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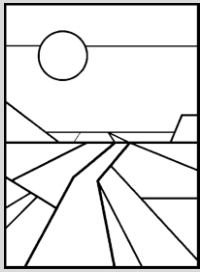
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Purdue Agricultural Economics Report

June 2012

Jobs, Jobs, Jobs: Purdue Ag Economics Students Get Them!

Andy Oppy, Career Services Coordinator and Academic Counselor

Purdue Agricultural Economics undergraduates continue to have great success in the job market as their degrees open the door to challenging professional opportunities. Just 30 days after graduation, the Class of 2012 reported that 88% had secured full-time employment or elected a professional direction, including further education. This is a common trend for graduates of the department. Over the previous four years, an average of 93% were either gainfully employed or continuing their education within 90 days of graduation (Figure 1).

There are a number of reasons for Ag Econ graduates' success in finding professional opportunities. The department has been fortunate to attract talented students both as first year students and as older Purdue students who transfer into the program because of the positive things they hear from other Ag Econ students. These students come with both a passion to learn and a passion to lead. These characteristics have been noticed by industry. When asked why he prefers to recruit students from Purdue's Ag Econ Program, Drew Ratterman, Market Sell Workforce Leader for Dow AgroSciences, said, "It is because of their professionalism and soft skills due to all their extracurricular and experiential activities. As we recruit across many universities, Purdue is second to none."

Past Agricultural Economics students have had a long history of leadership, which is strongly fostered by the department, and today's students follow in a wide variety of leadership positions across campus. In most years, Agricultural Economics students hold several officer positions in the College of Agriculture Student Council, are a predominant major among student representatives of the college, and are extremely active in the leadership of residence halls and Greek and Co-Op housing. The department's students also are active in Purdue Athletics and Purdue Student Union Board and can be found holding high offices within Purdue Student Government.

Another factor leading to career placement success has been the strong growth in the agricultural economy. Throughout the current general economy downturn, agricultural companies have continued to grow and thrive. The growth of ethanol production has increased demands for commodity merchandisers. Advances in technology have provided many more opportunities for our students in the crop protection and seed sector. Also, the aging population of current employees in the industry has created vacancies for recent

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graduates. And the future looks bright as agriculture is being asked to help meet some of the world's greatest challenges: feeding 7 billion people (headed to 9 billion), helping increase the world's energy supply, aiding in global warming solutions, learning to more efficiently use the earth's limited natural resources, and doing all of this sustainably.

after a student's freshman year, which means they may have three summer intern positions in their undergraduate program. A number of seniors return to campus in August with full-time job offers from a summer internship employer.

The Department of Agricultural Economics and the College of Agriculture at Purdue continue to do a terrific job of preparing

teaching by the Agricultural and Applied Economics Association since 2000.

Students get exposed to employers by design. In October each year, the college hosts an Agricultural Career Fair with over 120 employers in attendance. Many return to campus for the Spring Fair in February. Bringing these representatives to campus offers outstanding opportunities

