Chapter 7

Community and Labor

Animal agriculture is undergoing fundamental change, driven by new production technologies, changing consumer demand, genetic improvements, new retailing pressures and globalization. One significant outcome is a change in the relationship between farms and rural communities. Production units have become larger and more technologically advanced, using supply chains and marketing channels to link to the economy at large. Much production has shifted from independent operators to vertically coordinated operations that largely bypass community linkages. New operations may bring new resources, opportunities and economic growth to local economies. Large production or processing operations require a concentration of workers, who may not be highly paid and may have to be recruited from other locales. All this challenges the socioeconomic milieu of communities where these enterprises are located. New economic opportunities may impact the community's autonomy, norms, traditions, pace, culture and control.

The community and labor impacts associated with livestock and poultry production and processing are significant, but very diverse. Labor is more mobile than is industry infrastructure and inputs that give a particular region a comparative advantage in animal agriculture. Livestock and poultry production is a value-added enterprise that creates jobs directly and indirectly as producers and workers purchase goods and services. The local economic impact of this industry will depend in part on the community's ability to meet the needs of producers or processors. In some rural communities where animal production and processing have expanded, there are more jobs than available local workers; immigrants increasingly fill these generally unskilled jobs. Regions of the United States and Canada are sometimes challenged to integrate new people and new cultures into existing communities. Mexico, whose rural communities often supply the immigrant workers to U.S. and Canadian companies, benefit from the remittances sent to families. However, the out-migration to urban cities in Mexico and north of the border is creating challenges in rural Mexico.

This chapter discusses the current situation in North American rural communities and labor markets. It then identifies existing policies and activities addressing these issues, concluding with an outline of future options and implications.

Current Situation

United States

During the last 20 years, there have been four significant trends in the U.S. livestock sector: growth and concentration, increasing scale, shifting location, and, in meat processing, movement of employment to rural areas from urban locales.

Growth: U.S. animal agriculture is a $99 billion sector that has grown at a rate of more than $1 billion per year during the last 35 years. This growth has not only matched increasing demand in the United States, but also reflects the country's increasing competitiveness in export markets.

Scale: This growth has been accompanied by a dramatic increase in the size of livestock enterprises, and increasing concentration of ownership and processing. Retailers, hotels and institutional meat buyers are looking for consistency, high volumes, quality and low price. Large livestock enterprises, especially in poultry, pork and dairy, are best able to deliver those attributes to processors, who are also growing in size and concentration (Goldsmith et al., 2002). This is a global phenomenon—farms need to get bigger and acquire the latest technologies in order to compete globally. In the United States, many Western and Plains states have seen operations increase in scale by severalfold as new, modern systems have been built in low-population regions. Increases in size of operations are also occurring in the traditional livestock production areas of the Midwest. Processors continue to consolidate into larger units.

Location: During the last 25 years, meat processing has shifted from urban areas near consumers of meat products to rural areas near cattle, hog and poultry producers. The share of meat-processing employees in non-metro areas rose to 60 percent in 2000 from less than half in 1980. Rural plants are larger, and estimates are that more than 85 percent of the beef, pork and chicken come from large plants with more than 400 employees.

The shift of meatpacking from urban to rural areas was due to lower land and labor costs, less stringent environmental restrictions, and declining transportation costs. Lower labor costs and improved labor efficiency are also factors contributing to the growth of boxed, vacuum-packed, and cut-up and

sometimes cooked meat products prepared in processing plants. Meatpacking work is "hard and dangerous and wages are low by manufacturing standards, although often high compared with alternative employment in the rural communities in which plants are concentrated" (Craypo, 1994).

Employment: The $70 billion U.S. meat slaughtering and processing industry employs about 500,000 workers (U.S. Statistical Abstract, 2004-05, Table 982). Animal slaughtering and processing is the largest manufacturing industry in the rural United States, representing one-third of food manufacturing employment (Table 1).

