PURDUE UNIVERSITY

Center for Food and Agricultural Business

CAB CS 11.3

JBS United and the Future: Too Many Opportunities

It was a late May day in 2011; the bright shining sun was a welcome relief after all the rainy weather that had dominated central Indiana that spring. John Swisher, chairman and CEO, enjoyed the sunlight streaming through the south windows of his office at the headquarters of JBS United. A diversified mid-sized agribusiness firm, JBS United is known for its use of research and development (R&D) to drive innovation that fosters success for its customers.

John had just engaged in a particularly exciting, but also challenging, conversation with Don Orr, president of JBS United. Don had recently returned from China where he had been investigating business opportunities and meeting with JBS United's joint venture partners. The enthusiasm he saw regarding China's economic dynamism was quite exciting. That economic growth is particularly promising for expanded meat consumption. Coupled with a rapidly urbanizing population, the potential for growth in commercial pork production is pronounced. These trends are quite attractive for JBS United's nutrition products and for its OptiPhos product, which both enhances producer profitability and reduces the environmental impact of commercial pork production.

While the international prospects were attractive, JBS United's potential for growth in domestic markets also warrants attention. Gaining market share and expanding in lesser-served regions with JBS United's current nutritional products has the potential to materially increase the firm's profitability. Further, JBS United and a number of collaborators are in the process of transforming emerging technology-based inventions into potentially valuable innovations. Early success in those efforts has been promising, but these processes can be time and financial resource intensive, especially if regulatory approval is required.

At one level, the next step is obvious — conduct a thorough economic and financial analysis of each alternative and then select those that are most promising. However, conducting a thorough analysis itself can be a costly undertaking, most importantly in terms of the managerial time and attention required. In a mid-sized firm such as JBS United, managerial attention is a scarce resource needed both for operational and strategic decision making. As John heads out for the weekly sales meeting, he notes that he and the senior management team need to address the question, "Just how should they allocate the managerial attention needed to pursue these opportunities while continuing to manage JBS United effectively?"

This case study was prepared by Steve Sonka, professor at the University of Illinois, as a basis for class discussion and represents the views of the authors, not the university. The author would like to thank John Swisher, Don Orr and their colleagues at JBS United for their collaboration on this case.

An Overview of JBS United Today — More Than a Feed Company

JBS United is a diversified mid-sized agribusiness firm, known for its use of R&D to drive innovation that fosters success for its customers. Since its establishment in 1956, it has been headquartered in Sheridan, Ind. However, its products are employed in animal agriculture throughout the world. In 2010, its sales exceeded $450 million. As shown in Exhibit 1, growth has been a constant feature of the firm's history. However, growth has been particularly strong in the decade since the turn of the century.

Similar to the growth in revenues, the number of JBS United employees has grown from the three who were present at its founding. Currently, there are more than 400 employees at the firm. The potential for key employees to have an ownership stake in the firm has been a long-standing practice and has proved useful as the firm grew through friendly acquisitions. There are more than 170 shareholders, although the founder's family maintains a majority ownership interest.

Organizationally, JBS United is comprised of the following four operating segments:

1. Nutrition and emerging technologies
2. Grain division
3. Farm division
4. Corporate support

The nutrition and emerging technologies segment encompasses both the oldest and the newest products of the firm. About 38 percent of the firm's assets are devoted to this segment. JBS United's initial thrust was to provide feed products to Midwest swine producers. The sale of premix and base-mix feed to swine producers remains the firm's major product line. In recent years, however, the firm has seen success in providing products based upon advanced technology to the production animal sector.

Through acquisitions, JBS United has developed a solid platform in the grain industry with about 30 percent of its assets engaged in the grain division. Executing a geographical niche approach, the firm has very strong positions in the locales in which it operates. As swine production practices underwent dramatic change over the last five decades, JBS United developed a commercial farming division to gain actual knowledge of the challenges its customers' face. Approximately 31 percent of JBS United assets are devoted to the farm division. The final segment, corporate support, provides essential organizational services to the firm.

From its inception, the firm's leadership has been driven by a "markets-served" orientation. Key precepts of that orientation include ensuring close ties to customers, a consultative approach with those customers, and a passion for the development and delivery of solutions that provide direct value to the customer.

Relatively early in the company's evolution, its management team recognized that employing an effective, applied R&D capability would be a key enabler to achieve its markets-served philosophy.

Today, JBS United has one of the most extensive R&D systems serving animal agriculture, in terms of both personnel with advanced degrees and capacity to conduct commercial-scale experiments. This orientation is exemplified in the description of its approach to knowledge creation and delivery (Exhibit 2). Serving customers through application of new knowledge, whether embedded in existing or new product categories or provided as consultative services, is central to the firm's future directions and prospects. As a guiding beacon, the statement **"JBS United Inc. will be the premier animal health and nutrition innovator"** captures the essence of the firm's ambitious future agenda.

Composition of Today's JBS United

At its inception and for much of its early history, focusing on a single species, swine production, was a central organizational tenet at JBS United. Over time, market and technical opportunities have led to expansion of the company's offerings to include products serving both dairy and poultry production. The geographical scope of the firm's products has similarly expanded from central Indiana to the world. This discussion of the company's current footprint will address the swine and dairy species individually and then will describe the firm's R&D capabilities. In addition to serving the firm's nutrition focus, these R&D capabilities fostered its move into emerging technology-based products (which will be discussed after the R&D section). Then, the farm and grain divisions will be described.

Swine Nutrition

Swine production practices have changed dramatically since JBS United's establishment. These changes have affected the swine nutrition markets in central Indiana, the United States and many segments around the world. JBS United's products and approach to the market have had to adapt to these evolving conditions. Indeed, an analysis of the Midwest feed industry's history would show a long list of firms similar to JBS United in 1956 — many of which didn't adapt and no longer exist.

In the 1950s, farms were small and diversified. Feed company profits were derived from providing complete feed rations to livestock producers. Tons of feed sold was the industry yardstick and the driving force in measuring success. As farming operations became more specialized and animal units became larger, farmers gained efficiency by acquiring their own feed-mixing equipment and using their own corn in combination with concentrates provided by the feed company. As this process advanced, farmers started to purchase bulk sources of soybean meal separately from concentrate. The feed company's premix and base mixes provided key elements, such as amino acids, vitamins and minerals.

Today, large-scale swine producers have sophisticated feed-mixing systems that rival those of their suppliers, and some have dedicated internal research facilities. Therefore, access to milling capabilities, which once was a key competitive asset for the feed company, is no longer important. Instead, very targeted inputs and the knowledge of how to optimally employ those inputs are key competitive differentiators. In addition, that knowledge component has differential advantage at differing stages of animal growth. For swine, nursery and starter rations are critical. Therefore, targeted, knowledge-based offerings are of key competitive importance.

JBS United's offerings of products and services have evolved in lockstep with those industry trends. In U.S. markets, the firm operates several company-owned feed manufacturing locations focusing on pre-mix and base-mix products, including:

- Complete pre-starters to fit various weaning ages, weaning weights and health statuses of weaned pigs.
- Starter base mixes to be fed to pigs when they reach 14 pounds of body weight.
- Base mixes that fortify grow-finish pigs. Various products are available depending on environmental issues, economics, co-product availability and genetics.
- Sow feeding programs designed to maximize sow productivity and profitability, with differing options for gestation and lactation.
- A line of nutritional swine feeds, marketed under the Grand Prairie brand, is available for the producer who desires not to feed antibiotics or animal proteins to their livestock.

During 2010–2011, the number of nursery pigs consuming JBS United products increased by more than 4 million head, signaling the company's success in the market. Relative to the approximately 100 million pigs produced annually in the United States, JBS United nursery products have about a 17 percent market share. Swine sales represent about 90 percent of the company's feed sales.

With its roots in central Indiana, JBS United's expansion has naturally spread throughout the Midwest. As shown in Exhibit 3, the firm's six manufacturing facilities now extend across that region.

Organizationally, sales teams are divided into eastern and western segments, with natural concentration of sales around those manufacturing hubs. Product sales occur from the East Coast to the Rocky Mountains and Canada. The firm's total sales team consists of more than 30 employees. Since its inception, JBS United holds biweekly meetings with its sales force to explore the latest market intelligence, industry trends and R&D advances.

In addition to feed products, JBS United provides a comprehensive diet management program, called StrataPlan, to swine producers. Driven by maximizing economic returns, StrataPlan offers the following capabilities:

- Evaluation of genetic lines within a system
- Diet and budget evaluations
- Close-out strategies
- Stocking density
- Mixed-sex vs. split-sexed feeding
- Paylean™ utilization
- Utilization of packers within a system

JBS United Swine Records Program provides performance and economic farm data, resulting in more profitable and better-informed swine producers.

The company's domestic competitors vary in intensity across the sales territories, encompassing diversified, multinational agribusiness conglomerates, as well as similarly sized firms focused on animal nutrition. The following is a summary of JBS United's key competitors.

- **Cargill Animal Nutrition** is the world's largest feed company and provides customized animal productivity solutions to commercial producers across the Americas, Europe and Asia. As such, they offer products across the relevant animal-agriculture species — aquaculture, beef, dairy, pork and poultry. Their brands include Nutrena and Acco Feeds, as well as Cargill Animal Nutrition.
- **ADM Alliance Nutrition** is a wholly owned subsidiary of Archer Daniels Midland (ADM) and is a leading producer of livestock feed ingredients. They provide products to support production of poultry, goats, cattle, sheep and swine, while serving customers interested in purchasing proteins, vitamins or amino acids.
- **Land O'Lakes Purina Feed LLC** provides feed to dairy, pork, poultry and beef producers. The parent organization, Land O'Lakes Inc., is a member-owned cooperative offering local cooperatives and agricultural producers across the nation an extensive line of agricultural supplies and business services. The firm is also a marketer of dairy-based food products for consumers, foodservice professionals and food manufacturers.
- Located in Lewisburg, Ohio, **Akey** has a history of more than 40 years of aggressive growth and is widely recognized as a leader in nutrition solutions. A subsidiary of the international feed and nutrition company Provimi, Akey markets products for swine, poultry, dairy and beef animals. Akey is deeply committed to assisting customers in understanding and using nutritional technology to optimize animal performance and lower the cost of production. Nutrition services include diet formulation, feeding program recommendations, product-line development, employee training, custom research and technology agreements.

Swine production is an important agricultural sector across the world, not just in the United States. In the early 1990s, JBS United started exploring and then entering key international markets. Exports to the Philippines were initiated in 1993. Relationship development and maintenance have been critically important to JBS United's success internationally, as market entry primarily is through marketing alliances and joint ventures. JBS United is now exporting to Southeast Asia and distribution has been established in Central and South America.

Early entry in Southeast Asia fostered exploration and development of significant joint ventures there and also in China, the world's largest swine-production market. The Chinese market's importance is not measured solely by its size, as China's pork-production sector is undergoing massive change. "Backyard" pork production has been the traditionally dominant means of generating pork. In this system, individual households maintain a sow or two, which would receive table-food scraps or forage to obtain food. Meat not used by the individual household would be sold in village markets.

Advancing incomes and, in particular, rapid urbanization have required that significant portions of China's pork production move to commercial (50 to 3,000 head) and super commercial (more than 3,000 head) production units. Backyard production has been in decline for some time and that decline is expected to continue. Industry experts suggest that 70 percent of swine farms were backyard units, producing less than 50 pigs annually; however, fewer than 30 percent of farms will be backyard units in the near future. These units will be replaced with production units of size and scale similar to that of industrial nations, such as the United States and Europe. Although movement to production systems of such scale is not without significant challenges, these units will have access to sophisticated technologies. Implementation of nutritional technology of similar sophistication will be required.