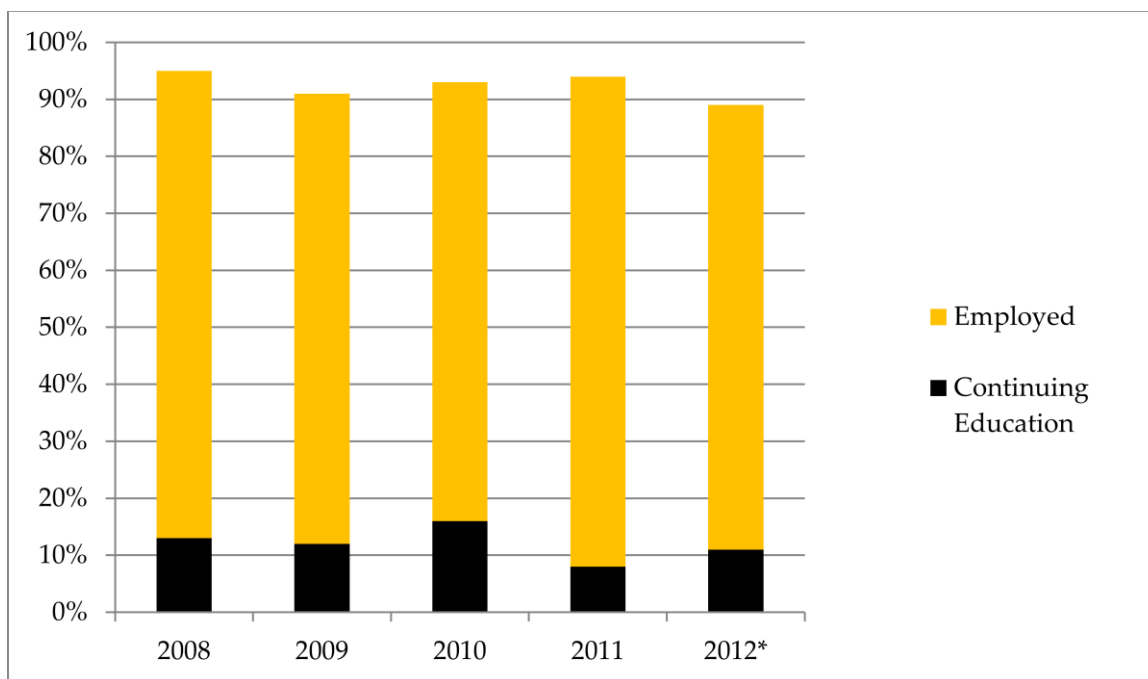


Figure 1. Percentages of Agricultural Economics Graduates Gainfully Employed or Continuing Their Education

Over the years, agricultural companies and organizations have increased the number of internship opportunities available to students. They find internship programs to be a phenomenal way to preview and then to fill their talent pipeline. Students use this form of experiential learning as a way to gain employment experience, learn about the companies, and demonstrate their abilities to potential employers. The department often has more internship request than students to fill those positions. Some internships can even start

graduates for the working world. Tim Baker, Recruitment Specialist for Farm Credit of Mid-America said, "I think with the outstanding education that they are receiving along with all of their other activities, they just seem to be better equipped to walk into our company and excel!" The department has a rich history of teaching excellence. Seven faculty members have won Purdue's highest undergraduate teaching award and five faculty members have been recognized for national excellence in undergraduate

for students to explore career opportunities. Beyond the Career Fair, the college and the department send notices to students regarding job opportunities on a daily basis. The Agribusiness Club and Farm Management Club sponsored by the department hosted 10 different companies at their meetings this past year to provide information and networking opportunities for students. One of the clubs hosted a "Benefits Seminar" aimed at helping graduates better understand the full benefits

packages that generally come with an official professional job offer. Professors often use guest lecturers to help students understand the relevance of economic principles to the “real” world. In turn, the organizations those guests represent are often back on campus seeking to employ talented students.

It is easy to see why students earning a degree from the Department of Agricultural Economics at Purdue University have been so successful in their career searches. Carefully balancing education, extracurricular leadership, and experiential learning and having outstanding teachers in an environment that fosters strong

become sought-after employees with opportunities for professional Jobs, Jobs, Jobs.

Ethanol Transforms Indiana Corn Uses

Chris Hurt, Professor

Rapid growth of ethanol production in recent years has caused major changes in the uses of corn raised in Indiana. In 2006 there was one ethanol plant in the state. Today, there are 13 ethanol plants with capacity to produce just over 1 billion gallons annually. Indiana’s plants represent about seven percent of the country’s total ethanol production capacity. Most of the expansion occurred from 2007 to 2011, after the Energy Independence and Security Act of 2007 established the Renewable Fuels Standards II. That law mandates the use of conventional U.S. ethanol production to rise to 15 billion gallons by 2015.

In-State Users

In a few years, ethanol plants quickly became the number one

destination for corn produced in Indiana. The single plant operating in 2006 used about 88 million bushels of corn running at capacity. Today, the 13 plants operating at capacity would require an estimated 381 million bushels.

