A hog farmer looking to expand operations in Illinois has a big challenge. He or she is likely poring over government regulations, eyeing global markets, talking plans over anxiously with family and friends, and scribbling estimates.

This enterprising farmer knows that a larger operation might result in profits and success—or controversy and problems—or another combination of outcomes. That uncertainty, largely generated by pressures to grow and compete, is felt by the Illinois hog industry. The farmer also knows the choices could be crucial. “The pace of change in the swine industry today is unprecedented,” says Randall Westgren, associate professor in the ACES’s Department of Agricultural and Consumer Economics. “The poultry industry, which has undergone tremendous change in the past few decades, moved at a glacial pace by comparison.” Iowa, North Carolina, and Minnesota are the biggest pork states, followed by Illinois. North Carolina has boasted that it will have more sows than Iowa, which means it could surpass that state and take the industry’s overall lead. Driving whirlwind change are economies of scale and increasing vertically integrated production. Hog farmers worry about staying profitable and whether to build facilities to house more hogs.

And changing food demands among affluent Asian and Pacific-Rim urban dwellers are expected to boost markets for pork. (See Perspectives, p. 2). Illinois producers must act soon if they want to compete successfully for these markets. Many factors enter into the calculations, stemming from rapid changes in swine enterprises nationwide and the resulting social, political, and environmental debates.
Pigs Are Important

Most Illinois citizens don’t realize the economic impact of the swine industry on the state. Each year, the industry generates more than $1.1 billion in receipts—part of the livestock industry that pumps about $17 billion into the state’s economy.

The state’s swine industry is a major consumer of the corn and soybeans grown on Illinois cropland, annually using more than 138 million bushels of grain and about 1.2 million tons of protein supplements.

The swine industry creates 21,000 jobs; another 15,000 come from value-added activities, with economic effects in rural and urban areas of the state far beyond farms and processing plants.

“Animal agriculture, including swine production, is vitally important to Illinois, both now and in the future,” says Robert Easter, head of the ACES’s Department of Animal Sciences. “For every dollar received from animal sales, an additional five dollars is generated in economic activity in support industries.”

Pork Industry Scaling Up?

Just like our perplexed hog producer, swine operations in Illinois are buffeted by the sea change of opportunity. Illinois has dropped from second to fourth in hog inventory numbers and ranks fifth in number of hog farms. In the last ten years, Illinois has lost half its hog farmers, down from 19,500 in 1985 to 9,600 in 1996.

Those producers still in the business are tending to larger operations. Nearly 35 percent of the state’s hog inventory is in operations of 2,000-plus pigs. The traditional picture of hog production as part of a multi-use farmsite is increasingly out of date in Illinois and in the industry’s high-growth states.

Twenty years ago, Illinois farmers began shifting from multi-enterprise agriculture—combining the production of corn, pigs, cows, and soybeans on a single farm—to more specialization.

Major shifts in technology, led in significant part by U of I researchers and faculty, helped many producers manage larger, efficient, specialized operations.

Today, swine units in the state range in size from 100 sows to 5,000-plus sows. Many larger units have been in operation for a decade or more. Nearly all large units are owned by the operator and are classified as “family farms.” However, many of these family farms are also multi-million dollar corporate businesses.

Pig Populations in Closer Proximity

As with other industries, economic pressures are increasing in the swine industry toward more and more concentration.

North Carolina provides perhaps the best example of a state whose swine enterprise is dominated by large operations of 2,000 sows, with a potential 40,000 pigs. More than 80 percent of the state’s hogs are raised on farms with 2,000-plus head. North Carolina moved up to second place in swine production as a result of factors such as government encouragement.

Following North Carolina’s example, other states—notably Mississippi, Oklahoma, Utah, and Missouri—pursued the large-scale enterprise strategy. Mississippi’s swine herd jumped by 65 percent and Oklahoma’s by a phenomenal 375 percent.

Meanwhile, Illinois’s share of national production dropped by 8 percent.

With large-scale operations has come controversy. In some states, critics’ demands for government intervention and control are increasingly voiced. In states like Iowa and Illinois, where interest grows in operating on a large scale, there are two main points of contention: one apparent, the other less so.