JBS United has been engaged in a successful joint venture focusing on feed premix in China since 2000. Two joint venture companies have operated as a partner with Shandong Liuhe Group Co. Ltd., located at Qingdao, China. The second joint venture company with Liuhe involves production of nucleus swine genetics with a third partner, Hypor China, a division of Hendrix Genetics B.V. based in Boxmeer, Netherlands.

Recently, Liuhe has been transferred into a publicly traded company under the New Hope Group, a large diversified conglomerate company in China. That transaction provided JBS United an opportunity to divest its feed premix joint venture with Liuhe. As a result, JBS United is reconfiguring its Chinese animal nutrition business into a new joint venture company focusing on animal feeds. This new joint venture is reuniting JBS United with former Chinese partners and management with which the company has previous business experience.

Dairy Nutrition

As JBS United expanded its operational and marketing efforts, it acquired firms with dairy-related product lines and customers with interests in dairy, as well as swine. The firm's reputation for customer service similarly attracted dairy producers to express interest in JBS United products for that species. These developments tended to be located in Michigan, northern Indiana and northern Ohio. By investing in resources and talent, JBS United has developed a viable dairy business in certain locales.

In dairy, the company has continued to base its approach upon its R&D-driven methods to generate customer advantage. Improving animal nutrition results in reduced stress, improved dairy cow comfort and superior milk production. In addition, customers can take advantage of comprehensive diet-management programs that the company offers. For example, JBS United has developed a three-phase feeding and cow management program targeted to the dairy cow's particular needs prior to and at the time of calving:

- Phase 1 (60 to 22 days before calving): The far-off dry period during late pregnancy is critical to preparing the cow for her next lactation. Special nutrition and management practices at this time will return more milk and healthier cows in the next lactation.
- Phase 2 (22 to zero days before calving): The dry-cow transition period is a critical point for both the productivity and profitability of a dairy herd. Nutrition and management in

this phase directly affects the incidence of post-calving disorders, milk production and reproduction in the successive lactation.

- Phase 3 (one to 14 days after calving): Metabolic diseases in fresh cows have been estimated to cost dairy producers between $150 and $350 per incidence. This post-fresh nutrition program reduces those risks and allows for a more productive lactation.

Research and Development

Driven by the passion to provide solutions to customer problems, JBS United initiated what was to become one of the firm's core competencies — a pioneering applied-research capability — in the early 1970s. Indeed, the company was one of the first U.S. nutrition businesses to invest, and to continue to invest, in its own proprietary research. Early on, key scientific leadership was provided through consulting relationships with swine nutritionists at select land-grant universities. Over time, the effective application of R&D capabilities led to adding advanced-degree-holding researchers to the JBS United employee team.

JBS United has one of the most extensive swine research systems in the world, integrating knowledge creation from labs, experimental pens and production-scale trials (Exhibit 4). The firm's capabilities include 14 technology research centers with more than 500 experimental pens and 24 production-scale research facilities. Using computerized feeding devices, more than 17,000 pigs can be monitored at the individual pen level at one time. JBS United has the capacity to run nutrition trials for more than 45,000 animals annually through all production phases. The firm's research farms are located in Frankfort and Sheridan, Ind., and in Gridley, Ill.

Focused on conducting applied research that can lead to enhanced customer profitability, the firm's R&D expertise includes:

- Animal well-being
- Space optimization
- Gilt development
- Ingredient valuation
- Nutrition requirements for specific genotypes
- Nutrient management
- Biological modeling

The JBS United R&D and tech services team numbers more than 25 people. More than half have doctorate or master's degrees in nutrition, reproduction, microbiology, genetics and enzyme technologies. The team applies its findings to commercial settings to develop products that perform in practical environments. This innovative approach creates positive economic outcomes for its customers. For larger producers, a member of the R&D team is assigned specific relationship responsibility, along with a member of the sales team. Often, JBS United arranges meetings with nutritionists from larger customer organizations to discuss challenges and emerging opportunities.

The strength and growth of the R&D team at JBS United is particularly noteworthy when contrasted with the decline in the traditional, publicly funded nutrition programs within the United States Department of Agriculture (USDA)/land-grant university complex. A common topic at industry and academic conferences is the decline in this historic capability, especially for applied research in the public sector. Even at universities with relatively strong swine nutrition programs, much of the scientific talent is focused on investigations that are externally funded and tend not to focus on production agriculture. The existence of a large concentration of scientifically oriented talent, in conjunction with significant physical assets, is a potentially powerful capability for growing JBS United.

Emerging Technologies — Adapt or Die

JBS United distributes a bimonthly newsletter, "News for U," to the JBS United family — customers, employees and other stakeholders. In the February 2011 issue, the lead article was "Reinventing JBS United Again — The OptiPhos Story." The article's first sentence stressed the relevance of the evolutionary principle "that which does not adapt dies" to the company (Insert 1).

Over the last two decades, JBS United has realized that the capabilities and experiences it has developed provide the firm with key capabilities needed to move ideas from basic research inventions to innovative products within the animal-agriculture marketplace. Of course, the physical attributes of the firm's R&D centers and farms are critical assets. More important are the capabilities of the staff (researchers and technicians) who can effectively and rapidly evaluate performance of prospective innovations both in the lab and in more commercial settings. Third, JBS United understands how potential innovations will affect performance and acceptance by customers in the animal-agricultural marketplace.

Realizing these capabilities and their value led to establishing the Emerging Technologies Division within JBS United. The division's overriding goal is to advance and develop technologies that will better serve customers and environmental needs worldwide. Currently, this division is pursuing the following areas of technology and innovation in the animal health and nutrition sectors:

- Agricultural biotechnology
- Digestive enzymes
- Omega 3 fatty acids
- Animal probiotics
- Livestock waste solutions
- Swine reproduction management

The OptiPhos Product

Both swine and poultry need phosphorous for bone and muscle development, as well as to better utilize energy in their diet. Inadequate phosphorus in their diet leads to reduced bone and muscle accretion. Further, swine and poultry only digest 20 to 30 percent of phosphorus in feed grains because they lack sufficient levels of phytase, an enzyme that releases phosphorus from grains and

feedstuffs. As a result, most phosphorus fed to these animals is excreted as waste into the environment. First-generation phytase products (fungal origin) have been available for some time. Although those products are helpful, performance of the OptiPhos product (bacterial origin) significantly exceeds that of all the first-generation phytase products. Compared to first-generation products, use of OptiPhos has been shown to release twice the amount of phosphorus to swine and is three times more effective in poultry production.

Exhibits 5 and 6 show the dramatic reduction in the need to add costly inorganic phosphate in rations for swine and poultry. For finishing swine, use of OptiPhos at the 500 FTU/kg level reduces the need for inorganic phosphate by two-thirds. Use of OptiPhos at the 1,000 FTU/kg level eliminates the need to add costly inorganic phosphate. Similar results occur for poultry production.

In addition to reducing production costs, using OptiPhos results in sharply lower levels of phosphorus excretion from livestock facilities. For swine, The Maschhoffs, a large, Illinois-based family swine organization, published findings showing that using OptiPhos resulted in a 45 percent reduction of phosphorous excretion. Similar findings by JBS United showed more than 40 percent reductions in phosphorous excretion when OptiPhos was fed to poultry.

Insert 1 describes the processes required for OptiPhos to become a successful marketplace innovation. While the first market sales occurred in 2005, work on the basic invention occurred more than 10 years before. Numerous collaborations were required, which led to establishing the Phytex LLC venture. Work to enhance the product was occurring on a continual basis, requiring that additional patents be secured. Further, a three-year process was required to obtain domestic regulatory approval from the Food and Drug Administration. That process involved significant learning for JBS United in terms of both processes and challenges. Original cost estimates for this process significantly underestimated the approximately $18 million that was required. Similar approval processes have been, and are being, secured in other regions of the world. Approval in the European Union is expected in early fall of 2011.

Although a challenge to bring to market, OptiPhos is experiencing strong market success. It is estimated to have achieved a 30 percent market share in pork production and a 29 percent market share in poultry production in the United States. Interestingly, major feed company competitors for JBS United's nutrition products can be major customers for OptiPhos.

Successful product development and registration does not guarantee market acceptance. Production costs must be sufficiently low to allow customers to adopt and continue using the product. Relative to OptiPhos, JBS United needed to develop efficient processes and alliances, which would then provide cost structures for allowing the product to be accepted in the market.

The OptiPhos story is the most developed example where employing JBS United's capabilities in concert with basic science inventions led to a commercial product. However, similarly significant innovations are being pursued. Two examples are:

Ovugel
Ovugel is a product of Pennatek LLC, a joint venture of JBS United and GelMed Sciences, a Pennsylvania-based firm marketing inventions from scholars at Penn State University. Using OvuGel enhances swine ovulation synchronization, employing easier-to-use methods than previously available.

The Pennatek team, comprised of employees from both GelMed and JBS United, has effectively shepherded Ovugel through key regulatory hurdles and is approaching approval for sale in the United States. At this point, the strategy is to develop a focused sales team to market the product domestically and to find strategic partners to market the product in key areas outside the United States. This technology will provide for the development of a platform from which other pharmaceutical products could be developed and marketed. However, given the market need and patent regulatory protection, this product is also valuable and could be sold to others in the industry.

Microbial Discovery Group (MDG)
Focused on defining and delivering innovative biological solutions, MDG partners with clients to identify individual needs and then craft bioscience-based solutions. Located in Franklin, Wis., MDG is a joint venture of United BioNutrition and JBS United.

This business was developed to support early stage development and production of a joint venture focused on new product development for both swine and poultry. When the JBS United portion of that business was sold to a competitor, investment was retained in this area because the company sees microbial products as a key strategic platform for future growth.

Grain Division
The seven elevators that comprise JBS United's grain division are located in Illinois (Exhibit 7). Grain is merchandised from these locations to ethanol producers, feed mills, southern and southeastern pork and poultry integrators and export markets. The elevators are strategically located on three different railroads. One group is located in the east-central area of the state in the communities of Royal, Collison and Rossville. The second grouping is in west-central Illinois, around Pike County. Corn production in Pike County averages 25 million bushels. In the 2008 crop year, JBS United handled more than 18 million bushels in that area.

As JBS United grew through acquisitions, it amassed the capacity for grain origination, leading to the evolution of the firm's grain division thrust. The company's fundamental market and customer focus has led to stunning growth in this area of the firm's operations. Exhibit 8 illustrates this dynamism, with the division's grain-storage capabilities ramping up from less than 3 million bushels in the mid-1980s to reach 24 million bushels in 2009.

A key to this success is the serious concentration of both management and employees to developing systems that provide the farmer customer key advantages. In the case of grain procurement, delivering grain to the elevator can be a major time-consuming bottleneck for farmers during their busy harvest season. JBS United's grain division is committed to being the "fastest unloader in the area," striving to ensure that no farm truck spends more than 30 minutes in the unloading process during the busiest harvest times, four minutes otherwise. In

the division's Griggsville facility, systems and processes focus on minimizing the time required to unload. Separate inbound and outbound scales facilitate the flow of delivery vehicles. Probing to determine grain quality is accomplished before the vehicles reach the scale. After inbound weighing, traffic lights direct trucks to one of four unloading locations. The entire system is focused on efficiently unloading and moving these delivery vehicles back to the farm.

Another feature of the western-Illinois area for the grain division is its key business partnership with The Maschhoffs, one of the largest family owned pork-production networks in the nation. The Maschhoffs has been a significant customer for the nutrition segment of JBS United for some time. When The Maschhoffs moved to establish a new feed mill near Griggsville, a unique business partnership with the grain division developed.