Wet corn mills are the second largest user of corn in the state. Wet mills break down the corn seed into its four components: germ, hull, gluten, and starch. Corn oil is extracted from the germ, the hull and gluten are used for livestock feed, and the starch can be converted into sweeteners, starch products, or alcohol. Wet mills can thus manufacture high fructose corn syrup (HFCS), industrial starches, and ethanol if they choose. Because they break the seed into its component parts, they can be

flexible in selecting their final products. In 2012 it is estimated that the five Indiana wet mills have the capacity to process about 213 million bushel of corn annually. The plants are in Hammond, Lafayette (two), Indianapolis, and Washington.

The third largest user of corn in Indiana is for animal feeding, which accounts for an estimated 186 million bushels in 2012. Hogs are the largest user, growing from 83 million bushels of used in 2005 to an estimated 104 million bushels in 2012. The amount of corn fed to poultry has also expanded somewhat in recent years to an estimated at 52 million bushels. Corn fed to cattle has stayed fairly constant, although the amount used by beef cattle has declined and the amount used by dairy cattle has

Table 1: Estimated Feeding of Corn In Indiana

	2005	2006	2007	2008	2009	2010	2011	2012
	-----Million Bushels-----							
Hogs	83	84	89	103	100	101	102	104
Poultry	48	52	49	49	51	51	51	52
Beef & Dairy Cattle	27	27	27	27	28	28	29	27
Other	4	4	4	3	3	3	3	3
Corn Fed In-State	162	166	169	182	182	183	185	186

Table 2: Estimated Indiana Corn Use at Processing Capacities

	2005	2006	2007	2008	2009	2010	2011	2012*
	-----Million Bushels-----							
Ethanol	36	36	104	237	291	284	366	381
Wet Milling	208	210	213	213	213	213	213	213
Animals Feeding In-State	162	166	169	182	182	183	185	186
Dry Milling	28	28	28	28	28	28	28	28
Total corn Use at Capacity	434	442	515	661	715	709	793	808
Indiana Corn Production	889	845	981	874	934	898	840	978
Production Minus Capacity Use	454	403	466	213	219	190	47	170

*2012 Production is based on 166 bushel per acre "normal yields"

increased. Table 1 provides estimated corn use by species groups since 2005.

Dry corn mills are the fourth largest in-state user. Dry mills grind the corn to make cereals, corn meal, corn flour generally for human products, corn products for pet foods, and some animal feed products. One plant in the state processes white corn for human consumption. There are four dry mills in the state with an estimated annual processing capacity of 28 million bushels.

Out-of-State Users

One of the biggest impacts of the rapid expansion of corn use for ethanol production has been on the out-of-state users of Indiana corn. Indiana has traditionally been a major excess producer of corn, meaning much more is produced than is consumed in the state, so that means moving corn to users outside of Indiana.

Corn may move in multiple directions out of the state. The largest single direction has been for feed use in the southeastern U.S. poultry and hog industries. Indiana corn also has traditionally moved into foreign markets via the Ohio River in Southern Indiana and to a smaller extent

via the St. Lawrence Seaway through Lake Michigan ports. A small amount moves to the West Coast by rail in containers that are loaded on decks of ships for transit to Asian customers. Containers are especially used for high-value identity-preserved grains or soybeans that are using the backhaul capacity of containers that have come to Indiana from Asia containing goods such as car parts.

There is no official data available on grain movements in and out of Indiana, so that is estimated as shown in Table 2. This procedure simply takes each year's production and subtracts estimated in-state corn use assuming processors operate at capacity. Those results suggest that in 2005 and 2006 a total of 400 to 450 million bushels of corn was available to be transported out of state. That meant that about one-half of Indiana corn production was moved to non-Indiana users. The astonishing growth of Indiana ethanol production in recent years means that corn available to be shipped out-of-state is less than 200 million bushels per year. In fact, in 2011, when Indiana production was low due to poor yields, there may have been no more than about 50 million

bushels for out of state users if processors ran near capacity.

