. In a February 2, 2012 memo, the DLGF announced its intention to introduce these revised soil factors for pay-2013. The old factors ranged from 0.5 to 1.28. The new factors range from 0.5 to 1.66.

Data provided by the Indiana Legislative Services Agency allowed the calculation of weighted average soil factors for 69 counties. Each acre has a soil factor based on its soil type. County averages are calculated by summing the factors and dividing by the number of acres. The result is a "weighted" average because it accounts for the number of acres with each soil factor. Soil factors that apply to a large amount of acreage count more in the average. The weighted average old soil factor is 0.958, while the weighted average new soil factor is 1.203. The average soil factor increases by 25.5%.

The map in Figure 3 shows the soil type averages in four categories for the 69 counties with available data. The soil factors do appear to reflect corn yields in Indiana. Yields and soil factors are highest in the West Central region and lowest in the Southeast region.

Figure 4 shows a map of the percentage changes in the county-weighted average soil factors. The county average soil factor increases vary from 17.1% in Morgan to 40.5% in Jay. The

biggest increases are mostly in the counties in the eastern third of the state.

Figure 5 shows the distribution of old and new soil factors based on acreage in 2011 pay 2012. Under the old soil factors, half of all acreage had factors under 1.0, and half had factors of 1.0 or more. Under the new soil factors, only 17% of acreage have a factor less than 1.0, 48% have factors between 1.0 and 1.3, and 36% have factors of 1.3 or more.

This increase in the soil factors is problematic. Certainly yields continue to increase, and the soil factors may reflect these increases. But the base rate already includes the average yield statewide, implicitly in the rents, explicitly in the calculation of operating income. As yields rise year after year, so does the base rate. If the soil factors also increase, the rise in yields is double-counted in assessed values. The soil factors would have to average near one to avoid this double-counting.

The DLGF's assessment guidelines state that "The productivity factor for a soil map unit is calculated by dividing the estimated 10-year average corn yield (calculated in bushels per acre) by 100." The old soil factors originated about 30 years ago, at a time when the average corn yield per acre was approximately 100 bushels per acre. This may explain why the old factors varied around one (see Figure 5). Average bushels per acre are now well over 100 bushels per acre, which may explain why the new factors vary around 1.2.

In March the Indiana General Assembly passed Senate bill 19, section 9 of which requires the DLGF to postpone the use of the new soil factors from pay-2013 to pay-2014. The old soil factors must be used for taxes in 2013. It is expected that the effects of the new soil factors will be reviewed by one of the legislature's summer study committees.

Property Tax Bills

The Indiana Legislative Services Agency (LSA) provides estimates of the effect of assessment changes on tax bills by property type. The base rate is rising from $1,290 to $1,500 for taxes in 2012, a 16.3% increase. LSA estimates that agricultural business tax bills—including farm buildings and land—will rise by 11.4%. The base rate will increase another 8.7% to $1,630 for taxes in 2013. LSA estimates that the agricultural business tax bills will rise another 5.3% in 2013.

In each year the increase in tax bills is less than the increase in the base rate. This is partly because the assessments of farm buildings will increase less than the assessment of farm land. In most cases tax bills rise by less than the base rate increase because other property also will see increases in assessed values. Farm land assessments rise more, so agricultural tax bills will rise more than bills on other property types.

LSA's estimates were made before the DLGF announced the new soil productivity factors. The new factors represent a substantial increase over the old factors, 25.5% on average. LSA has estimated that the introduction of the new soil factors in pay-2013 would increase farm land property taxes by 18.5%, in addition to the increase from the rise in the base rate.

The new soil factors would *decrease* the tax bills of all other property types. Higher valued farm land means agriculture would pay a larger share of the statewide property tax bill. Other taxpayers would pay a smaller share. Farm land makes up a small share of statewide assessed value, so the decreases in other taxpayers' bills would be small. LSA estimates that average homeowner tax bills would fall 1.2% and average business real property tax bills would fall 0.7%. In addition, average property taxes on farm buildings would fall 4.6%.