Opened in 2009, The Maschhoffs' grain-receiving facility has capacity for 1.6 million bushels. In this unique business model, JBS United leases the facility and originates the grain coming into it. However, employees of The Maschhoffs operate the facility. Under this arrangement, JBS United is the sole supplier to the facility. Farmers deliver to the facility as if it were another JBS United operation and are paid by JBS United; however, The Maschhoffs buy the grain from JBS United. This unique arrangement illustrates the value of long-term customer orientation, coupled with the willingness to employ innovative business partnerships to achieve common goals.

Farm Division

Again fostered by attention to customer needs, JBS United realized that nutrition can't be completely addressed in isolation of other key production factors, such as genetics, ventilation, facility systems and health. Further, broader business and management issues challenge producers, sometimes to a greater degree than solely production issues. Therefore, the company entered into its own commercial production division as pork production evolved from a supplemental activity on the small family farm to a specialized, highly technical industry.

JBS United's farm division, Signature Farms, has production locations across the Midwest (Exhibit 9). Signature Farms raises company-owned pigs and manages pigs owned by others. Its total capacity exceeds 700,000 pigs annually, with the majority of those being company-owned animals. In recent years, capacity at Signature Farms has been downsized somewhat to preserve capital needed for other business segments.

The Path Taken

In 1956, John Swisher was about to decide to become an entrepreneur — long before Silicon Valley made that term popular. Armed with a bachelor's degree in animal science from the University of Illinois, a couple of years of industry experience, 70 percent of the minimum funding thought needed, and support of family and friends, John and two colleagues started the firm that has grown into today's JBS United. He and his colleagues had three key precepts that guided them at the firm's initiation. First, the firm would focus on providing feed for one species, swine, as it would be too difficult to provide high-quality products across species. Second, a high-quality product would be supported by a knowledgeable sales force. Third, the product would be marketed directly to swine producers.

The firm established operations in Sheridan, Ind. This location, a focus for hog production in Indiana, also allowed the firm to begin operations without building its own feed-milling plant. The firm's first headquarters was the town park's ticket booth on skids, 8 feet by 10 feet in size. From those modest circumstances, the firm started down a path, first of organic market-share growth and then, expansion through acquisition.

Throughout these growth periods, attention to people and quality of personnel has been a constant theme. In 1996, JBS United produced a company history of its first 40 years. The banner at the top of each page states, "A COMPANY IS BUT THE SUM OF THE PEOPLE THEREIN." The biweekly sales meetings that have been conducted since the firm's beginnings illustrate that commitment, both to employees and customers. Although the means of communication have evolved with technology, the devotion to providing the needed information to allow customers to excel remains.

In 1965, the firm undertook a product strategy that proved to be profound, although risky at the time. The firm introduced a base-mix program and its 60-pound package of Mighty Mix 60. Producers would combine Mighty Mix 60 with bulk-purchased soybean meal and their own corn. A result was that JBS United's production costs fell, while at the same time, farmer profits rose. Other competitors measured success in terms of tons of feed delivered. Because of that, many missed this change in the market as the base-mix approach grew to dominate the industry.

In 1970, the firm made the strategic decision to invest in R&D capabilities. At this time, the move to confinement production of swine was gaining momentum in the Midwest. To successfully target its feed products to the needs of this new production system, the firm needed to understand these interactions and then be able to market that knowledge to its customers. This led to the decision to build the United Feeds Research Farm. Although the need was apparent, this was a difficult decision for the firm. Establishing the farm required an investment of almost half the company's net worth. The firm's physical R&D assets have expanded significantly since that time, as effective knowledge creation and application is a core asset of the firm. However, that first step was a difficult one.

With the addition of its research farms, JBS United effectively used consulting relationships with key professors at Midwestern ag schools to provide the depth of knowledge it needed. However, as the role of research increased in the firm, the need for dedicated internal expertise also accelerated. In 1984, Don Orr, Ph.D., joined the firm as its in-house nutritionist; another major step for a mid-sized feed company. That capability has continued to expand over time, leading to the company's current significant R&D and technical support staff.

The 1970s also saw the start of a wave of acquisitions and mergers that expanded the firm's presence and scope. Interestingly, these steps tended to be "friendly" in nature, resulting from owners and key staff in the acquired firms moving to retirement or the need to relieve the acquired firm of financial pressure. A partial listing of acquired firms includes:

- Dekalb Molasses Feed Company, Ind.
- J/R Specialties, Minn.

- Urbana Mills, Ohio
- King Milling, Ill.
- Wallace Grain Company (Feed Mill), Ind.
- The Granary, Mich.
- Busboom Grain Company, Ill.
- Royal Farmers Co-op, Ill.
- Ringer Feed Company, Ill.
- Nutrition 101, Ill.

From its early days, JBS United has made ownership shares available to key employees. This practice was employed to facilitate growth through acquisition and merger, as key employees in the target companies were attracted to employment and ownership within JBS United.

In later years, growth at JBS United evolved in new directions. Recognizing that pork production is not just a domestic industry, the company began exploring the needs for its knowledge-based products on the global stage. Early work in Southeast Asia led to exporting products into the Philippines in 1993. Continued efforts to build understanding and relationships in Asia led to a joint venture focused on feed premix in China in 2000. Since then, two joint venture companies have operated in China as a partner with Shandong Liuhe Group Co. Ltd., located at Qingdao, China. Recently, the Liuhe has been transferred into a publicly traded company under the New Hope Group, a large diversified conglomerate company in China. That transaction provided JBS United an opportunity to divest its feed premix joint venture with Liuhe. As a result, JBS United is reconfiguring its Chinese animal nutrition business into a new joint venture company focusing on animal feeds.

JBS United's research capabilities and its knowledge of animal agriculture led to another area of growth potential for the firm starting in the 1990s. As described in Insert 1 for the OptiPhos product, the JBS United assets can be complementary and valuable for inventors and startup firms with technologies that have potential market development. As noted in the Emerging Technologies section of this case, these capabilities have led to a number of ventures that can bring value to the animal-agriculture sector.

Key Elements of JBS United's External Environment

JBS United has a strong history of growth and is facing a number of exciting potentials. However, as a mid-sized agribusiness, the company must consider the external environment in which it operates and will compete in the future. This section provides a brief discussion of several key external forces.

Global Livestock Production

Over the last five decades, the world economy has provided unparalleled opportunities for growth in living standards for billions of people, first in the developed Western nations and then

in the more rapidly emerging economies of Asia and Latin America. Clearly, poverty remains a challenge within developing nations, especially in Africa. However, even though the recent financial recession has dulled our perception of progress, the growth in living standards we've seen since World War II has been phenomenal.

Throughout this period, growth in income and living standards has been closely correlated with improvement in diet. Increased consumption of animal products is a direct result of growing per capita incomes as development occurs. Exhibits 10, 11 and 12 provide evidence of that relationship for pork, poultry and dairy milk. Globally, pork production increased by a factor of four from the 1960s to today. The growth of chicken meat was even more stunning, increasing 10-fold over the period, while milk production nearly doubled.

Regionally, fairly similar scenarios have played out over these 50 years. The relative shares of production in North America and Europe were much larger in the early years of the period and then declined significantly after the 1980s. Even when production volumes were increasing absolutely in those regions, their relative position was in decline compared to that of Asia. Certainly increases in Chinese production were a major portion of Asia's increase, especially in the last 15 to 20 years.

Future economic growth, globally, is an important factor affecting the demand for animal products and, therefore, is a key strategic variable for JBS United.

The Structure of Pork Production

At the time of JBS United's establishment, domestic pork production was concentrated in the Midwest, where having a few hogs to supplement the production of grains and other livestock was the typical mode of farming. Over the next decades, confinement feeding, technology enhancements and specialization of operations greatly changed the structure of pork production. In addition to changes in production practices, the location of production expanded, especially to the Southeast and mid-South. Business organization dramatically changed to include integration of operations and marketing.

Today, less than 200 pork-producing firms, each marketing more than 50,000 animals per year, provide more than 60 percent of the hogs raised in the nation (Lawrence and Grimes). Firms with sales of more than 10,000 head now dominate the industry, providing 85 percent of production.

Exhibit 13 provides a visual perspective of the geographic distribution of U.S. pork production in 2007. The Southeast, especially North Carolina, and the Midwest, especially the Iowa-Minnesota axis, continue to dominate as pork-producing regions. Exhibit 14 shows how the distribution of pork production has shifted between 2002 and 2007. Overall, the increase in pork production tends to follow the pattern of production. However, there is an apparent concentration of that growth in the western Corn Belt region.

As noted previously, China, the world's largest pork producer, is undergoing the same change in production systems that the United States saw over the last 50 years. The backyard production system is declining rapidly and being replaced by production units that will have access to world-class technology and systems. It's likely that the transformation in China won't take 50 years.

Corn Prices and Ethanol

Availability of low-priced feed grains, especially corn, has been a major factor contributing to the profitability in the animal-production industries in which JBS United operates. For a number of years, some have seen use of biofuels and especially corn-based ethanol as a means to reduce dependence on foreign oil. In pursuit of those goals, a number of national policies have been established to promote use of biofuels (corn-based ethanol). These policies include subsidies to the firms that produce ethanol, a mandate to include specific amounts of biofuels in the national petroleum mix and tariffs on imports of foreign ethanol.

As shown in Exhibit 15, the combination of demand from ethanol, major increases in the need for corn to fuel livestock production in emerging nations and U.S. monetary policy resulted in substantial price increases for corn in recent years. From 2007 to 2008, corn prices more than doubled, exceeding $6/bu. Not surprisingly, media and political attention focused on a "food vs. fuel" debate in response to these increases. While prices then declined in pace with the global financial recession, a marked run-up in prices has been seen in 2010-2011. Pressure on demand from emerging economies is a contributing factor of note in the current set of price increases.

Uncertainties and interactions around ethanol and corn prices are a significant factor for JBS United. In the summer of 2011, there appeared to be a growing consensus to remove some of the long-standing policy features supporting corn-based ethanol. These included eliminating the production subsidy and removing the tariff on inputs. However, the combination of continuing the biofuel mandate and high prices for crude oil suggest that demand for corn-based ethanol will remain strong. Further, the distillers dried grain byproduct of corn-based ethanol production is an ingredient for livestock production. Knowledge, the type produced by JBS United, is essential for most producers to effectively use this input. Also, high corn prices themselves put a premium on feed efficiency and the type of nutrition knowledge for which JBS United is known.

Societal expectations

At one time (not that long ago), agricultural systems that could provide large quantities of safe, affordable food were held in high esteem. And, indeed, systems that can produce such results are still desperately needed in many parts of the world. However, among some market segments and among some parts of society, additional attributes of agricultural systems are desired.

Some consumer segments have a particular interest in food products that have been produced in natural systems, where the animal's welfare is enhanced. Meat produced without the use of antibiotics also is desired by some consumer segments. Environmental concerns are particularly important in many regions of the world.

The dynamics of these societal expectations can affect future growth for JBS United. These effects can occur through reductions in demand for the products of animal agriculture. Or, these effects can be demonstrated through restrictions on specific types of production systems. If these restrictions result in reduced livestock production volume, this could have a negative impact on JBS United. Conversely, responding to regulatory restraints often requires the type of knowledge that JBS United's research can provide.

Discussion Questions

1. JBS United in 2011 is a very different organization than it was as a startup feed company in 1956. Indeed, the firm's senior managers note that major change occurred during every decade of its life. Four major growth episodes are noted below.