Summary

The rapid growth in Indiana's ethanol industry between 2007 and 2011 means that more of the state's corn stays inside the state for processing and that much smaller amounts are now available for out-of-state shipment. The amount of corn annually available to be shipped to users outside Indiana was estimated to be more than 400 million bushels in the mid-2000s, but now is less than 200 million bushels per year.

The ethanol industry in Indiana moved from a relatively minor user of corn in 2006 to become the largest user of corn as early as 2010. If 2012 corn yields were near normal, ethanol would use nearly 40% of the corn produced in the state. Wet milling of corn in-state is estimated to be the second largest user, representing about 22% of a normal 2012 crop. The animal industry in the state is the third largest user, representing about 19% of use. This leaves out-of-state users as the fourth largest user, representing only 17% of Indiana corn use. In contrast, out-of-state

shipments were around one-half of Indiana corn use in 2005 and 2006.

The rapid expansion of ethanol has meant changes for the corn industry. Those include a shift toward more corn acres in Indiana, primarily at the expense of soybean acres and somewhat lower wheat acres. It has therefore changed farmers' crop rotations, which were primarily 50/50 corn/soybeans, toward heavier concentrations of corn. By 2012 planted acreage of the two main crops had reached 55/45 corn/soybeans.

Larger acreage planted to corn has impacted rotations as producers are learning how to more effectively produce corn-on-corn. The fact that corn yields tend to be more than three times those of soybeans has meant a large expansion in grain handling capacity. The state's permanent grain storage capacity has expanded by 207 million bushels since 2005, representing 20% additional capacity. On-farm storage increased by 110 million bushels, and off-farm by 97 million. More farmers have also added semi-trucks to haul corn to ethanol plants.

Finally, corn and soybean prices have been increased by the rapid expansion in ethanol production in two ways. First, because the ethanol movement was a national and global expansion that contributed to increased demand for corn, it helped increase prices across the country and globe. Second, ethanol sharply reduced the "excess production" of corn in Indiana. This served to increase local corn basis levels as well. These price enhancements were one of the primary contributors to higher farm incomes and higher farmland values.

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Deer and Elk Farming in Indiana: Economic Opportunity for Rural Communities

Alicia English, Ph.D. Candidate and John Lee, Professor

Small-scale agricultural enterprises can have important economic impacts for families in rural communities. Indiana has been among the fastest growing states in the number of deer and elk farms. These farms are producing deer and elk mostly for hunting preserves, but also live

animals for breeding stock, hides, semen, antlers, velvet, and processed meat products. This article provides estimates of the dollar and employment impacts from Indiana deer and elk farming and hunting preserve operations.

Indiana and National Farms

There are deer and elk farms in a number of Indiana locations, but the top 10 counties for deer and elk farming, ranked by the number of BOAH permits (Indiana Board of Animal Health) in 2011, were LaGrange,

Marshall, Allen, Elkhart, Kosciusko, Miami, Noble, DeKalb, Adams, and Whitley counties. These counties are located in the North Central and Northeast portions of the state and tend to be rural, with the exceptions of Allen (Ft Wayne) and Elkhart counties. LaGrange County had 60 permitted farms.

Using estimates from Waldorf (2007), the top 10 BOAH permit counties are given a relative rurality score that is shown in Table 1. The maximum rurality score on this scale in Indiana is

Michigan and Indiana. In Indiana, opportunities for deer and elk farming and hunting operations have increased the number of licensed breeders by 19% since 2006, with a majority of the distribution in the northeastern counties of the state (Indiana State Government 2011).

What about the entire country? A 2007 cervid study conducted by Texas A&M University estimated there were 7,828 cervid operations nationally. This estimate included approximately 1,600 Amish operations that

especially those that are high valued trophy bucks.

