# A VISION FOR IOWA ANIMAL AGRICULTURE

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IOWA STATE UNIVERSITY
COLLEGE OF AGRICULTURE

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## FOREWORD

Animal agriculture long has been an economic driver for small towns and rural communities in Iowa. Iowa offers excellent potential for growth of its animal food systems.

Iowa's animal agriculture industry is in the unique position of being favorably located geographically, in an area of competitive advantage for feed ingredients and has cropping systems that are compatible for manure utilization. Issues of concentration and environmental impacts exist, and continue to be addressed.

The 2004 Battelle report that made recommendations on how to grow Iowa's economy indicated the state's strength in animal agriculture. It said Iowa State University's research and intellectual resources and Iowa's animal agriculture industry are a potent combination for economic development.

Iowa State University's Department of Animal Science conducted a visioning exercise to evaluate the current status of animal agriculture and the opportunity for growth. About 40 industry representatives were involved in the process, with reports written for six livestock categories – beef, dairy, equine, pork, poultry and sheep/goats. Summaries of those species reports are included in this document.

This report outlines the current successes of Iowa's animal agriculture industry, the greater potential it offers and actions needed to help reach that potential. Read on to learn more about the tremendous asset animal agriculture is to Iowa's economy, and what can be done to build on this strong foundation.

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While the population of Iowa has been stable over the past few years, it has shifted from rural communities to urban and suburban communities.

Rural Iowa offers a high quality of life but is in dire need of economic development. Fertile soil and a climate conducive to growing things combine to make agriculture a vital part of the state's economy. Iowa's agricultural land base makes an efficient, integrated system of crops and livestock possible. The state is in an excellent position to increase its domestic and global market share for all types of agricultural products.

Animal agriculture long has been an economic driver for Iowa's small towns and rural communities. Its animal agriculture industry is favorably located geographically, in an area of competitive advantage for feed ingredients and has cropping systems that are compatible for manure utilization. Development through animal agriculture is a logical and exciting avenue to grow the state's rural economies.

Iowa State University's Department of Animal Science conducted a visioning exercise to evaluate the current status of animal agriculture and opportunities for growth. Reports were written for six livestock categories – beef, dairy, equine, pork, poultry and sheep/goats. As these individual reports were developed, it became clear that a number of central themes and issues exist across all livestock species grown in Iowa.

## KEY MESSAGES

- **Iowa has the capacity to increase all animal agriculture species grown in the state.**

Iowa's animal agriculture has a long history of being a low cost producer of high quality products. Staying competitive in the global market will be essential if Iowa's industry is to grow. The animal industries must focus on profitability for the producer in the future if Iowa is to remain competitive globally, expand its industry and garner a larger percentage of the U.S. market.

Iowa has the land resources to increase livestock and poultry production. Think about a diversified crop-livestock farm that feeds all the crops grown on the farm and sells only livestock or poultry products. More labor is needed to care for the animals and value is added to the crops that are converted to higher value animal proteins. The farm would purchase less commercial fertilizer because the manure nutrients would meet most, but not all of the crop needs. Now use the same logic for the state of Iowa. How much livestock and poultry production is possible?

A recent analysis by the Center for Agricultural and Rural Development at Iowa State University evaluated the number of hog or cattle finishing spaces needed to fertilize crops per section of cropland (Table 1). These estimates follow sound agronomic practices and environmental regulations. Iowa has about 36,000 sections of corn and soybeans. If all were planted in a corn-corn-soybean rotation under a phosphorus standard, it would take all of the hogs and 80 percent of the fed cattle in the United States to generate adequate nutrients for the crops. Iowa currently is at approximately

26 percent and 6 percent of the nation's hogs and fed cattle inventories, respectively. Clearly, Iowa has the land resources to expand animal agriculture.

**Table 1. Number of Animal Spaces Needed to Generate Adequate Manure to Fertilize 640 Acres**

| Crop Rotation | Finishing Hogs | Fed Cattle |
|---|---|---|
| Continuous Corn | | |
| N-standard | 5,734 | 1,213 |
| P-standard | 2,731 | 651 |
| Corn-Corn-Beans | | |
| N-standard | 3,186 | 674 |
| P-standard | 2,412 | 575 |
| Corn-Beans | | |
| N-standard | 1,911 | 404 |
| P-standard | 2,275 | 542 |

*Source: Are More Livestock in Iowa's Future? Iowa Ag Review Fall 2005, Vol. 11 No. 4*

Table 2 summarizes the Iowa livestock and poultry sector at the start of 2006 and identifies the potential expansion and targeted growth considered in this report. Cash receipts from animal agriculture in 2005 were nearly $7.9 billion in Iowa and represented 53 percent of all agriculture receipts. Growth opportunities differ across species due to current position and competitive advantages in Iowa compared to other regions. The bottom line is that cash receipts from animal agriculture have the potential to increase by $2 billon over the next decade.

**Table 2. Iowa's Animal Agriculture and its Growth Potential to 2016**

| | 2006 Share of US[1] | 2005 Receipts $ Billion | Growth 2006-16 | # Head Target Million | 2016 Receipts $ Billion | 2016 Share of US[2] |
|---|---|---|---|---|---|---|
| Fed cattle marketings | 6.2% | $2.43 | 50% | 2.07 | $3.28 | 9.3% |
| Beef cow inventory | 3.2% | | 10% | 1.15 | | 3.5% |
| Milk production | 2.1% | $0.63 | 50% | 5,640 (bil. lbs) | $0.94 | 3.2% |
| Swine breeding herd | 17.8% | $4.30 | 15% | 1.23 | $4.76 | 20.5% |
| Swine finishing | 27.8% | | 10% | 16.86 | | 30.6% |
| Layers | 14.6% | $0.34 | 37% | 70 | $0.46 | 20.0% |
| Turkey | 3.6% | $0.136 | 40% | 13.50 | $0.19 | 5.1% |
| Goats | 1.3% | $0.009 | 160% | 0.09 | $0.02 | 3.5% |
| Sheep | 3.8% | $0.040 | 40% | 0.33 | $0.06 | 5.3% |
| **Total** | | **$7.87** | | | **$9.70** | |

*1) Production in 2005 or inventory at start of 2006 as a percent of U.S. total*
*2) Iowa share of U.S. 2006 production and inventory*

Iowa's beef industry marketed 1.38 million fed cattle in 2005 and had 1.05 million beef cows at the start of 2006. In part due to the growing supply of co-products from ethanol production, fed cattle marketings have the potential to increase 50 percent by 2016. Ten percent growth in beef cowherds also is expected.