   - Shift of emphasis to producing base mixes to exploit the industry's move to the corn-soy ration, a radical change from the standard complete-feed approach
   - Establishment of significant in-house R&D capacity, including significant investment in personnel and research farms
   - Expansion through merger and acquisition, including entry into the grain business
   - Establishment of an international presence for both nutrition and emerging technology products

   For each of these episodes, what was particularly attractive about the opportunity? What were the major risks? Were there specific key capabilities of JBS United that mitigated these risks?

2. JBS United has established a considerable presence in Midwest domestic agriculture in the segments where it has chosen to compete. Although challenges face Midwestern livestock and grain agriculture, there also are significant opportunities. JBS United has a successful pedigree of carefully identifying and then expanding through merger and/or acquisition into new geographic markets in core Midwestern areas. Here are three types of growth opportunities:

   - Expansion of swine feed production to serve markets in the western Corn Belt, specifically Iowa, Minnesota and eastern Nebraska
   - Expansion of dairy feed production to serve markets in the upper Midwest, probably through acquisition
   - Establishment of a third and/or fourth site for grain operations

   Is Midwestern agriculture a good opportunity for growth? Why? Why not? For the types of opportunities noted above, what factors are particularly attractive (or unattractive) for JBS United? If you had to select only one, which would it be? Why?

3. JBS United has 11 years of experience and a track record in China, the largest swine market in the world. That market is rapidly transforming from its historic basis in backyard production to production predominantly in commercial units of considerable scale. In addition to its nutrition expertise, JBS United has experienced the process of change from small family farms to large-scale production in the U.S. swine industry.

   The company has the opportunity to expand its presence in China for its swine nutrition products. Strategically, can JBS United afford not to pursue this opportunity? Why? Why not? Central to JBS United's success has been the combination of intensive personal communications to empower employees and reliance upon targeted, applied research

information to enhance customer profitability. Differences in culture and geographic distance make it more difficult to replicate those capabilities in China. How can JBS United, as a mid-sized firm, overcome those challenges?

4. A key to the success of JBS United emerged in the 1980s, with the establishment of a high-quality and substantial in-house R&D capability. While the capability within JBS United has grown over the last decades, the capability for public sector, applied research in swine nutrition, which anchored the industry's growth in the last century, has declined substantially. Similarly, capabilities within some historically important competitor firms also have declined.

   It appears that JBS United now possesses one of the larger collections of R&D capabilities focused on swine nutrition in the nation. How might JBS United exploit that platform of expertise and capacity to further grow profitability? Currently, R&D staff members meet periodically with colleagues at some of their largest customers to share insights. Fee-based consultation is done with a limited number of large production organizations. Given the rapid advances of information and communication technologies, are there opportunities to provide expertise in a more nearly real-time fashion? More importantly, what business model could be implemented so that exploitation of these capabilities will contribute to profitable growth? Should the effort focus more on markets that are domestic, international or both?

5. JBS United has been successfully opportunistic in recent years in bringing emerging technologies to the market. Although related, these innovations didn't emerge from traditional sources of nutritional R&D. These opportunities arose because of the ties company leaders have with colleagues in the science and technology community. One option for the future is to continue to be opportunistic as similar products present themselves in the future. Alternatively, what steps might JBS United pursue to routinize the identification and pursuit of similar, but currently unknown, opportunities? What are the key capabilities that JBS United can contribute to future collaborators?

6. When John and Don next meet to consider future growth, what advice would you offer them regarding their key question: **How should they allocate the managerial attention needed to pursue opportunities while continuing to manage JBS United's effective operations?**

Exhibit 1

Growth of sales at JBS United, 1956-2008

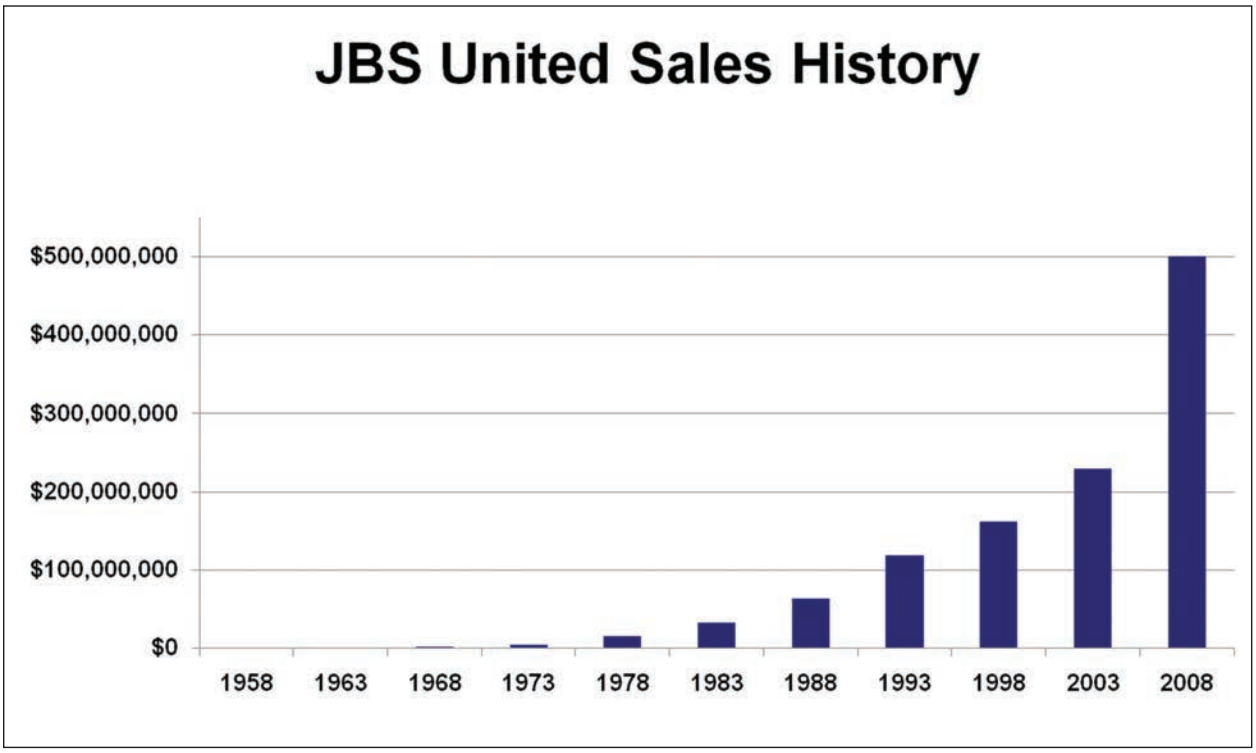


Exhibit 2

R&D underlies nutrition and emerging technology products at JBS United

Exhibit 3

The firm's six manufacturing facilities now extend across that region.