A number of the hunting preserves Indiana farms sell to are in other states. For example, Pennsylvania has approximately 1000 deer and elk breeding farms and over 47 cervid hunting preserves. Indiana, in contrast, has 388 farms and only four hunting preserves. Indiana regulations will phase out these four gradually, and no new Indiana entrants are currently to be allowed. The deer and elk farm to preserve ratio is 21:1 in

Table 1 Relative Rurality of Indiana Counties

		Relative rurality score	
		1990	2000
LaGrange	60	0.53	0.49
Marshall	27	0.44	0.41
Allen	26	0.22	0.20
Elkhart	23	0.28	0.23
Kosciusko	20	0.44	0.38
Miami	12	0.41	0.38
Noble	12	0.45	0.42
DeKalb	10	0.40	0.36
Adams	8	0.43	0.41
Whitley	7	0.45	0.46

0.57. The top 10 counties by number of BOAH permits in 2011 have rurality indexes ranging from 0.20 to 0.49 for 2000. Thus, the majority of deer and elk farms are located in rural counties.

According to USDA Agricultural Census data, the states with the largest increases in cervid (deer and elk family) operations were Wisconsin, Michigan, Pennsylvania, Indiana, and Ohio. Lancaster, Pennsylvania had the largest gains, with a 1,531 deer inventory increase from a population of 491 in 2002 (USDA NASS 2011). Elk inventories in contrast had smaller inventory increases. States with the largest increases were Pennsylvania,

consider deer and elk breeding an opportunity to diversify and generate income on relatively small acreage (Anderson, Frosh and Outlaw, 2007).

What Is the Market?

Growth in neighboring states represents a potential opportunity and some challenges for Indiana deer and elk farmers. Their market relates to the selling of deer and elk products and breeding stock. This includes live animal for breeding and hunting, hides, semen, antlers, velvet, and processed meat products. Hunting preserves typically serve as the primary end market for many of these animals,

Pennsylvania, while the same ratio is 97:1 in Indiana.

Additional problems can arise when Hoosier breeders try to rely on out-of-state markets. Other states may choose to regulate imports of live animals, semen and other cervid products. A review of different state rules and regulations regarding the cervid farming industry reveals a wide variation in policies. Some states have banned the importation of live animals from other states in an attempt to support their own breeding industries. Still others have restricted importation based on possible health risks due to the fear of diseases spreading to their own herds. In addition, deer

Change 02-07 Deer Inventories

- 3 - 42
- 43 - 95
- 96 - 175
- 176 - 271
- 272 - 415
- 416 - 639
- 640 - 1531

Change 02-07 Elk Inventories

- 7 - 12
- 13 - 24
- 25 - 42
- 43 - 61
- 62 - 85
- 86 - 138
- 139 - 276

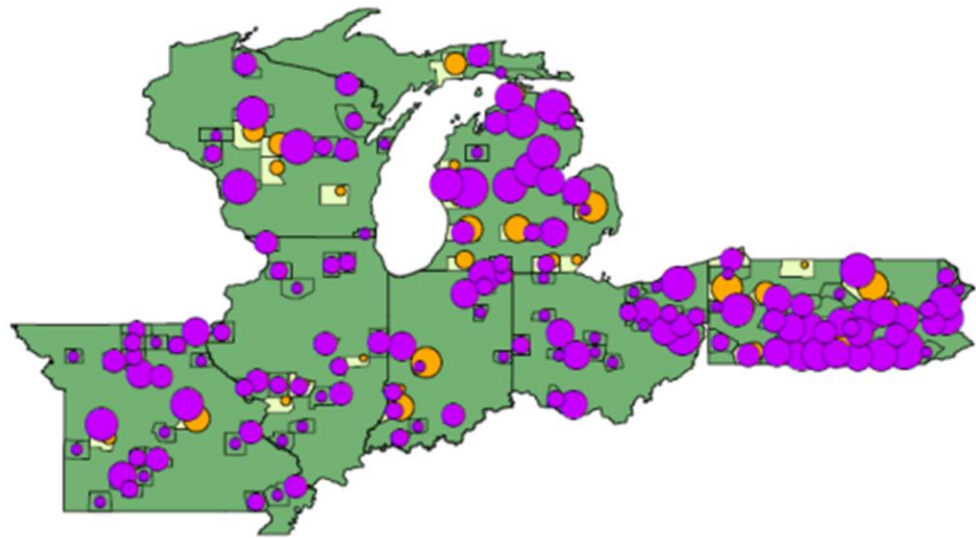


Figure 1 USDA Agriculture Census, Growth in Deer and Elk Inventories (Number of Animals) from 2002 to 2007

and elk breeding operations are always at risk for disease outbreaks from wild herds. Indiana DNR and BOAH, as an example, are monitoring wild Indiana deer herds for the spread of bovine tuberculosis from herds in Michigan and Minnesota.