In 2006, Iowa's dairy cows produced 3.79 billion pounds of milk. By 2016, it's estimated that could increase to 5.64 billion pounds, a 50 percent increase in milk production through increased productivity and cow numbers.

At the beginning of 2006, Iowa's pork industry included 1.07 million sows and 15.33 million finishing pigs. By 2016, it's estimated those numbers could increase to 1.23 million sows and 16.86 million pigs. This would mean a 15 percent increase in the breeding herd and a 10 percent increase in finishing pigs.

In 2006, Iowa's poultry industry included 51 million laying hens and 9.6 million turkeys. By 2016, it's estimated those numbers could increase to 70 million layers and 13.5 million turkeys. This would be a 37 percent increase in laying hens and a 40 percent increase in turkeys.

In 2006, Iowa's equine industry included 200,000 animals. By 2016, it's estimated that could increase to 240,000, a 20 percent increase.

In 2006, Iowa's sheep and goat industry included 34,000 goats and 132,000 sheep. By 2016, it's estimated those numbers could increase to 88,200 goats and 182,000 sheep. This would mean a 160 percent increase in goats and the addition of 50,000 ewes to the state's sheep flocks.

- **The economic impact of increasing animal agriculture in Iowa is tremendous.**

Projections from the Iowa State University Department of Economics on the effect on jobs and income if Iowa were to grow its animal agriculture industry are impressive. Table 3 identifies the expected increase in employees working directly in livestock and poultry production and the new indirect jobs supporting the larger industry.

**Table 3. Potential Job Creation and Economic Activity from Projected Growth in Animal Agriculture**

| | New Direct Jobs | New Indirect Jobs | Total Jobs | Total Economic Activity |
|---|---|---|---|---|
| Fed cattle marketings | 383 | 920 | 2760 | $6.56 B |
| Beef cow inventory | 33 | 79 | 9200 | |
| Milk production | 925 | 2683 | 8178 | $2.6 B |
| Swine breeding herd | 500 | 1300 | 9994 | $10.5 B |
| Swine finishing | 77 | 200 | 2192 | |
| Layers | 475 | 1235 | 4550 | $1.01 B |
| Turkey | 152 | 365 | 1264 | $382 M |
| Sheep/goats | 173 | 417 | 1081 | $155 M |
| **Total** | **2,718** | **7,199** | **39,218** | **$21.2 B** |

The total jobs figures include the employment that results from increased economic activity as wages and spending turns over in the economy. It also identifies projected economic activity related to the $9 billion in cash receipts shown in Table 2.

The growth of Iowa's animal agriculture offers traditional partners an increased demand for Iowa grains, supplies, capital, energy, labor and consumables. It also has the potential to add jobs in other areas. Nearly 10,000 new jobs, both direct and indirect, would be created if the growth projections outlined above are reached.

Cash receipts in 2005 in Iowa for the six livestock categories totaled $7.874 billion. If growth projections are reached, cash receipts in 2016 would be $9.705 billion and total economic activity would be $21.2 billion.

- **Adding value offers some of the greatest opportunities for growing Iowa's animal agriculture industry.**

The demand for attribute-defined niche products continues to grow, as more consumers are willing to pay a premium for products from animals reared in a particular way.

Creating new products and developing new branded products will lead to additional sales for producers. It also will create jobs in processing, marketing, retail, research and support. Expanding further processing of animal agriculture products is an essential component of adding economic value to the state and increasing jobs in rural communities.

- **The implementation of information-driven, consumer-focused quality control programs for each species is critical.**

Food safety and security is essential to the long-term success of Iowa animal agriculture. To insure this food safety and security, traceability of end products must be possible by implementing quality systems at all points in the food chain.

An essential element to increased sales is the ability to efficiently verify the source of an animal and track it through the supply chain with a complete computerized record system. A national animal identification program, combined with tracking technology, is needed.

Identifying an animal as being Iowa-bred and raised will increase the value of that animal or product derived from that animal. Development of branded products with specifications that assure consumers of quality, method of production and safety of products will be a part of Iowa's animal agriculture future. These unique branded products based on certified production or processing practices will result in added value.

- **Iowa's biobased industry offers advantages to animal agriculture.**

Ethanol and biodiesel production in Iowa is increasing rapidly, and competing for feed grain with livestock and poultry production. But the availability of high quality

feeding byproducts also is increasing. It's to the advantage of ethanol plants to have co-products fed locally to livestock to reduce drying and freight costs. At the same time, these co-products are an excellent source of cost-efficient feed for Iowa livestock producers.

It is essential for the role of livestock in the bioeconomy to be defined. Additional research is needed to find ways to use the byproducts more effectively in the diets of animals and to find alternative energy sources or feedstuffs for swine and poultry.

There also are opportunities for animal agriculture to provide feedstock for biofuel production, since meat processing waste and manure are good sources for energy production.

- **Iowa's animal agriculture industry must protect the state's water, air and soil.**

The livestock industry must take a proactive approach to protecting the state's environment. Top on the list is manure management. Livestock manure is an excellent soil nutrient and fertilizer for crop production, and a good replacement for petroleum-based fertilizers. When manure is applied to meet the nutrient needs of the crop, and erosion is minimized by proper soil conservation practices, the potential for environmental harm is almost eliminated.

Odor and gas emissions are a major issue facing animal agriculture production systems. Research is needed to find new technologies, improved management and dietary alterations that will mitigate odor and gas emissions to an acceptable level.

Growth models must take waste management into account. It may be of value to identify areas of the state where expansion should be limited by waste management options, or conversely, could be enhanced because of limited livestock numbers.