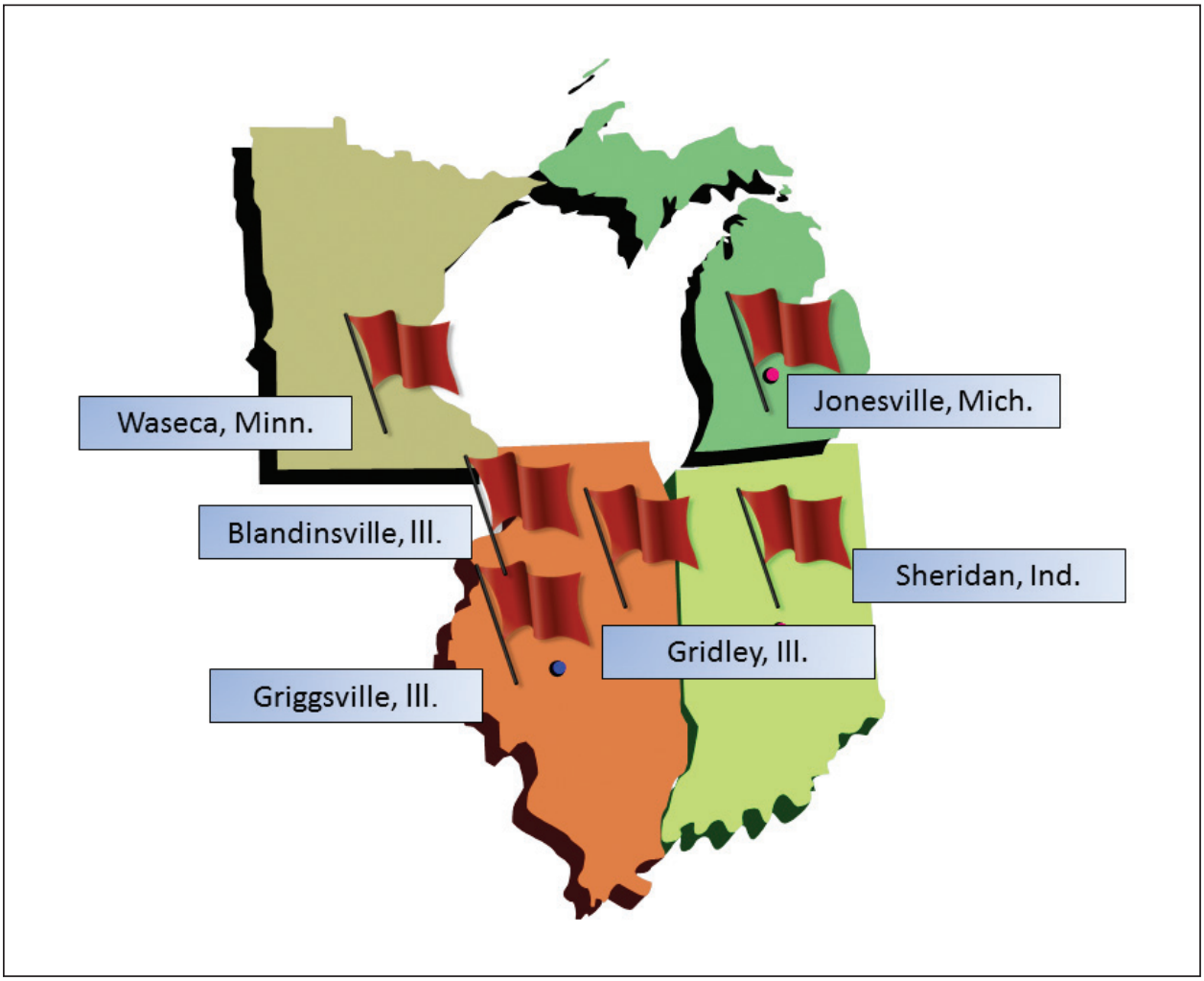


Exhibit 4

JBS United research capabilities

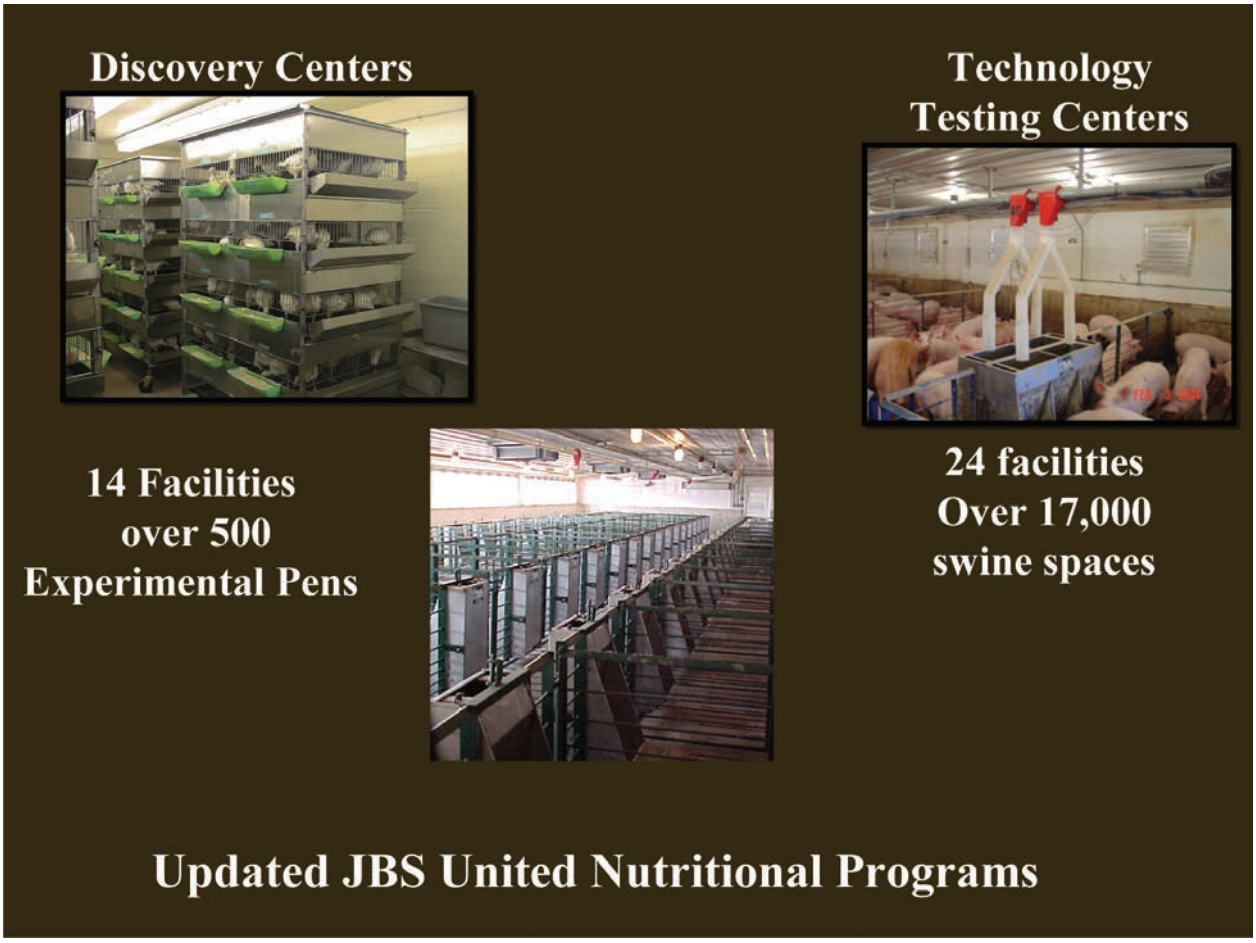


Exhibit 5

Reduced Inorganic Phosphate Use in Swine Production

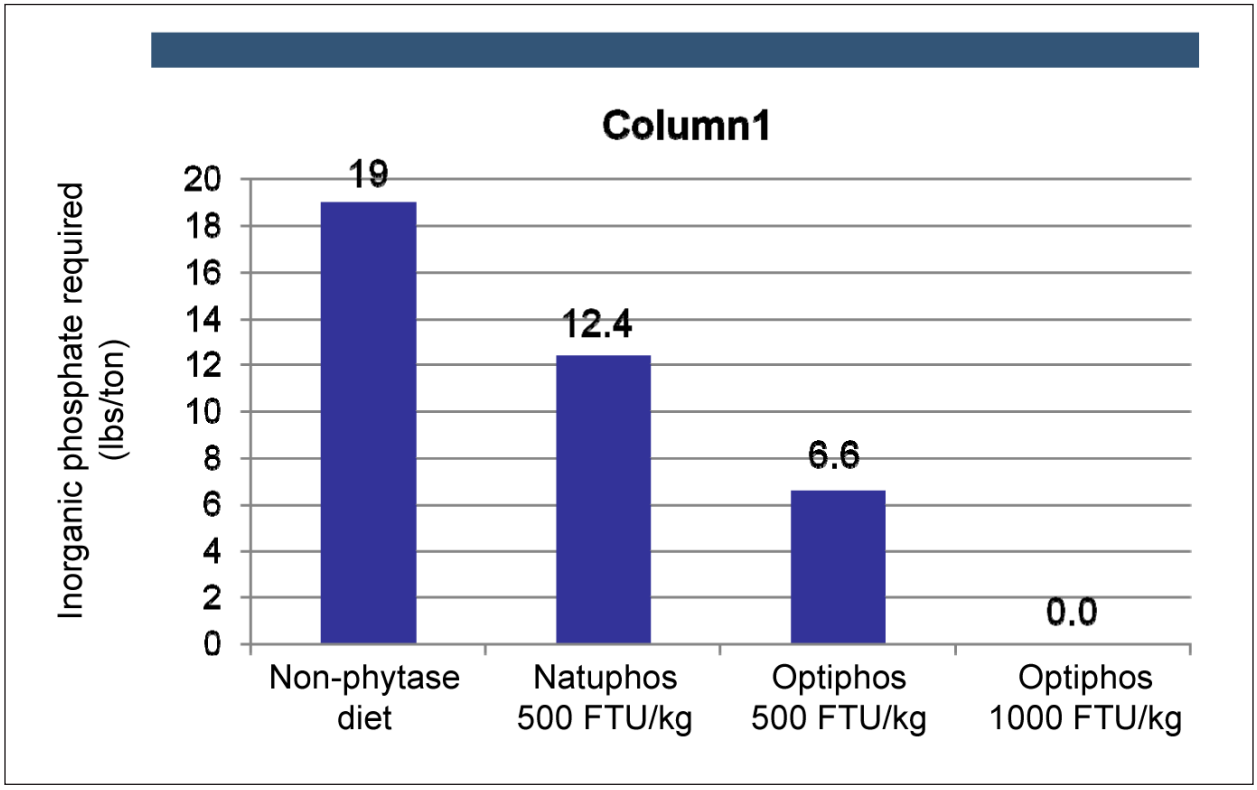


Exhibit 6

Reduced Inorganic Phosphate Use in Poultry Production