The overall increase in agricultural tax bills from the rising base rate and revised soil factors would be substantial. Implementation of the new soil factors has been postponed by the General Assembly. The factors will be studied and possibly modified before they become effective. But the base rate increases will occur unless there is a change in the capitalization formula. The General Assembly made such a change for pay-2011, but there was no further modification considered in the recently concluded 2012 session. Farm land owners should plan for higher property taxes, probably for the rest of the decade.

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*Farm Managers' and Rural Appraisers' Assessment of Indiana's Farmland Market***

Craig Dobbins, Professor

The farm press and rural coffee shops have been abuzz this winter with discussions of farm land values in Indiana and other Midwestern states. In the February 2012 issue of the *AgLetter*, the Federal Reserve Bank of Chicago indicated that farmland values in the Seventh District (Iowa, and parts of Illinois, Indiana, Michigan, and Wisconsin) increased 22% from January 1, 2011 to January 1.2012. This was the largest annual increase since 1976.

To obtain a perspective about changes in Indiana's farm land market, members of the Indiana Chapter of Farm Managers & Rural Appraisers were surveyed during their winter meeting on February 15, 2012. To obtain information about Indiana's farmland market, members were asked to estimate current farm land values in the context of the following situation:

80 acres or more, all tillable, no buildings, capable of averaging 165 bushels of corn per year and 50 bushels of soybeans in a corn/bean rotation under typical management and not having special non-farm uses.

Thirty-two responses were received from people in 25 different Indiana counties. The average estimated price of farm land was $7,533 per acre. All of the respondents indicated their estimated price was higher than the value in February 2011. The average percentage increase from February 2011 to February 2012 was 14%. This makes the annual percentage increase less than the annual increase of 27% reported for Indiana in the Federal Reserve Bank of Chicago survey. The range in estimated increase provided by the farm managers and rural appraisers was 2% to 24%.

Attendees were also asked to estimate the cash rent for 2012 given the previously described situation. The average cash rent was $253 per acre. Twenty-seven of the respondents indicated that cash rent was higher than in 2011, and two respondents indicated it was the same. No one indicated a decline in cash rent. On average, the cash rent increased $28 per acre, an increase of 12.4%. There was a wide range in the estimated cash rent and cash rent change. Estimated cash rent varied from $150 to $400 per acre. The

Table 1. Percent of Respondents Using Each Type of Lease and Percent of Leases Represented by Each Type

Lease Type	Percent of Respondents Using Lease[1]	Percent of Leases[2]
Crop-share	85%	22%
Fixed cash	93%	42%
Variable cash	81%	34%
Other	15%	2%

change in cash rent varied from $9 to $70 per acre.

The increased variability of net returns associated with leasing farm land has prompted tenants and landlords to experiment with various types of adjustable leases. To get a sense of the type of lease used, attendees were asked to report the percentage of their cropland leases that were crop-share, fixed cash, variable cash, and other. The percentage of the respondents who reported using each type of lease and the percentage of their leases of each type are presented in Table 1.

Crop-share, fixed cash, and variable cash leases all had a high rate of usage among the respondents. Many of the respondents were using all three types of lease. The most commonly used lease was the fixed cash lease, averaging 42% of the leases. This was followed by the variable cash lease at 34%. Crop-share leases were 22% of the leases.

Many people ask if the increase in farm land values is likely to continue. The farm managers and rural appraisers were asked to provide two forecasts about future farm land values. One was where farm land values would be in one year. The second was where land values would be in five years. When asked about land values in one year, 75% of the respondents indicated that values would be higher. The other 25% said there would be no change. The expected increase averaged 8%, with a range of 5% to 12%.

There was less agreement about the change in farm land values over the next five years. In this case, 48% of the respondents indicated farm land values would be higher, 31% indicated there would be no change, and 21% indicated farm land values would be lower. For those respondents indicating that farm land values would be higher, the expected increase averaged 18% with a range from 10% to 25%. For those respondents expecting a decrease in farm land values, the decrease averaged 16%, with a range from 5% to 30%.