Keys to protecting the environment may be in keeping the density of animals at any one location down and using technology, where possible, to reduce the output of manure and gases. For most livestock production systems, there is an optimal size that will be matched to the land base available for application of nutrients at a rate that is consistent to cropping needs. Yet depending on the biofuel production potential, larger production facilities may be more economically feasible.

- **An adequate labor supply is needed to grow Iowa's animal agriculture industry.**

Iowa's small population makes it difficult for animal agriculture producers to hire enough adequately trained people. Immigrants are filling many of the job openings in animal agriculture. But finding and keeping legal immigrants, and having them accepted in the community, is a challenge.

The challenge goes beyond the production sector. As value-added markets emerge, the need for more highly skilled labor accelerates. Iowa's educational system must help provide the required personnel.

- **Innovative business models and support networks are needed that will help producers manage risk and attract new capital.**

Improving the economic performance of the animal agriculture industry is important not just for the individuals directly involved – producers, customers, owners, employees – but for the industry as a whole. A strong animal agriculture, performing well economically, will help keep a constant flow of money coming into Iowa that will benefit both rural and urban areas.

One key to long-term success is economic sustainability. Producers need help with the financial and management aspects of their operations. Steps must be taken to improve the business management education for both current and future producers, their employees and industry participants.

An Iowa banking industry that aggressively finances animal agriculture is needed. Financial and growth consultants must play an important role in growing the animal agriculture industry. Business options that include financial and economic strategies as well as new products must be developed.

- **Iowa State University will play a key role in future growth of the state's animal agriculture industry.**

Iowa State University has a strong legacy of providing support to the animal agriculture industry in research, extension and teaching.

Public institutions must have the ability to conduct unbiased research for the public good. Research is needed in many areas – new feed ingredients, new industry business models, new products, new uses. Ongoing research in the areas of animal and human health, genetics, production and environmental management and meat products must continue.

The animal agriculture industry requires a diverse set of skills. Educational support for university students who will comprise the next generation of producers, managers, marketers, laborers, researchers and workers for all segments of the animal agriculture industry must continue.

Equal value must be placed on academic and vocational forms of learning. Equal value also must be placed on the needs of entry-level workers and ongoing outreach and professional development for producers and employees at all levels of the industry.

# BEEF

Iowa has a rich tradition in beef production. The state's beef industry represents a major activity in the Iowa economy and is a significant part of Iowa's core business — agriculture.

## CURRENT SITUATION

In terms of gross cash receipts, the $2.13 billion of cattle marketings in 2004 represents 20 percent of all agricultural marketings and 37 percent of livestock and poultry marketings. Including the meat processing sector, an estimated 36,600 jobs and $780 million of personal income are generated in Iowa from the beef industry.

From 1968 to 1972, Iowa was the top cattle feeding state in the nation marketing more than four million fed cattle per year — 18 percent of the U.S. total. Since then, many things have changed. Technology improved feed efficiency and reduced Iowa's cheap grain advantage. Feedlots grew in size to capture economies of scale and relocated to more arid climates as irrigation produced more locally produced corn and environmental controls and regulations favored low rainfall regions. Over time, the packing industry relocated near the cattle.

## OPPORTUNITIES

Now the beef industry is changing again. Iowa has adopted many of the efficiency technologies, but also is well positioned for the growing natural beef market due to low feed costs. And because of the recent expansion of the bioeconomy, Iowa's beef industry could grow significantly by adding value to distillers grains and solubles (DGS).

Since its low in 1998, beef demand has increased more than 20 percent, driven in large part by consumer preferences for high quality beef. Those preferences are reflected in a Choice – Select spread that has nearly doubled in 15 years and the dramatic growth of Certified Angus Beef that represents the upper two-thirds of Choice. Cattle in the upper Midwest, and particularly Iowa, are higher grading. These changes are accompanied by increased branding of beef products.

Given these changes, Iowa once again is positioned to grow its beef industry, especially in the production and marketing of high quality beef. Strategies that enhance Iowa's low cost of production advantage with producing premium priced high quality beef will improve profit and competitiveness of Iowa producers. To accomplish that, Iowa also must be a leader in:

- Implementing information-driven, consumer-focused quality systems that assure food safety, environmental stewardship and profitability.
- Adopting genetic and nutrition technology to improve product quality and human health.
- Developing innovative business models and information systems to manage risk and attract new capital to assure new producers and global competitiveness.
- Creating new consumer products and inviting branded beef products.
- Being environmental stewards and adopting functional production systems to utilize biorenewable co-products and improve profitability.

The returns to a successful Iowa beef sector are significant. Iowa is competitive in the commodity beef business, but Iowa's true strength and brightest future lies in high quality specification products for the branded beef market. The rapidly growing ethanol industry benefits from a local market for DGS that do not have to be dried for storage or shipping. Iowa also has a reputation for feeding cattle to a higher quality grade (Choice, CAB, and Prime) that is highly valued in domestic and export markets. Further processing these higher value products for export or domestic markets creates additional value-added income in rural communities.

Successful branded beef programs must have the ability to efficiently track cattle through the supply chain. Likewise, successful feedlots will have group performance and financial analysis and individual animal identification. The Iowa Cattlemen's Association has a proven radio frequency identification (RFID) system that is compatible with national animal identification and with the tracking technology being adopted by major retailers. Iowa has approximately 1 million beef cows delivering about 850,000 feeder animals annually. Nearly 450,000 of these Iowa born calves are vaccinated and often preconditioned at the farm through state sanctioned certification programs. These producers are likely candidates for rapid adoption of electronic information systems. Once the infrastructure is in place to track individual cattle, the need for data analysis and decision support software will increase dramatically.

Much like the feedlot sector, feed supplies and costs are an important advantage for Iowa's cowherds. While currently the productivity of Iowa land makes it the lowest cost investment in pasture land needed per cow of any of the top 11 beef cow states, increased demand for corn production to fuel the bioeconomy will increase the opportunity cost of pasture land. In addition, there are nearly 1.9 million acres in the CRP program that can be converted to grazing and stored forage production and still provide the important environmental benefits of protecting water and wildlife habitat. Numerous studies have found that local economic activity decreases as CRP payments increase in rural communities. Ethanol co-products along with low quality hay or grazing from CRP land or cornstalks make a ration for cows that is both nutritionally sound as well as cost competitive. Applying advanced management techniques such as rotational grazing and mixing and delivering prescription feed rations allows Iowans to have a cow-carrying cost that is extremely competitive.