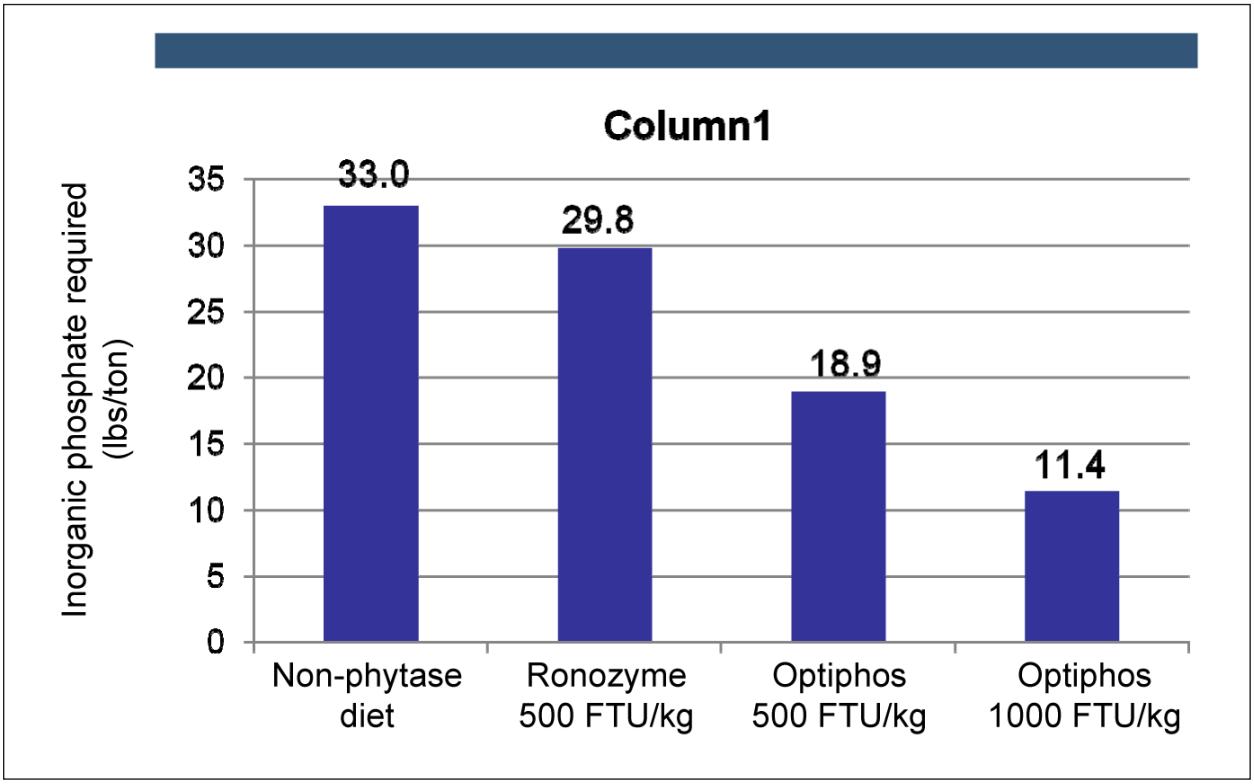


Exhibit 7

Grain division locations

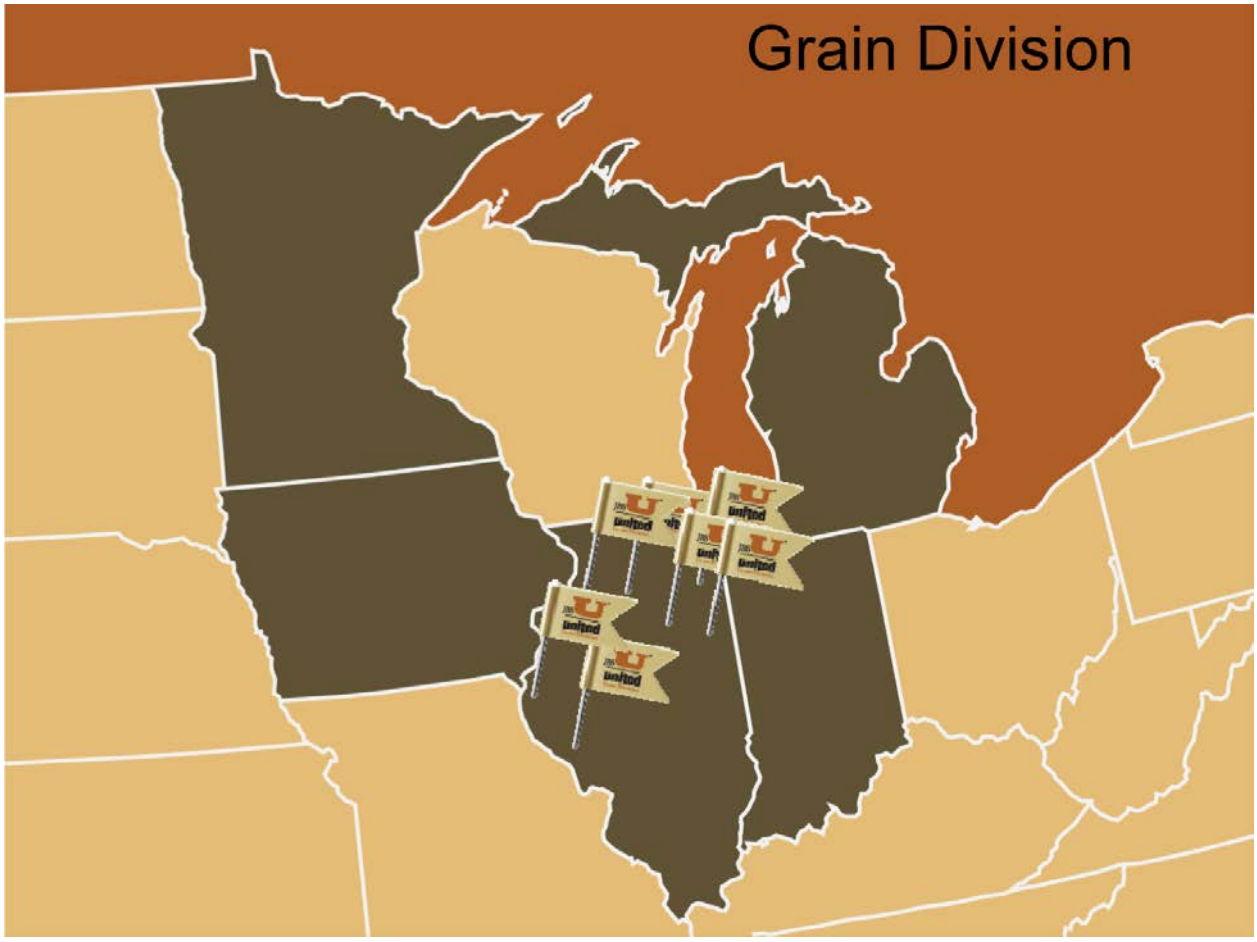


Exhibit 8

Growth of grain storage capacity, 1985-2009

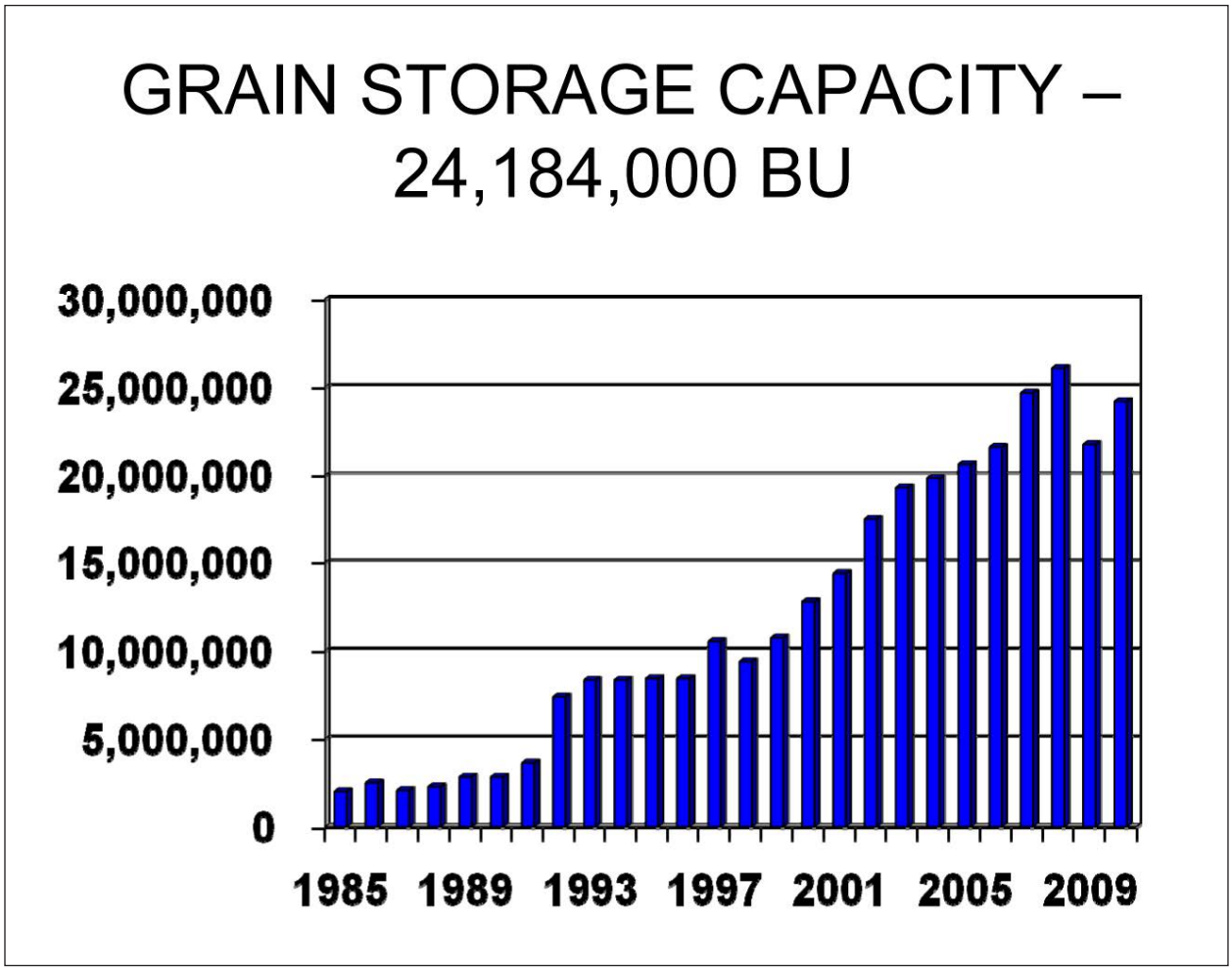


Exhibit 9

Location of finishing system units for Signature Farms

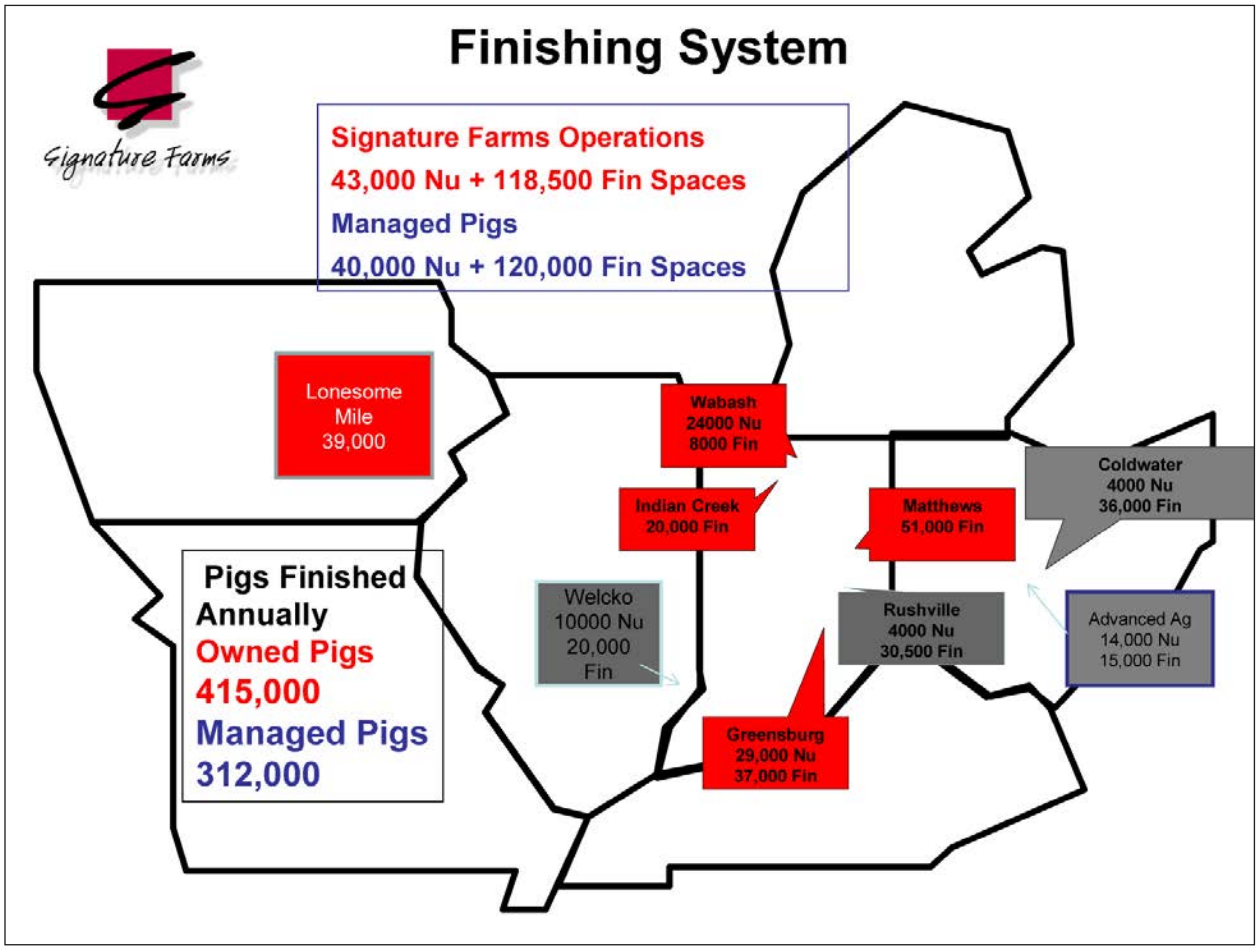