The lightning-rod point involves waste management and odor. The more subtle point, but perhaps equally powerful, relates to the economy’s trends toward economic concentration and vertical integration.

Waste-Management Measures and Emergency Rules

Swine producers often store waste in lagoons. In 1995, a series of spills from the lagoons of large-scale operations in North Carolina and Iowa led to public outcry. In both states, laws were enacted requiring set-backs and manure-management plans.

Some groups opposing large-scale operations continue to raise waste-control and odor issues. Producers likely will face these challenges in the future.

In Illinois, the debate has spilled into the Illinois State Legislature and has drawn into the arena a number of public-interest and producer groups. One effect: the Illinois Pollution Control Board issued emergency rules for waste management.

Opponents of large-scale swine operations say the regulations don’t go far enough. But supporters, including many producers, don’t want more government involvement in production.

ACES’s Research: Listening and Visioning

How can our producer pondering these questions sort through the demands and challenges to chart a viable future course?

Some of the questions involved in making these decisions relate to economies of scale and are inherently political on the community and state levels. Still, a number of the issues can be addressed by scientific research—such as conducted by ACES.

About eighty individual ACES research projects are under way on all aspects of swine production and marketing. While not the only research goal, finding ways to quantify and control odor is receiving important attention. Researchers are anticipating steps the state’s swine industry can take to compete in a rapidly evolving international market.
In 1995, the ACES’s Departments of Animal Sciences and Agricultural and Consumer Economics joined together to launch “The Illinois Pork Industry Initiative.” The project gathers input from suppliers, producers, packers, processors, lenders, academics, and government representatives to work for a bright future for Illinois pork. Research addresses access to capital, odor control, and information and decision systems.

The initiative has given birth to a comprehensive project for four of Illinois’s major agricultural products—corn, soybeans, cattle, and swine.

“Crafting Future Strategic Visions for Illinois Agriculture” is headed by Associate Professor Westgren and Professor Steve Sonka, holder of the Soybean Industry Chair in Agricultural Strategy. Representatives from all links in the pork-value chain will be included in the process of envisioning the future and how to get there, explains Westgren. “We’re asking, ‘What kind of a future do you want to create?’”

Six internationally known scholars in the field of strategic visioning will help pork-industry people construct computer models to move successfully into the next century. The project is expected to be completed in 1998.

**Tackling Odor Issues**

If there is a flash point over large-scale swine operations, it is literally perceived at the tip of one’s nose. Part of the problem is defining what constitutes an odor problem. Odor levels noxious to one person may be acceptable to another. And when noxious odors exist, how can they be reduced or eliminated?

Within the ACES’s Animal Environmental Research Laboratory, researchers are mounting a multi-pronged effort to tackle odor problems.

“We really don’t know the scientific basis of swine odor,” explains Associate Professor Gary Riskowski of the Department of Agricultural Engineering. “Until we can quantify the odor’s components, we really can’t effectively deal with the problem.” Riskowski searches for ways to use air scrubbers to reduce dust and odor escaping from swine production facilities.

Associate Professor Michael Ellis of the Department of Animal Sciences studies how odor might be reduced by manipulating swine diets. Another animal sciences professor, Rod Mackie, works to identify the origin of odor compounds and the chemical identity of key odor components.

**Turning Waste into Fuel**

Yuanhui Zhang, associate professor of agricultural engineering, spearheads a project that could radically change the equation. He focuses on turning swine waste into components of oil, combustible gases, a much less odoriferous fertilizer, and cleaner post-processed water.

Zhang wants to apply a process known as thermal depolymerization—a chemical-reforming reaction of organic compounds in a heated enclosure—to swine waste. The process could yield at least three benefits: an alternative energy production source, an environment of reduced solid waste and odor, and potential business development.

“This technology was studied during and after the oil crisis of the 1970s using such expensive materials as wood sludge and could be potentially applied to swine manure,” Zhang explains.

**Research Anticipates Viable Alternatives**

In these uncertain times, a producer needs more and better information to make decisions. Robert Hauser, head of the ACES’s Department of Agricultural and Consumer Economics, pledges that the college will “continue to take leadership in addressing means to anticipate rather than react to important issues in the industry.”