Economic Impacts

The total economic impact of the deer and elk farming industry in Indiana is the sum of the direct, indirect, and induced effects. The direct effects are those related to the economic activity and employment in raising the animals. The indirect effects relate to the purchases of goods and services made by the deer

and elk farms in the local economy. Examples include the purchases of equipment, feed, fencing, veterinary services, transportation, utilities, and insurance. These purchases result in the economic impact multiplying through the other sectors of the rural economy.

The induced effects result from the spending by other businesses and people in the state that support the deer and elk farming and hunting preserves. For example, catered meals to hunting lodges involves local businesses that start with the caterer purchasing food, hiring staff, and buying equipment and vehicles from

other local businesses. Through these activities, economic activity is spread throughout the local and state economy.

In order to estimate the economic impact of the cervid industry in Indiana, two surveys were conducted by the Indiana Deer and Elk Farming Association in 2011. These asked members to provide estimates of the values of animal sales and purchases; herd inventory, operations and facilities costs; equipment and veterinary and feeding expenses; and hunter- and hunting-specific operational expenses. These values were used with the IMPLAN (Impact Analysis for Planning) model developed by

Table 2. Direct, Indirect, and Induced Impacts of Deer and Elk Farming in Indiana from Model Results

	Output	Labor Income	Employment
Direct	\$27,037,505	\$4,246,781	378
Indirect	\$15,898,052	\$3,887,249	124
Induced	\$6,391,666	\$2,081,126	73
Total	\$49,327,223	\$10,215,156	575

the USDA Forest Service. The multiplier coefficients for Indiana came from *The Economic Impact of the Indiana Livestock Industries* (Mayen and McNamara, 2007).

The total economic impact of deer and elk farming in Indiana is estimated to be \$49.3 million in 2010. This includes the value of sales at \$27.0 million (Table 2). The industry generates over \$22.3 million in indirect and induced effects for the economy of Indiana. Total labor income resulting from deer and elk farming exceeds \$10 million dollars annually.

Total employment from Indiana's deer and elk farming is estimated at 575 people. It should be noted that this input/output model result may understate the real employment impact for Hoosiers. This is because many deer and elk farmers rely on part-time hourly employees or on family members to provide labor. In fact, survey results for the state's industry revealed 497 full time

employees and over 2,600 part time hourly workers statewide. Survey results suggest labor income exceeds \$16.2 million dollars annually. In addition, total wages paid by hunting preserve operations for cooks, guides, and labor results in approximately an additional \$200,000 in seasonal income.

Summary

Indiana is among the fastest growing states in deer and elk farming operations. These enterprises are predominately owned and operated by small acreage rural land owners. Many of these deer and elk farmers engage in this activity as a means to improve household income and employment in economically limited rural areas.

This study estimated the Indiana industry to have an economic impact of \$49 million in 2010, and survey results indicate a labor income of over \$16 million to families involved in the industry. While the total dollar impact is small compared with

the traditional agricultural sectors of the state economy, the economic footprint of deer and elk farming can be important to individual families in rural Indiana counties.

Future growth in this industry is expected to be driven in large part by the market for deer and elk by hunting preserves. Currently more than 90% of Indiana animals purchased go to hunting preserves. There are headwinds for the industry, however, because the state of Indiana is phasing out in-state preserves, and shipments from Indiana to other states may be limited by those states due to restrictions regarding the transportation and health risks of out-of-state animals. This means that Indiana producers will need to build strong relationships with out-of-state preserve managers and strive to meet all regulatory rules of those states.

The complete report is available at: http://www.indianadeer.net/IDEFA_EconomicImpactAnalysis_final.PDF

For more information about this interesting industry, visit the Indiana Deer and Elk Farmers' Association at <http://www.indianadeer.net/>.

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