Exhibit 10

Pork Meat Production, 1961-2009

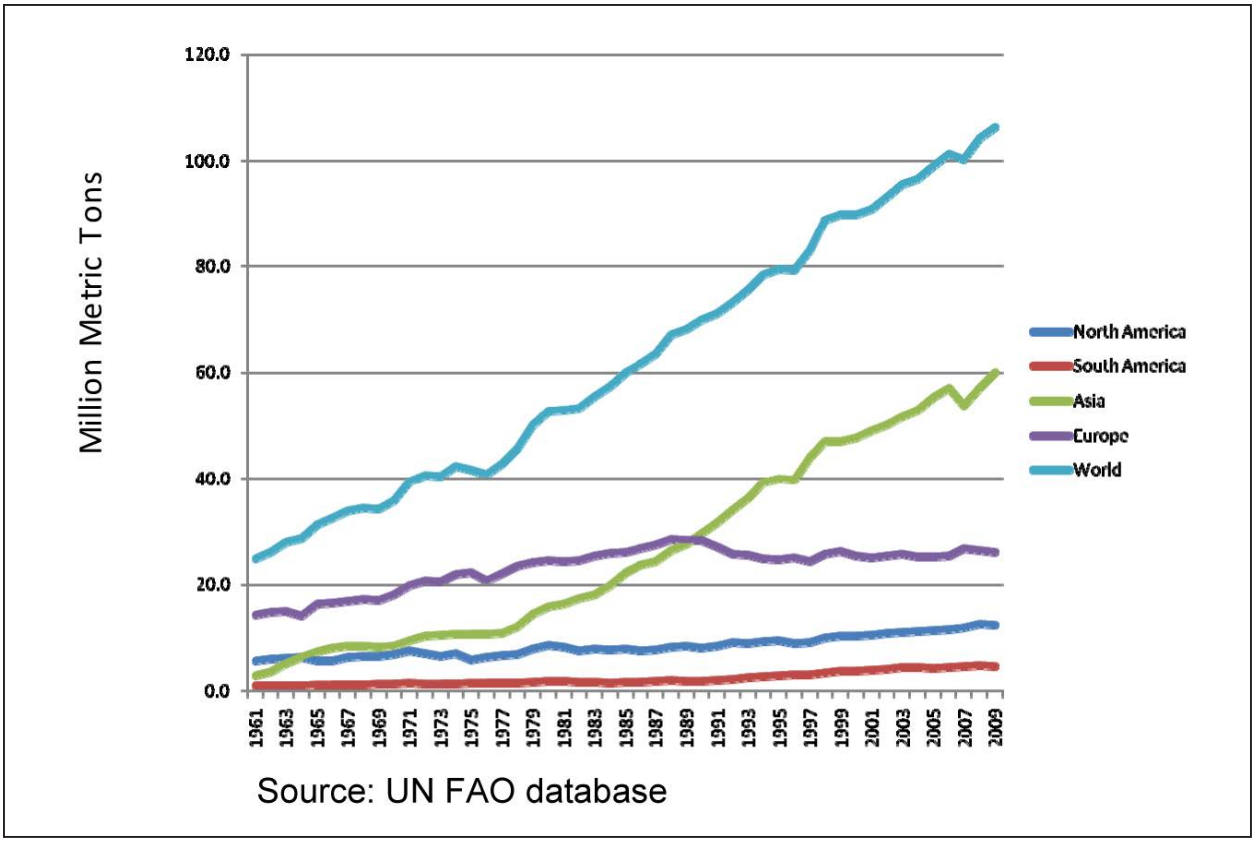


Exhibit 11

Chicken Meat Production, 1961-2009

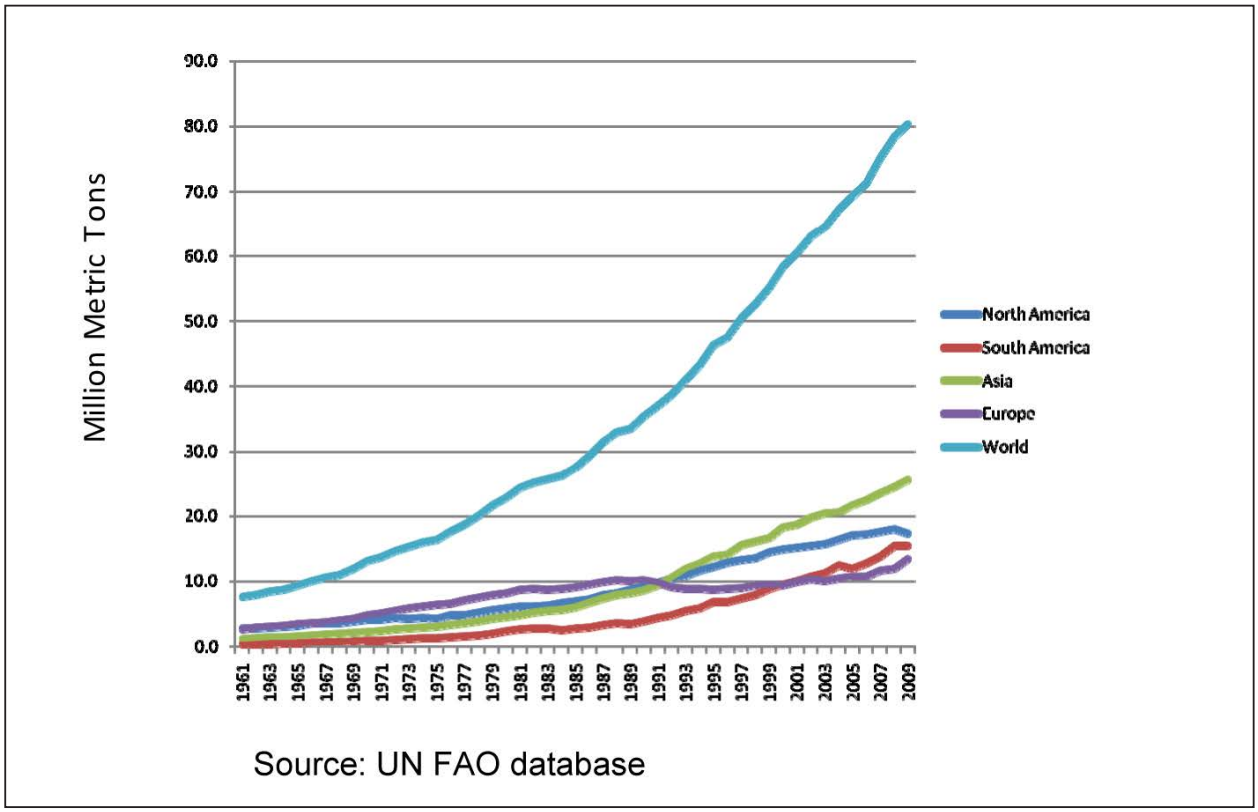


Exhibit 12

Dairy Milk Production, 1961-2009

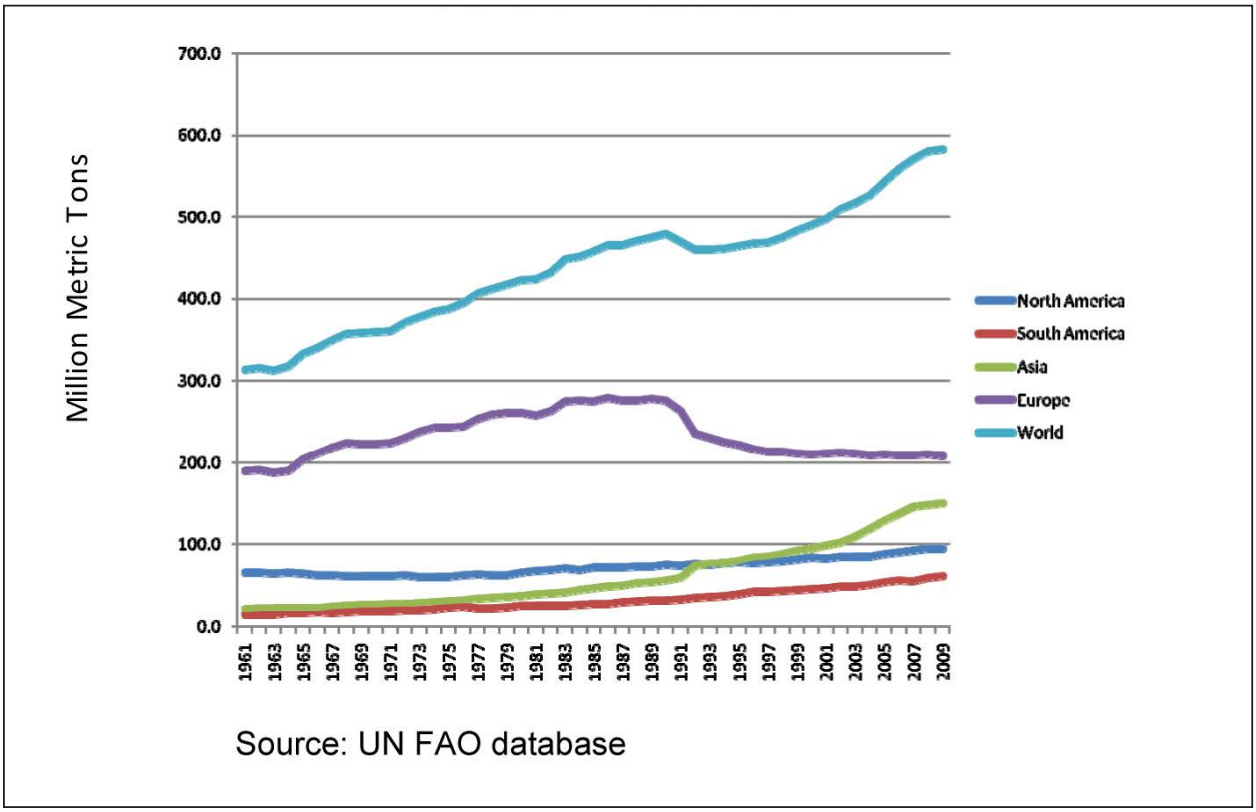
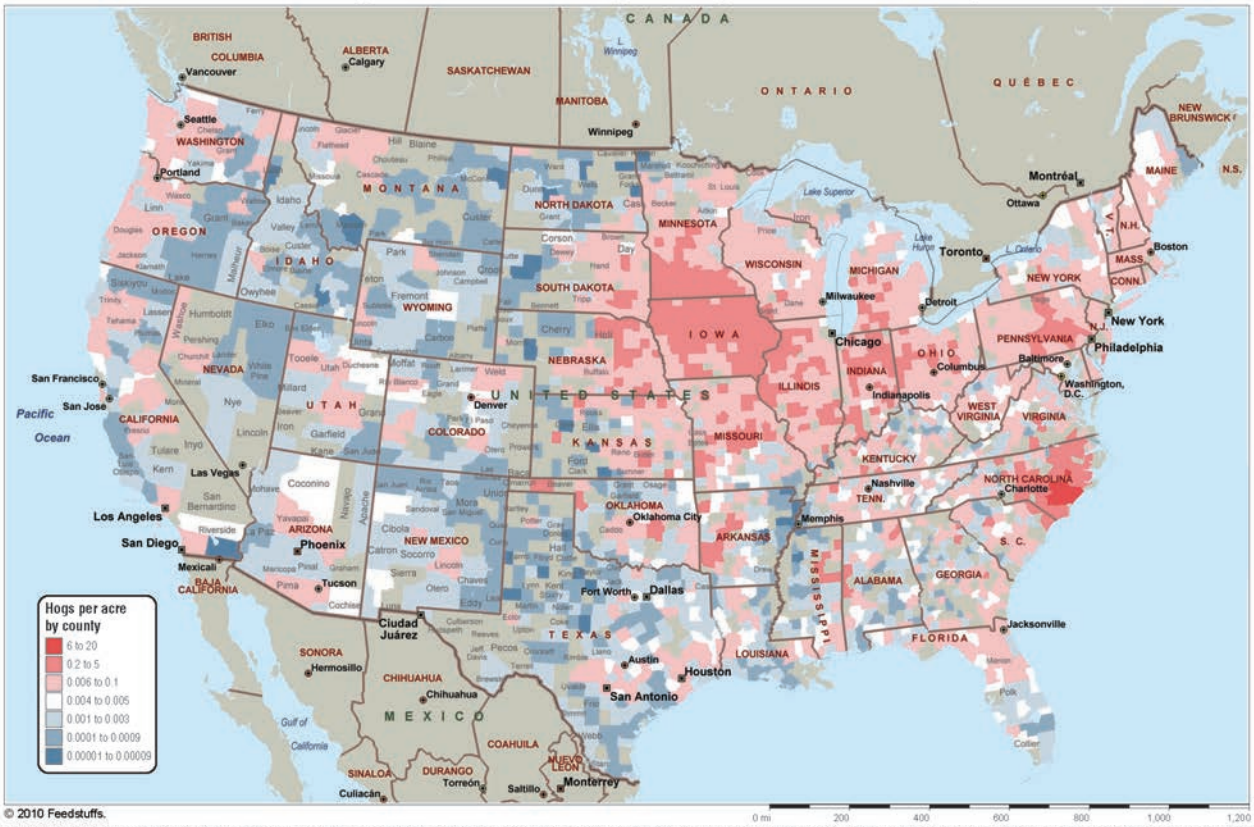