Cowherd genetics is the foundation to improved beef quality and Iowa has a substantial seedstock industry. Iowa State University has been a leader in beef genetic and beef improvement research including EPDs, performance information and ultrasound data for carcass predictability.

Iowa's people also are an advantage to increasing specification beef production. Iowa beef producers are well educated and capable of complex management and marketing practices. Beef is consumed for its taste and tenderness. Production and marketing systems that can improve on these traits can provide more profitability to the producers involved. There is a growing demand for verification in domestic and export markets that improves consumer confidence about the safety and quality of the product.

Thus, an opportunity for growing Iowa's high quality beef lies in well-managed specification beef production systems. Such an approach develops and protects the quality and reputation of Iowa beef by following a predictable production system. The following specifications are recommendations to produce an end product that can be labeled as "Iowa" beef.

1. Verification of source, birth date, and genetics
2. Born and raised on accredited and audited ranches and feedlots using quality assurance practices
3. Lifetime traceability available on request
4. Minimum amount of corn and/or corn co-product fed in the diet
5. Minimum of 150 days on feed in an Iowa feedlot

USDA quality grades may sort this Iowa product, but the production standards and accountability can differentiate it in the retail market. By developing a system to produce value-added beef, the present system of beef production in Iowa will be enhanced. Producers of all sizes will have the opportunity to follow the production specification programs that are developed.

## CHALLENGES

While there are new opportunities and benefits to increasing beef production in Iowa, there also are challenges that must be addressed. These challenges are complex and dynamic issues and will require an immediate and ongoing response for Iowa to have a competitive industry and healthy environment. The examples below illustrate the type of research and education expertise and resources needed to grow the Iowa beef industry in a responsible manner.

Ruminant nutrition: Co-products are an important revenue source in the bioeconomy and often are an excellent feedstuff for livestock and particularly cattle. However, there are multiple production processes that result in co-products with different characteristics and feed values. Co-products will continue to evolve as technologies change and new uses for fractions of the co-products are found. Each process results in a different feedstuff that must be evaluated to determine its feed value based on cattle performance, whether in the feedlot or on pasture.

Genetics: Cattle performance, carcass characteristics and consumer traits are influenced by environment, but have their foundation in the animal's genetic potential. Conventional breeding programs and selection processes will give way to DNA testing and genetic markers for economically important traits. Additional research is needed into this more rapid and precise genetic process that will pave the way for high value products that are more satisfying due to taste and tenderness and that are healthier because of their fatty acid profile.

Environment: Facility siting and design greatly influence the impact of livestock production on water quality. Animal nutrition influences manure nutrient production. Grassland enhances landscape diversity and water quality and wildlife habitat. Additional research is needed to better understand and manage these complex biological systems so farmers can be educated on how their management influences the natural resources under their control.

Management: Cattle producers will continue to face significant changes in the future. They must remain competitive and economically viable while evaluating the implications of an evolving bioeconomy, emerging genomic research and technologies, expanding information transfer capabilities, and escalating environmental regulations and public expectations. Applied research and extension education to provide managers a functional process for decision-making is needed for Iowa to succeed in the future.

Iowa State University has been a leader in these and related beef production, management and marketing areas. To maintain that leadership and to meet the needs of the new beef industry, additional resources are needed to replace and/or expand expertise in these crucial beef research and extension areas.

## REWARDS

A specification beef production program would enhance profitability of Iowa beef producers and grow the numbers of cattle in the state, thus growing economic activity.

The added advantage to growing cattle income in Iowa is that most of the growth will come in the most economically challenged rural areas of the state. This growth can be accomplished while also enhancing the environment in the state. The CRP program has reduced cattle production in significant numbers in southern Iowa and reduced the local economic activity associated with a profitable cattle industry. The goal of the CRP program was to prevent soil erosion. Well-managed pastures with cows grazing this land accomplishes the same thing. Cowherds on pasture also protect "green space" and riparian areas. In addition, research has

shown that cattle grazing systems are not detrimental to wildlife habitat. This can mean more "outside" income for those areas by using the CRP land for multiple purposes.

A specification beef production system would grow the number of jobs in Iowa. The obvious first place of job growth is in the industry support areas — equipment suppliers, construction, veterinarians, repair, transportation, etc.

The next significant area of job growth is in the new professional support jobs available. These include consulting in three areas — health, nutrition and genetics. In addition, there will be a need for auditors to confirm the specifications of the system and people to manage the information.

To focus on an Iowa beef product, it will be necessary to harvest and process this product in Iowa. In addition to the normal needs for harvest and processing, specification beef adds jobs that will do the brand development, merchandising, advertising, new product development, support and marketing.

# DAIRY

There is more milk produced in Iowa than consumed in Iowa, and there is more milk processed in Iowa than produced in Iowa.

## CURRENT SITUATION

Iowa imports milk to process and exports milk and milk products to surrounding states. To control costs, processors prefer to limit incoming transport of raw milk and outgoing transport of products to less than 300 miles. That means Iowa is within reasonable transportation distance of several major population centers — Minneapolis, Chicago, Kansas City and St. Louis.

A goal of growing Iowa's dairy industry — both in production and processing — makes sense. This growth could come from within by increased production efficiency of current farms, expansion of existing facilities or new start-up dairies by Iowans, or as a result of emigration into Iowa by producers from other states or countries.

## OPPORTUNITIES

Iowa has a bountiful supply of low-cost feedstuffs. In addition to large supplies of corn and soybeans, there are a significant number of processing plants that create byproduct feeds suitable for dairy diets. The dairy cow is exceptionally adapted to utilize the byproduct feeds of the growing Iowa alternative fuel industry. Dairy diets can effectively utilize both wet and dry corn fermentation byproducts. Utilization of wet corn byproducts can significantly reduce energy costs of drying the byproducts.