These results indicate that in the short term, Indiana's farm land market is expected to remain strong. No one expects farm land values to decline for the year, but relative to the past few years, respondents expect the rate of increase to be much less. Longer term, there is less certainty in how farm land values will change. More respondents expect farm land values to be steady or higher than to decline in five years, but sound risk management suggests that the effect of a 15% to 20% decline in farm land values on the business should be explored.

Purdue's annual survey of Indiana land values and cash rents will be conducted in June, with results published in the August 2012 *Purdue Agricultural Economics Report*.

[1] These will not total 100% because a respondent often uses more than one type of lease.
[2] Across the different types of leases the total will be 100%.

**A special thanks is expressed to the Indiana Chapter of Farm Managers and Rural Appraisers, which participated in the survey. Without their assistance it would not have been possible to take the pulse of Indiana's farm land market.

Passing the Farm's Management to the Next Generation

Amber Remble, Graduate Student, Roman Keeney and Maria Marshall, Associate Professors

The past century has brought dramatic change in agriculture, a sector that features a relatively small percentage of farms producing the majority of output. This change and the increased scale of operation have implications for how to organize management of farms. Retirement of farmers who were not followed by a direct successor is a leading factor contributing to farm consolidation. Expansion of on-going operations is largely driven by this release of acreage following a family's exit from farming. In this respect, intergenerational succession on farms and how that process is managed become an important concern for understanding a number of issues, including increasing scale in agricultural production, drivers of farm structure in the U.S., and best practices for succession in farm management.

What We Looked At

Researchers often treat the succession decision as a full exit/full entry decision, with the succeeding generation wholly replacing the previous generation at a designated time. However, succession takes place over time for most operations, often with an extended period of time in which individuals from different generations jointly manage the farm. The execution of this apprenticeship period during which management is gradually transferred is a function of both the ability of the younger generation to take over the managerial responsibilities of the farm and the impending retirement of the elder generation.

Figure 1 illustrates a possible transition of management responsibility over time between the elder and younger generations of family members. Initially, the elder generation bears all managerial responsibility (1.). Over time, the elder generation has a declining share of managerial responsibility (2.). This can occur because the elder generation relinquishes certain managerial tasks or through expansion of farm enterprises providing managerial opportunity for the younger generation. This increasing presence in the share of the farm's management is indicated in the dashed line tracing the role of the younger generation (3.). This process continues until, eventually, the younger generation's role in decision making eclipses that of the senior person (4.). Eventually, the elder generation reaches a full retirement state, and the younger has sole responsibility for managing the farm. Figure 1 offers a generic perspective on a process that requires planning in both business and family contexts.

The timing of the younger generation's movement toward being the primary manager will differ due to characteristics and goals that are unique to each farm family. Research in the area has focused on the planning and process of farm asset transfer for understanding motivations to sustain a family farm. Our research differs from this planning perspective and maintains that it is equally important to understand how

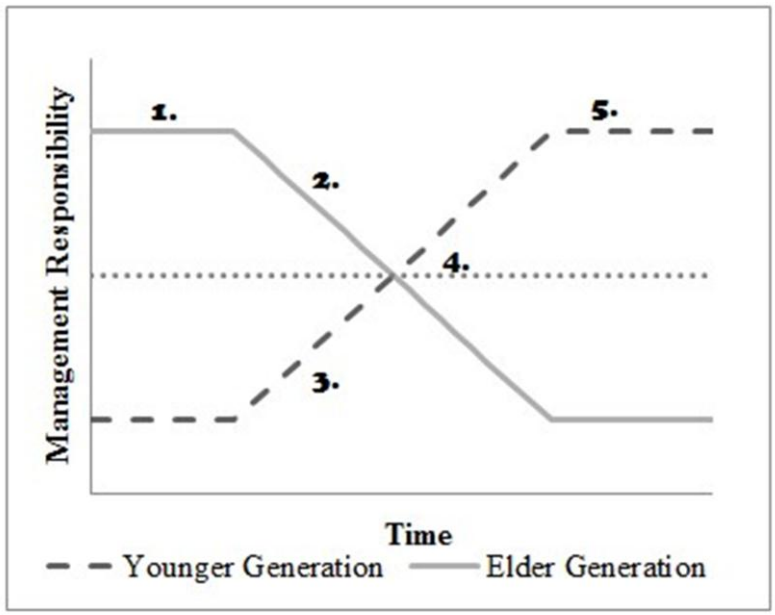

Figure 1. A Dynamic View of Transitional Succession

managerial responsibility is passed on in practice if we are to inform farm families of best practices for insuring successful transition of a family farm across multiple generations.