Exhibit 13

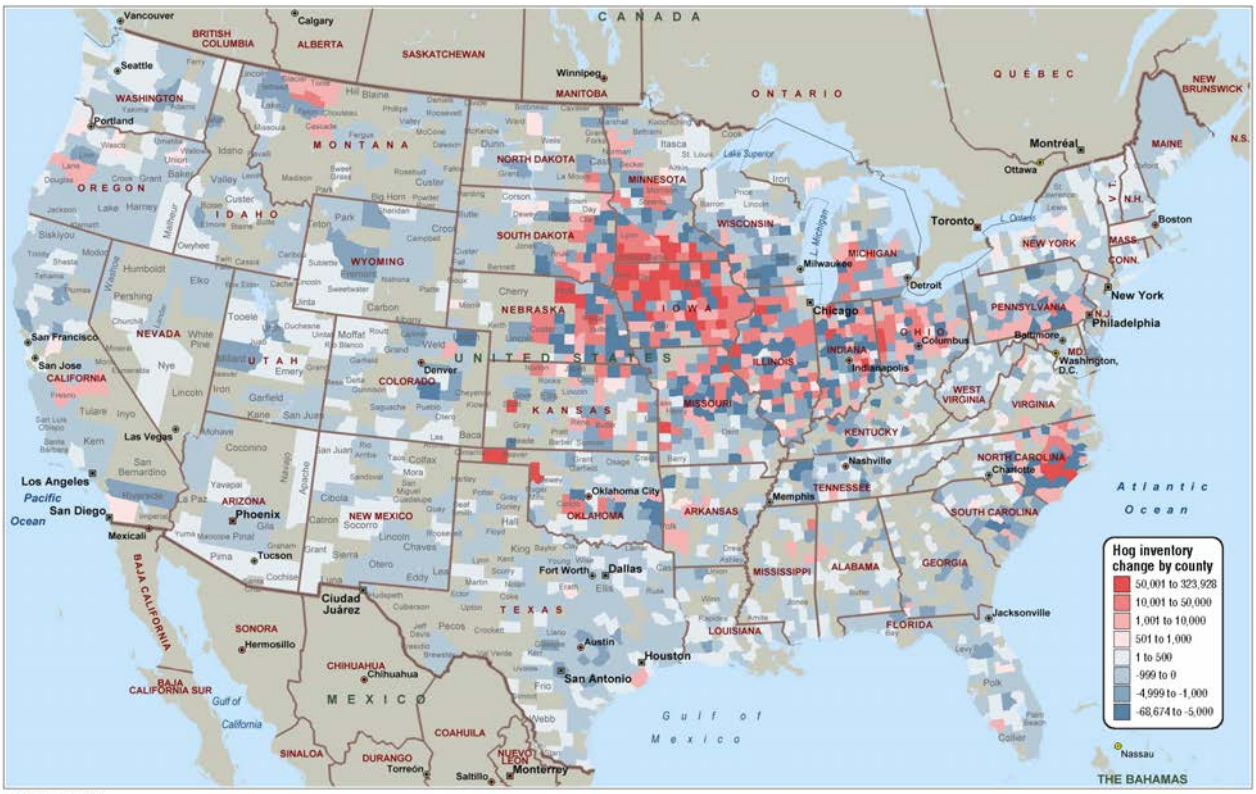
Hog inventory by county, 2007



This map plots the hog inventory per cropland acre by county based on data from the 2007 Census of Agriculture. County inventories of hogs were summed together before dividing by the number of acres in cropland production for each county for this map. The 10 most hog-dense counties included Duplin, N.C. (14.343 hogs per acre); Bladen, N.C. (11.499 hogs per acre); Sampson, N.C. (10.234 hogs per acre); Onslow, N.C. (7.290 hogs per acre); Pender, N.C. (7.163 hogs per acre); Greene, N.C. (6.112 hogs per acre); Wayne, N.C. (4.054 hogs per acre); Jones, N.C. (3.885 hogs per acre); Lenoir, N.C. (3.287 hogs per acre), and Richmond, N.C. (2.963 hogs per acre).

Exhibit 14

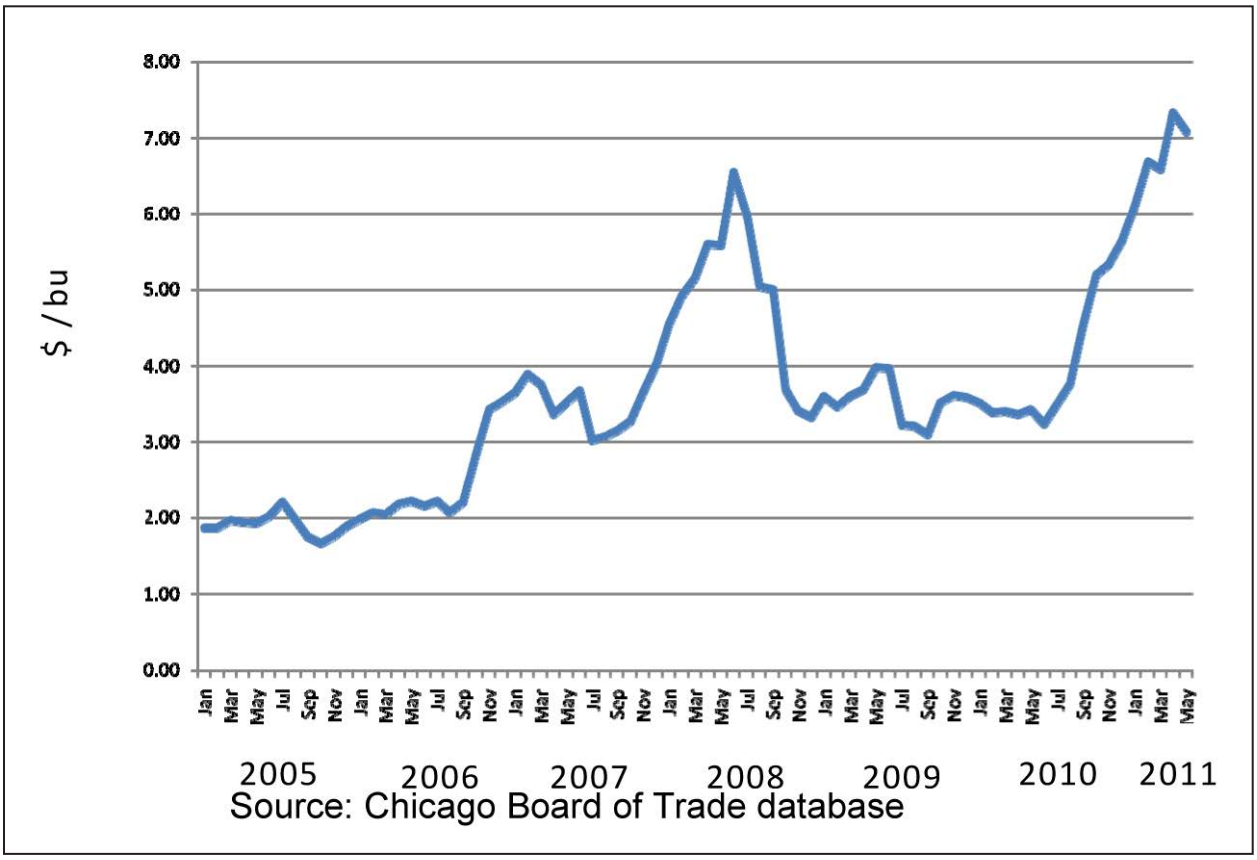
Change in hog inventory by county, 2002-2007



This map plots the change in hog inventory by county from the 2002 Census of Agriculture to the 2007 Census of Agriculture. Counties indicated in red increased their inventory, while those in blue saw decreases. Tan counties did not report hog inventories in one or both census reports. The five counties with the largest increases were Kossuth, Iowa (323,928 more hogs); Franklin, Iowa (266,781 more hogs); Wright, Iowa (254,099 more hogs); Sioux, Iowa (225,182 more hogs), and Osceola, Iowa (203,893 more hogs). The five counties with the largest decreases were Jones, N.C. (68,674 fewer hogs); Johnson, Ind. (58,312 fewer hogs); Bladen, N.C. (53,739 fewer hogs); Robeson, N.C. (46,146 fewer hogs), and Ottawa, Mich. (45,389 fewer hogs).

Exhibit 15

Corn Prices — Central Illinois, 2005-2011



Insert 1

JBS United

News for U

A Bi-Monthly Newsletter for the JBS United Family

February 2011

Reinventing JBS United Again—The OptiPhos Story

JBS United is a product of continuous organizational evolution, generally subscribing to the theory, "that which does not adapt dies." It is from such a philosophy that our recently introduced phytase product OptiPhos emerged as a new inhabitant upon the animal nutrition industry landscape.

As a research based, application science, animal nutrition company, JBS United is always seeking innovative new technologies with the potential to enhance the profitability of those who depend on our expertise. Increasingly, we find the most effective way to do so is through carefully constructed alliances with other equally innovative groups. Our experience indicates that the resulting synergy frequently produces outcomes greater than the sum of its constituent parts. It has certainly been the case with OptiPhos.

Although our path to holding the world's best phytase technology might appear serendipitous, we prefer to believe that chance favors those who are well prepared. Even so, the OptiPhos journey has been a long one. By the time we turned our first dollar of sales in December, 2005, the OptiPhos story was already ten years old, with its essential beginnings even older.

OptiPhos is based on patented technology invented by Xingen Lei, Associate Professor of Animal Science, Cornell University. The technology is licensed by

(continued on page 3)

(continued from page 1)

The OptiPhos Story

Cornell Research Foundation to Phytex, LLC, a majority-owned subsidiary of JBS United in partnership with Protein Scientific, Inc. JBS United also holds certain application patents related to the OptiPhos technology.

The relationships described above have their origin with Dr. E. F. Miller, Professor of Animal Science, Michigan State University. One of Dr. Miller's graduate students was Dr. Donald E. Orr, Jr., President of JBS United, Inc. Another of Dr. Miller's graduate students (15 years later), was Dr. Xingen Lei. About 1994, during the course of JBS United's continuing pursuit of innovative nutrition technologies, Dr. Orr contacted Dr. Miller who connected him with Dr. Lei. Subsequently, JBS United contracted with Dr. Lei as a nutrition consultant.

In June, 1997, Dr. Orr visited Dr. Lei at Cornell University to discuss Dr. Lei's novel phytase work. By June, 1998, JBS United and Cornell entered a formal alliance for the continued funding of Dr. Lei's work. In June, 1999, after a year of legal due diligence perfecting certainty of its freedom to operate, JBS United executed an option with Cornell Research Foundation to license Dr. Lei's phytase technologies.

During the option period, JBS United made connections through Cornell Research Foundation with

Dr. Frank Ruch, President of Protein Scientific, Inc. (Portland, Maine). Protein Scientific, Inc. had an interest in pursuing commercial applications for phytase outside of animal agriculture. In early 2000, Dr. Orr and Dr. Ruch met together with representatives of Cornell Research Foundation to discuss matters of mutual interest related to the commercialization of phytase applications. As a molecular biologist, Dr. Ruch and Protein Scientific, Inc. held expertise in large-scale enzyme production, JBS United held expertise in the application of animal nutrition technologies, and Cornell held expertise in the underlying basics science. The pieces were all in place and by September, 2000, JBS United and Protein Scientific formed a joint-venture named Phytex, LLC and entered into an exclusive, world-wide license with Cornell Research Foundation for rights to the phytase technologies invented by Dr. Lei. As Dr. Lei continued to develop his innovative phytase technology through funding provided by Phytex, LLC, JBS United conducted several related application trials in both its own research facilities and through public universities and made novel discoveries in the application of the base technology for which additional patents were filed in 2002.

Phytex submitted its request for domestic regulatory approval

OptiPhos®
The Advanced Phytase

The market's overwhelming acceptance of the OptiPhos technology has been encouraging. It has created great excitement among our clients and, therefore, within our Company.

to the U.S. Food and Drug Administration in August, 2002 and received final approval in July, 2005. Development work continued for another six months as product formulation and stability technologies were refined and production technologies and scale-up capabilities were enhanced. In December, 2005, Phytex, LLC made its first commercial sales for the U.S. market through JBS United. Commercialization efforts are advancing for other world markets. The market's overwhelming acceptance of the OptiPhos technology has been encouraging. It has created great excitement among our clients and, therefore, within our Company.

The future *is here* in OptiPhos.

—By John Corbett

John Corbett
Author of The OptiPhos Story