The new Iowa State University dairy research and teaching farm will provide an excellent site for research related to expanding the use of byproducts of the ethanol and biodiesel production industries. Coupled with this nutrient utilization opportunity is the need to add additional research faculty to discover the nutritional limits, as well as unique feeding methods, for utilization of Iowa's newly created biorenewable byproduct feeds.

Iowa produces adequate amounts of hay, although due to weather differences the quality often is not as high as Western hay. Since Iowa is served by major interstate highways, transportation costs for alfalfa hay from Nebraska and Kansas are reasonable.

Iowa benefits from reasonably priced electricity and abundant water. In addition, Iowa is a state with an agricultural heritage where farmers are respected, which translates into political and public relations capital.

Perhaps the most important asset is Iowa's ability to process milk. Iowa is well served by processing plants, high quality farm-to-market roads, three interstate highways and close proximity to large marketing centers. Capacity of the Iowa dairy processing industry significantly exceeds in-state milk production. Approximately 25 percent of the milk processed in Iowa must be imported from other states. Iowa has an excellent market for the processed products and should capture this excess manufacturing capacity by increasing production.

## CHALLENGES

The future success of the Iowa dairy industry will require a solid commitment from Iowa State University. Investments need to be made in the College of Veterinary Medicine dairy production medicine area as well as in the College of Agriculture for faculty and research in dairy science. Consideration should be given to developing satellite diagnostic laboratories to serve the Iowa dairy industry.

Labor supply may be a constraint to growth. Many Western dairies and some larger Iowa dairies are successfully employing Hispanic workers. For those dairy managers who are open to learning a second language, learning and appreciating another culture, and making a concerted effort to be successful with immigrant laborers, perhaps the labor supply is not a constraint.

The secondary issue related to immigrant labor may be more formidable — helping the immigrant labor force assimilate into the surrounding communities. Considerable effort may be needed to convince the local community that it benefits from new immigrants.

The fastest way to lose community support is if a livestock operation is a threat to the environment. People will not tolerate pollution no matter how many times they are told the livestock operation creates jobs. It is in the best interest of the dairy industry to take a proactive approach to manure management. Growth models must take waste management into account. It may be of value to identify areas of the state where expansion will be limited by waste management options, or conversely, could be enhanced because of limited livestock numbers.

Other constraints to growth may be in the area of support industries. An Iowa banking industry that aggressively finances the Iowa dairy industry is needed. In addition, other financial and growth consultants must play an important role in growing the dairy industry in Iowa.

## REWARDS

At present, a significant quantity of milk is brought into Iowa to process. The goal is for Iowa production to displace a large percentage of this imported milk.

Many sectors would benefit from a healthy, growing dairy industry. Smaller dairies could benefit because of multiple service suppliers and multiple milk markets. Other farmers could sell feedstuffs, raise heifers, buy bull calves or purchase manure. A dairy in the community is an employer just like any other industry, creating jobs and adding to the tax base.

The children of immigrant workers may supplement a future generation of dairy science students at Iowa State University.

The growth of Iowa's dairy industry will be supported fundamentally by leadership. The leadership of the industry will shape the vision of the future and ultimately be responsible for its implementation.

# EQUINE

The United States horse industry is a $39.2 billion business associated with 9.2 million horses. The number of horses has increased 28 percent in 10 years. The horse industry's contribution to the U.S. gross domestic product is $102 billion, and it generates more than 1.4 million full-time equivalent jobs.

## CURRENT SITUATION

In Iowa there are 199,220 horses on 35,800 farms, which ranks Iowa 17th in the nation. Iowa horse farms are viable agricultural businesses. It is particularly important in rural areas since more than 70 percent of horse owners live in communities of 50,000 or less.

Expenditures to support the Iowa equine industry have an annual economic impact of $862.5 million. The majority of Iowa equine owners own land (88.15 percent), while others board horses at local facilities. Horse people own $5.6 billion worth of Iowa land, fencing and facilities. The total value of all equine-related assets in Iowa is $8.3 billion.

Horse racing is a significant and integral part of Iowa's horse industry. About 1,300 horses occupy the stable area at Prairie Meadows during the meet, bringing with them approximately 800 owners, trainers, grooms, exercise riders, feed and tack suppliers, veterinarians and farriers.

Activities geared toward professional riders include commercial breeders, affiliated sports, trainers, law enforcement, ranching and racing. Leisure-orientated activities include the provision of riding lessons, unaffiliated sports and tourist attractions.

Iowa equine owners spend nearly $503 million caring for equine, generating jobs and revenues in agriculture and agriculture service sector businesses such as equipment purchases, feed and bedding, veterinarian and farrier services, boarding, training and breeding fees, tack, grooming supplies, insurance, travel and lodging, capital improvements, advertising and other miscellaneous equine-related expenses.

## OPPORTUNITIES

Current trends, especially the growth in the leisure economy, suggest the potential for growth in Iowa's equine industry. The principal requirement for growth over the next 10 years is to develop the necessary infrastructure to build and implement a successful strategy that is actively promoted by the entire horse industry.

The formation of the Iowa Equine Promotional Commission is a first step towards growing the industry. Iowa State University, the Iowa Horse Council and breed and performance associations must work together on several fronts.

One is to educate legislators and the general public on the equine industry. Another is to improve the quality and breeding of Iowa horses and ponies. The words "Iowa-bred" should mark the finest horses of any breed in the world. Increasing the value of horses bred in Iowa and the market share of Iowa breeders and studs will boost the economic and employment benefits these enterprises bring to rural areas, and improve the balance of trade.

Also needed is an efficient communication network between breeders, breeding organizations, riders, drivers and the competition disciplines and a central source of breeding information and advice.

Steps need to be taken to boost the economic performance of equine businesses. Business activities range from tack shops to feed manufacturers, instructors to photographers, organized trail rides to insurance companies. Improving the economic performance of these enterprises is important not just for the individuals directly involved — customers, owners or employees — but for the industry as a whole.

Another step is to raise the equestrian skills, training and standards of those working with and riding horses to improve the industry's image and economic performance. The industry requires a diverse range of skills, from business owners to vets, farriers and grooms. Owners of equestrian businesses need to be trained in staff management skills and health and safety, in addition to business skills. The welfare aspects of horse management also should be featured in all training programs.