We accomplish this by focusing on survey data for farms that currently have two operators from different generations (age difference of 20 years or more). The data for each of these farms includes a response by the family as to which generation (elder or younger) is appropriately designated as the primary operator. This allows us to conduct analysis of farms at various points in the succession process depicted in Figure 1.We use statistical analysis of these survey responses to investigate factors that are correlated with families operating the farm with either the senior or junior generation as the primary manager.

The survey data for the analysis are from the 2002 Agricultural Resource Management Survey (ARMS) collected by USDA. In simplest terms, we sort the responses into two groups based on the generation with the primary management role and use a statistical model that estimates the influence of a number of factors on whether the family has chosen to maintain primary management with the senior generation or pass that role onto the younger generation. At the time of the survey in 2002, seventy-two percent of the farms reported that the older operator was the primary manager on multi-generation farms.

What We Found

We looked for the factors that had resulted in the younger generation taking over the primary management role. Results are shown in Table 1. The first column gives the factor description. The second column reveals whether the factor had a positive (+) or negative (-) impact on the transfer of management.

Increasing age of the senior generation increased the chance that the farm had passed on the majority of managerial duties to the younger generation. This is consistent with an elder

Table 1 Factors Contributing to the Choice of the Younger Generation as Primary Manager

Variable	Significant (Factor) *
Elder Generation	
Age	✓ (+)
Female	
College	
Household Size	✓ (-)
Younger Generation	
Age	
Female	
College	✓ (+)
Household Size	✓ (+)
Work Experience on Farm	
Dairy Operation	
Poultry Operation	
Crop Share	
Debt/Asset Ratio	
Total Farm Expenditures ($10,000)	
Labor Expenses	✓ (+)

Note: Pseudo $R^2 = 0.3414$

*Statistically significant at the 0.10 level or higher

generation reducing their involvement and passing more duties to a successor. This may play out in a number of ways as authority is given to the person most active on the farm and the senior generation takes on a more advisory role. This relationship is expected because elder farmers reaching retirement are more likely to focus on non-physical work activities and on planning for the future of their farm and estate. The finding is consistent with the lifecycle of the farm business, which indicates that farm operators achieve peak productivity at middle age due to both physical and human capital accumulation. Beyond this peak, farm productivity gains tend to wane for a variety of reasons, including the process of an older generation establishing a set of standard practices. Younger generations may then bring innovative technologies or strategies that help keep productivity gains high.

An interesting finding is that younger generation individuals who obtain college degrees are more likely to be serving as the primary manager on the home farm. While higher education has long been noted as a means for farm children to gain career options and increase earning ability, the complexity of modern agricultural markets, policies, and technology are also factors driving those who choose farming as a career to invest in higher education.

Mechanization of U.S. agriculture has contributed to a reduction in the average farm family size. We investigated how family size might relate to the transition of primary management from senior to junior generations and found that an increase in the number of individuals living in the seniors' household decreases the chance that management has transferred to the younger generation. Perhaps older generation operators are less likely to retire if they still have dependents living in the household who rely on their income.

Having more children in the young-generation household increased the likelihood that transition of the primary management role had already occurred for the younger generation. This would be consistent with the income demands that additional family members bring in the younger generation. Indeed, the increased income demand and ability of the younger generation's family to supply labor to the business may be one of the most important factors driving expansion of the farm business, with the younger generation adopting new enterprises that use both farm capital and family labor resources.

The only financial indicator that proved statistically significant in the model was labor expenses for the farm. We found that farms with higher labor expenses (relative to their gross income) are more labor intensive and have more tendency to feature the younger generation in the primary management role. Farms that are labor intensive require a large time allocation to labor oversight, which may encourage a quicker transition of management to the younger generation.