The U.S. 2002 Economic Census reported 520,000 employees in almost 4,000 meat-processing establishments (Table 1). The 773 meat-processing establishments with 100 or more employees accounted for more than two-thirds of total employment. About 86 percent, or 435,000, of these employees were production workers, earning an average $22,400 a year or about $10.80 an hour. There were 214,000 red meat and 216,000 poultry-processing workers. Red-meat-processing workers earn higher wages because more of them are in the Midwest, where wages are higher. The poultry-processing industry comprised 311 firms with 536 establishments, according to the 2002 Economic Census.

Food manufacturing pays less than the average wage in the U.S. private sector, and meatpacking pays less than the average wage in food manufacturing (Table 2). However, food manufacturing workers tend to work more hours per week than other private-sector workers. The median hourly earnings of slaughterers and meatpackers was $9.80 an hour in 2002, and $8.47 for meat and poultry cutters and trimmers. About 18 percent of meatpacking workers belonged to unions.

Meatpacking is one of the more dangerous manufacturing jobs. Common injuries are muscular trauma, repetitive motion injury, cuts and strains. According to the Bureau of Labor Statistics' 2003 annual survey of workplace injuries, the injury incident rate among 106 million private-sector workers was 5 percent, i.e., five of every 100 full-time workers had a reportable injury or illness (Bureau of Labor Statistics, 2005). The incidence rate was 6.8 percent in manufacturing, 8.6 percent in food manufacturing, and 10.3 percent in animal slaughtering and processing.

There were an estimated 10.3 million unauthorized foreigners in the United States in March 2004, including 1.7 million children under 18 years of age (Passel, 2005). Fifty-seven percent are from Mexico, and 24 percent are from other Latin American countries. There has been an increase in immigration flow since 1980. There has been little upward mobility in the first generation of this group, but more mobility in subsequent generations. Generally, unskilled, low-paying jobs, such as agricultural work, are the primary jobs available for the authorized and unauthorized migrant workers. Unauthorized immigrants make a disproportionate number of agricultural workers. Unauthorized migrants represent an estimated 5 percent of the general U.S. work force, but account for 29 percent of farm workers, 17 percent of food preparation and 27 percent of animal slaughter workers, according to the Current Population Survey, which may not fully enumerate such workers (Table 3).

Mexico

Mexico is undergoing a demographic transition, with significant migration from the countryside to the cities and to the United States. According to Mexico's 1995 population census, of the 5.3 million households located in communities with fewer than 2,500 inhabitants, 73 percent are in the lowest 4 percent of income distribution. The highest levels of poverty are in these communities. In comparison, in communities with more than 100,000 inhabitants, only 23 percent are at this level of poverty. The 2005 national fertility rate was estimated at 2.11, about equal to the replacement of the current generation.

The demographic conditions, combined with a relatively weak economy, have created a strong labor export market within the North American Free Trade Agreement (NAFTA) community. The United States has had a high rate of job growth during the last 10 years, and a highly flexible labor market that has been able to absorb a lot of immigration. Within the NAFTA context, this is what was expected. Trade barriers would fall, allowing resources to be efficiently allocated. The labor exodus from Mexico, though, was not anticipated. Most of the concern early on was for job flows to be the opposite, from the United States to Mexico. This raises an important policy question of what is preferred—a well-functioning NAFTA where capital and labor move freely, or somehow differentiating capital from labor in order to address important short-term social issues arising from migration.

Rural migrants represent about 44 percent of the overall annual flow of temporary migrants, or about 143,000 individuals annually in 2002. Of the 5 million households in small Mexican communities, 25 percent are linked to the international migration phenomena, and 10 percent receive remittances from a family member living in a neighboring country. The average income for rural households receiving remittances in 2000 was $3,250 pesos per month (US$313). The average income for rural households not receiving remittances was $1,662 pesos/month (US$160).

Only about 11 percent of Mexico's 196.5 million hectares (485 million acres) are arable. Only about 4 million hectares (10 million acres) are irrigated. The rural labor force is large in relation to the gross domestic product (GDP) of the primary sector. Average productivity per worker nationally is about 2.5 times greater than in this sector.

Slow economic growth in recent years has hampered creation of the necessary productive jobs to efficiently absorb the additional labor force. The risks of continued high unemployment and under-employment include social problems, such as poverty and loss of human capital. The economy is not improving adequately to generate the necessary productive jobs to reverse the trends. The challenge is to find export markets for productive work of the under- and unemployed work force.