Equal value should be placed on both academic and vocational forms of learning. Greater alliances between colleges and equestrian establishments would help provide more relevant work experience, and make course content more relevant. Training should not only address entry-level needs but also provide continuing professional development. Training also needs to be available for leisure riders and horse owners to improve their riding, welfare and horse-care skills. Information and clinics on all aspects of horse care need to be provided, and opportunities for individuals to explore the horse industry need to be created.

## CHALLENGES

A vision for the future should address the following issues.

- Iowa needs a regional sales/show multi-purpose arena with sufficient stabling. Until there are adequate facilities, people will continue to leave for other states to show and sell their horses, and breeders will continue to struggle to build their businesses.
- Industry economic development
- Land use and zoning
- Health and wellness of the equine
- Environmental concerns
- Sales tax on horse feed and sale of horses
- State-wide trail system
- Development of the equine program at Iowa State University, the oldest equine program in the country, but one of the least supported land-grant university equine programs.

## REWARDS

A strong equine business sector, performing well in economic terms, will help keep a constant flow of money coming into the equestrian world which will benefit both rural and urban areas.

Almost 47,000 adults in Iowa currently are involved in the horse industry. Growth in the industry would mean even more jobs — grooms, trainers, veterinarians, farriers, breed organizations, stewards, judges, announcers, publicists, commercial suppliers, tack shops, riding apparel, sale companies, accountants, saddle makers, transporters and other support industries such as feed and hay producers.

There also is potential to increase equestrian tourism in the state, including visitors attending race meetings, watching major equestrian events or going on trail rides. For some it might mean traveling to areas away from home to ride their own horses on bridleways or long distance routes or going to a riding center for a course of training or weekend break.

# PORK

The long-term outlook for demand for both fresh and further processed pork is excellent. The U.S. population grows at a rate of 13 percent per decade while per capita pork consumption remains relatively stable at 51 pounds per person. Internationally, the demand for pork escalates as economies develop, which is reflected in pork exports growing by 400 percent over the past decade.

## CURRENT SITUATION

The pork industry in Iowa is broad in its scope, diverse in its components and essential to the economy of the state. It is more than just the production of pigs. It also includes processing, feed grains, buildings and equipment, supplies, jobs, tax generation and soil nutrients.

The industry has evolved into different segments — commodity pork, attribute-based niche market pork, an emerging pork biotech segment, pork harvesting and further processing.

Iowa has inherent advantages for pork production — abundant and affordable feedstuffs, crop production that needs high quality and affordable nutrients, a large and growing pork processing industry, a history of pork production excellence and rural economies in need of development.

## OPPORTUNITIES

There are opportunities for growth in both the sow herd and pig finishing components of commodity pork.

While the number of hogs in Iowa has remained steady, the size of the Iowa sow herd has gradually diminished from 2.2 million sows in 1980 (23 percent of the U.S. sow herd) to 1.1 million sows in 2005 (18 percent of the U.S. sow herd). Sow units have a greater impact on the rural economy than finishing units of similar size. They employ more people per animal, cost more per animal unit and are more likely to be locally owned.

Economies of scale, diminished profit margins and the need for larger groups of pigs for finishing have made smaller sow units less likely to be profitable. But the need for extremely large sow units has not been conclusively shown. The potential of a sow unit that can produce batches of 1,000 pigs at a time for efficient use in finishing systems, but still be small enough to provide the nutrients to a section of land or less, is present and can be capitalized upon.

Pig finishing units are smaller both in scale and capital requirements and more flexible investments than sow units. They create more demand on locally produced grain, but also produce more manure and gases that must be managed correctly. The ownership of pig finishing units should be attractive to several segments of rural communities. Beginning farmers wanting an entrance to the pork production industry can find financing for a pig-finishing unit much more easily than a start-up sow unit. And the ownership of pig finishing facilities by grain farmers offers many advantages. It diversifies the agricultural enterprise in a manner that adds to overall profit, provides high quality nutrients for grain production at a lower cost compared to petroleum-based fertilizers, and allows the older grain farmer to bring children into the enterprise in a lower investment approach.

There also is potential to grow the industry in areas other than commodity pork production. The demand for attribute-defined niche market pork continues to grow. Some consumers are willing to pay a premium for pork that has been reared in systems that have preferred attributes. Production systems such as pasture-raised, organically fed and antibiotic-free all have seen growing demand and offer more potential in the future.

The field of further processed pork also holds potential for expansion into the rural areas of Iowa. Consumer trends towards eating more meals out of the home, and demanding foods that are further processed and easier to prepare at home, continue to grow. The production of these products is usually done in areas closer to the consumer, where the raw product is transported from the point of harvesting to the consumer location. However, there are advantages to locating this further processing in rural areas closer to the harvest plant. This cuts down on transportation costs of the final product and capitalizes on the lower labor costs in rural areas. Iowa has particular promise in this area based on its highly educated potential workforce and highly desirable location for families.

Developments in the bio-based sciences also offer opportunity in pork production. Different areas of animal biotechnology include biological research, development and manufacturing, genetics, Internet applications, feed products and research tools. The simplest perhaps is the utilization of co-products from the ethanol industry. The feedstuffs may offer advantages in cost that can be utilized to make pork production more profitable. There are several emerging bioscience-based technologies that offer the promise of a pork-based profit industry. The likely existence of the entire genome sequence of the pig by 2007 makes the pig an outstanding animal model for human health problems. Research at the University of Iowa and Iowa State University directed towards biomedical research likely will concentrate on the pig to solve future health problems. Further interest in using pig organs for transplantation offers the possibility of a new pig industry designed to produce organs for humans.

## CHALLENGES

There are many challenges that need to be considered concerning the future of the Iowa pork industry. But first is that of environmental stewardship. We must aspire to maintain and improve the soil, air and water quality across Iowa. The soils of Iowa need high quality nutrients to accomplish the yields that are needed for profitable crop production. The most predominant source of fertilizer has been petroleum-based fertilizers, but cost has risen dramatically over the past few years and most likely will continue to escalate. Manure from pig production is an excellent soil nutrient and fertilizer for crop production. If manure is applied improperly, nitrates and phosphorus can move from the soil to surface waters and create potential health or water quality problems. But when manure is applied to meet the nutrient needs of the crop, and erosion is minimized by proper soil conservation practices, the potential for water quality problems is almost eliminated.