Other variables shown in the table were explored, but did not have a statistical impact on the intergenerational transfer of management.

Concluding Remarks

The results of our analysis confirm the importance of family and individual characteristics in farm succession planning and execution. Economists have had a tendency to look at input and outputs, financial organization, and a number of other business strategies to present guidelines for farm transfer and succession. Our findings indicate that knowledge and productivity embodied in the skill and experience of the two generations are much more critical to the design of a successful transition. Similarly, family demands for income and earnings shares may be strong drivers of the succession process and distribution of farm returns to the different generations' management resources. This and the importance of family household demands on timing of succession mean that in addition to the apprentice effects (e.g., gained experience, farm specific training) that occur during the period of joint management, it is critical for both generations to use this period to discuss their expectations for planning and implementing a profitable management transition on the farm.

Indiana Farm Management Tour June 20 and 21

The 80th annual Indiana Farm Management Tour will visit Marshall County on June 20-21, 2012. The tour will start at Homestead Dairy south of Plymouth, IN at 1:00 p.m. on Wednesday June 20 and then move on to visit Sam Erwin's Indiana Berry and Plant Company at 3:00 p.m.

The 2012 farm management tour will be held in conjunction with the Indiana Master Farmer Awards dinner and ceremony on Wednesday evening. The Master Farmer program is sponsored by Indiana Prairie Farmer and the Purdue University College of Agriculture. A highlight of the Master Farmer program this year will be a panel discussion focusing on how the Master Farmers apply management principles in the management of their farm businesses.

At 8:00 a.m. on Thursday morning, the farm management tour will visit Stackhouse Farms, actually two separate grain operations that farm together but are managed completely independently and quite differently by Brad Stackhouse and his son Kyle. Later that morning the tour will move on to Marvin Houin's farm, where Marvin and his son Charlie operate a traditional farm partnership.

The tour includes a diverse set of businesses, including: an innovative grain farm that relies on specialty/niche markets and manages its irrigated and non-irrigated units as separate entities; a commodity grain operation that is at the forefront of technological efficiency; a modern computerized family dairy that uses a multiple-plant strategy to facilitate growth and profitability; and a fruit operation that is actually four businesses in one.

Lunch will be served at the Houin Farm at noon on Thursday for participants who have pre-registered for the farm tour. Lunch will be followed by a market outlook presentation by Dr. Chris Hurt. The tour is scheduled to wrap up around 2:30 p.m. on Thursday June 21.

To pre-register for the farm management tour visit the Center for Commercial Agriculture's website at Purdue University in mid-May, and select the Programs/Events page and the Farm Management Tour link: http://www.agecon.purdue.edu/commercialag/progevents/tour.html.

Direct specific questions about the farm management tour to Alan Miller via e-mail at millerwa@purdue.edu or by calling (765) 494-4203. For more information on the Master Farmer banquet or to pre-register for the banquet, contact the Purdue Ag Alumni Association by calling (765) 494-8593.

New Faculty: Dr. Elizabeth Yeager

Elizabeth Yeager, Assistant Professor, Agricultural Economics. Elizabeth received a bachelor's degree from Kansas State University and her doctorate in agricultural economics from Kansas State University. Her research and teaching activities are primarily related to agribusiness management, marketing, and production. She has a special interest in risk management. Elizabeth is currently advising the Purdue University National Agri-Marketing Association (NAMA) Team.

Visiting Faculty: Dr. Nestor M. Rodriguez

Dr. Rodriguez is currently teaching undergraduates two courses economics and agricultural prices. Nestor received his bachelor's and master's degrees, both in economics, from Florida Atlantic University. He received his doctorate in agricultural economics from Purdue University. His research is primarily in applied microeconomics and applied econometrics with application to food demand analysis. Other research/teaching interests include macroeconomics, monetary and fiscal policy, and agricultural and corporate finance. Nestor has served in the U.S. Navy as a Nuclear Reactor Operator aboard the USS Augusta. He was a New York City Police Officer working in the 32nd precinct in Harlem, New York.

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