The keys to good environmental stewardship of pig production units appears to be in keeping the density of pigs at any one location at a level that is not large enough to produce manure in excess of the needs of the land; locating the pig production units a reasonable distance from other rural residents; and using technology, where possible, to reduce the output of manure and gases that might have the potential to harm the environment. It is imperative to find solutions that will minimize or eliminate objectionable odors from swine units.

Another key issue is how to develop the next generation of pig farmers in Iowa. This involves many aspects. Commodity pork production is a capital-intensive enterprise. Beginning farmers generally do not have access to the capital needed to start a sow unit. Opportunities need to be available for young people to enter the pig industry through component enterprises such as contract finishing, custom nutrient application, building maintenance and cleaning, transportation and other avenues. Opportunities also exist in starting up a smaller pig production unit that focuses on an attribute that can contribute to a higher return. It is critical that as older, successful pig farmers exit the industry, the next generation of leaders is developed. This will need to be a joint responsibility of the existing pork industry groups and state government through the university and community college systems currently in place.

For a long-term successful pork industry, there needs to be open communication between rural and urban populations. Positive relationships need to be fostered and maintained for effective communications. Good public relations with non-agriculture audiences are essential to the success of the pork industry in Iowa.

Rapid developments in the bio-fuel industry challenge the availability of corn as the primary energy source for swine in the future. Research is needed to find alternative energy sources and to find ways to utilize more of the byproducts in swine diets.

Food safety and security also is essential to the long-term success of Iowa's pork industry. To insure this food safety and security, the pork industry will need to enhance the traceability of its product by implementing quality systems at all points in the food chain.

Another issue of importance is policy development. Areas of policy development that have huge potential impacts on the pork industry are local control, state-based permits, regulations on construction standards, regulations on country-of-origin labeling and animal identification, workman's compensation, animal welfare and more. It is imperative that the animal industries have a place in the discussions that are conducted in these policy areas and that land grant universities have the resources for developing unbiased information that relates to these areas.

One of the keys to long-term success is economic sustainability. An area of expertise that is vital to long-term financial success, no matter the type of pork enterprise, is in business management. We must strive to improve the business management education for both current and future pork producers, their employees and pork industry participants.

A major limiting factor in the growth of attribute-defined niche market pork has been the lack of business expertise required for long-term growth and success. Another limiting factor is enhancements to the production system to compensate for an attribute that may make it more expensive to produce pork. This is an area where the land grant university system can contribute.

The issue of labor availability is emerging as a challenge. As Iowa's rural populations decline, and the number of pork production enterprises decline, so has the existing labor pool. Other industries have expanded their reach for labor into non-traditional populations, specifically those of Hispanic origin. This approach offers good people good jobs, but it also brings new challenges. This need for labor availability goes beyond the production sector. As value-added pork markets emerge, the need for more highly skilled labor accelerates. Iowa's educational system must be able to provide these more highly skilled personnel.

A traditional issue of importance to the pork industry is that of animal health and disease management. Issues in this area will be intensified in the future if the industry is limited in its access to certain animal health products, and as new animal health challenges emerge. Iowa has successfully conducted a PRV eradication program. Other diseases have arisen that also may demand eradication efforts. Iowa must have the manpower, technology, commitment and capital to successfully conduct these efforts.

The need for research funding at both the state and federal levels is an issue that is not new, and will probably be of even greater importance in the future. Public institutions must have the ability to conduct unbiased research for the public good. As access to public research funding has become more difficult, the ability of scientists in public research institutions has been limited. Research funding levels must be increased to meet the needs of Iowa's pork industry.

## REWARDS

Growing Iowa's pork industry offers many rewards, including income generation, property tax generation and an avenue for beginning farmers to enter agriculture. The growth of commodity pork production offers traditional partners an increased demand for Iowa grains, supplies, capital, energy, labor and consumables. But it also has the potential to add jobs in other areas, such as custom finishing, building cleaning and maintenance, nutrient application and more.

There is a real need to grow the rural economies of Iowa. This growth needs to be sustainable from the environmental, social and economic standpoints. This growth needs to be diverse, including areas such as agriculture, manufacturing, construction, transportation, tourism, public services, energy, retail marketing and others. Keys to getting our best youth to stay in rural areas are jobs and a high quality of life. For the foreseeable future, the primary usage for rural Iowa land will be agronomic — the growth of crops such as corn, soybeans and other emerging crops. An integrated crop/livestock industry has great potential to grow Iowa's rural economies in a sustainable and profitable manner.

One example is of a 2,400-head pig grow-finish farm. This size is desirable because its nutrient production matches the needs of one section (640 acres) of Iowa farmland and is of adequate size to be profitable. A grain farmer who builds one of these units can earn additional income equivalent to at least a half-time position elsewhere, or provide a new position to a son or daughter who wants to return to the farm operation. Such a unit will generate approximately $270,000 in local economic activity and $700,000 in pig sales regionally each year, plus pay significant property taxes to support schools and local services.

Iowa is fortunate to already have demonstrated success in bio-based industries with pork related products. These new bio-based industries offer great promise for expansion of the pork industry, and have traditionally brought some of the highest paying jobs to the communities where they are located. With the two Regents universities in conjunction with the largest combined crop and pork industries in the world, Iowa has the potential to be the major center for biotechnology applied to the pork industry in the world.

# POULTRY

The poultry industry is a critical component of Iowa agriculture.

## CURRENT SITUATION

Iowa's egg industry is the nation's largest and is rapidly growing. The 2004 farm gate value of eggs in Iowa was $491.6 million.

Turkeys comprise the other significant sector of Iowa's poultry industry. Iowa accounts for 9 million birds produced annually and ranks 10th in the nation in turkey production. Farm gate value of Iowa's turkeys is estimated at $136.1 million.

A 2003 study estimated 8,649 jobs associated with Iowa egg production, with labor income of more than $221 million. Estimates in 2000 indicated that with levels of on-farm turkey production similar to 2004 levels, the state would expect almost 6,000 jobs and more than $139 million in labor income.

## OPPORTUNITIES

Opportunities exist for continued expansion of the Iowa egg industry with expanded use of eggs and Iowa's competitive structure for cost of production for liquid eggs. This competitive advantage will enhance Iowa's opportunity to increase its share of U.S. production. Expansion is likely to occur in plants that produce eggs and break them locally before shipping in large tankers. New uses for eggs and their components will lead to increased demand.

Excess turkey processing capacity provides an opportunity to expand turkey production to more closely align production in the state with processing capacity. Reducing transportation costs will help keep the production and processing industries more competitive.

## CHALLENGES

The egg and turkey industries face similar challenges. First, Iowa's poultry industry is mature. The industry needs to determine the best business model to help it transition to the next generation and progress through the next 50 years. Business options must be developed to grow the industry. These options could include financial and economic strategies as well as new products.

Animal health and biosecurity are key issues, particularly related to highly pathogenic and/or zoonotic disease problems and potential cross-species vulnerabilities, such as avian influenza.

The industry would benefit from nutrition research on energy ingredient shortages with corn going to ethanol and fats going to biodiesel. Utilization strategies of proteins from biorefineries also should be studied.

Work force needs must be addressed. The industry needs husbandry-trained, competent farm workers with two years of post-secondary education. In addition, marketing and operations are key areas where upper management personnel are needed. The industry needs graduates with bachelor's degrees who are competent in husbandry and have global management skills.

There are some specific challenges related to the egg industry. The industry faces public concerns related to the environment — odor, manure utilization, flies — and related to animal welfare — spent hens and mortalities.

The industry would like to see regional or national expansion, with Iowa ownership. This could result in the need for a regional poultry association.

Research is needed in several areas — new feed ingredients, new industry business models, new products and new uses for egg components, including food, industrial and nutraceutical uses.

The turkey industry also has unique challenges. The industry is concerned with preventive medicine and issues resulting from the loss of prophylactic antibiotics. More options need to be developed for dark meat usage, which is now in export demand.

Iowa State University has a strong legacy of providing support to the poultry industry in research, extension and teaching. Budget cuts and retirements have led to a decline in these services.

There is a need for a new faculty position with extension responsibilities to work with poultry firms and the boards of the Iowa Turkey Federation and the Iowa Poultry Association. This person would be the source of information regarding campus-based poultry work and would have competencies in statistics, economics and business structures.

Research and education should be focused on the optimal size of production facilities per site with regard to permits, economics and biosecurity concerns. Environmental and animal welfare concerns and the development of a national animal identification program also need the attention of Iowa State poultry research and extension personnel.

## REWARDS

The poultry industry, as other animal industries in Iowa, is in the unique position of being favorably located geographically, in an area of competitive advantage for feed ingredients and with cropping systems compatible for manure utilization. Growth in the egg and turkey sectors clearly will have important impacts on Iowa's future economic development, especially to the rural economy.

# SHEEP – GOATS

The United States sheep industry reached peak inventory numbers in the mid-1940s. Since that time, numbers have declined annually with the exception of a few years when high lamb and wool prices led to expansion.

## CURRENT SITUATION

Iowa has historically been ranked nationally as the number one state in total sheep operations. In the last few years, this ranking slipped to second place. Consistent with other livestock species, Iowa's sheep industry has seen consolidation and a reduction in operations.

Sheep are raised in several distinct types of operations — show-ring oriented purebred breeders, club lamb/youth project breeders, feedlot, fiber arts and crafts, and commercial ewe flocks.

## OPPORTUNITIES

Tremendous potential exists for growth of Iowa's sheep and goat industry. Increased competition for alternative use of federal grazing lands along with ever increasing grazing fees makes Iowa's low-cost feeding potential more attractive. With the expanding ethanol industry, distillers grains with solubles (DGS) provide an opportunity for developing economical rations when added to harvested cornstalks in a total mixed ration.

Iowa has many farmsteads with buildings that can be modified inexpensively for sheep production. Lower-cost hoop structures also provide an alternative housing structure that is being successfully used by many Iowa producers.

One of the seven large lamb harvesting facilities in the country is located in northwest Iowa, which reduces transportation costs of Iowa lambs.

Genetic resources exist which allow producers to create crossbred ewe populations with varying prolificacy levels that match producer management abilities and facilities. Development of low-labor, easy-care forage-based systems allows producers to handle larger numbers that have a greater impact on family income.

Hair sheep genetics offers animals that have lower labor requirements and tend to be easier care. Output from hair sheep systems offers the opportunity for niche marketing that maintains a larger proportion of the value at the farm level.

The sheep and goat meat industry is an international market. Advancements in free trade allow for expanded production at higher prices. In addition, much of the recent immigrant populations moving to Iowa are from traditional goat and lamb-consuming countries so this new consumer group has created expanded demand.

## CHALLENGES

The sheep industry has been challenged by its multi-product output of both lamb and wool. This dilution of purpose for muscle protein production was complicated by the Wool Act, a government program that provided annual payments of $5 to $25 per ewe based on the national average wool price versus the support price. The Wool Act was phased out during the mid-1990s. Since then, production systems have been modified to place more emphasis on lamb production and less on wool.

## REWARDS

The sheep and goat industries are low-capital/high-labor enterprises that are attractive to young producers getting started in agriculture.

Sheep and goats are a complementary enterprise with row-crop operations. In most situations, these animals are kept to utilize rough ground and balance labor supplies throughout the year, with most producers lambing in winter months. Sheep and goats fit nicely into family enterprises and with acreage owners because of minimal land base needs.

Another niche that sheep and goats may fill is a biological control system for noxious weeds and shrubs. In the Western states, ewe flocks are being contracted to graze rangeland to control leafy spurge. Goats and sheep have been used successfully to control kudzu in the southeastern United States. Grazing research indicates that multi-species grazing can increase output per acre by 20 to 25 percent. Capturing the increased demand for lamb and goat meat, along with the biological control service, can improve the profit potential of Iowa's small ruminant industry.