Canada

Canada's livestock sector is shifting to larger producers and processors, particularly in pork and beef. There has also been a rapid expansion in livestock slaughter and processing capacity in the province of Manitoba because of a 45,000-hogs-per-week (on a single-shift basis) processing facility in Brandon, built in 1999. The integrated nature of the North American market provides opportunities for movement of live animals at a variety of stages in the supply chain. For example, the pig crop in Manitoba has increased to 8.9 million in 2004 from 2.6 million head in 1992 (Agriculture and Agri-Food Canada, 2004). A large part of Manitoba's increased production has resulted in increased exports of live animals, both as weaners or feeders to the United States.

In 2004, the Canadian hog industry processed 26 million pigs, or 1.9 million tons, with about 30 percent raised in Quebec. About 950,000 tons of pork was exported in 2004 and 90,000 tons imported. The degree of industry concentration is growing in the pork and beef sectors, with a trend toward fewer and larger production operations.

Meat processing represents 28 percent of all food industry employment (Table 4). Meat processors report annual wages and salaries of about $2 billion, 28 percent of the payroll of the total food industry. Meat processing reported the second highest number of establishments, largely because of the many small specialty producers of smoked meats and sausages.

Meat products were Canada's single largest food industry export prior to the May 20, 2003, discovery of *bovine spongiform encephalopathy* (BSE). Canadians exported C$5.2 billion of meat in 2002, representing 31 percent of the value of all processed food product exports, and an increase of 135 percent, or C$3 billion, since 1995. Exports are now rebounding to levels near those prior to May 2003 in large part due to resumed beef trade with the United States and Mexico.

Adding value to raw agricultural commodities through food processing is often promoted as part of agricultural policy and as rural development policy to create jobs in rural areas. However, in 1996, fewer people were working in Canada's food-processing sector than in 1981, though more food was processed. Importantly for rural development policy, rural metro-adjacent regions gained a higher share of food-processing employment. Rural metro-adjacent regions appear to be relatively competitive in keeping a food-processing work force.

In Canada, as in the United States, a significant portion of farm families' income comes from off-farm sources. Even farms with sales of $100,000 or more earn about half of their family income off the farm. Small and mid-size farms do not have the scale of operations necessary for farm income to contribute significantly to total family income. For these families, off-farm income is even more important in determining standard of living, accounting for almost all of family income.

During the past 30 years, immigrants have accounted for a progressively smaller share of a farm population that is itself in decline. Today, in Canadian agriculture, an immigrant is likely to be a farm operator from the Netherlands, Britain, Switzerland or Germany. The number of immigrants moving to rural Canadian communities is still small in absolute terms. Across Canada, rural regions attracted about 12,000 immigrants in each of 2001 and 2002, down from a peak of 23,000 in 1993. Rural regions that attracted the most immigrants did so through cultural connections and employment availability. One example is Brooks, a community in Newell County, Alberta. Lakeside Packers, which has a plant near Brooks, has about $1 billion in annual sales and accounts for about 30 percent of Canada's beef processing. The Brooks plant is unionized. Because of the demand for labor in the plant, Brooks is now home to about 1,200 Sudanese, who comprise 10 percent of the community's population. This case highlights that the labor challenges for Canada as its meat industry expands, like the United States, will more likely be encountered at the processor level, than at the producer level.

In some meatpacking plants, landed immigrants (e.g., permanent residents) and immigrants who are now citizens constitute a significant portion of the work force. A small number of these immigrants are Mexican. Canada has a Seasonal Agricultural Worker Program (SAWP) that allows producers to bring in farm workers from foreign countries to work temporarily in Canada. These seasonal workers typically come from Caribbean countries, although Mexican workers are also employed. These workers live in housing supplied by the employer, live without their families and are not in the process of becoming permanent residents of Canada. However, SAWP has limited applicability to the meatpacking industry, which employs workers year-round.

In Western Canada, high wages paid in the oil and gas and construction sectors are drawing labor away from agriculture and the meatpacking sectors. Canadian meat product manufacturing workers earn an average of C$30,000 (Industry Canada).

In some cases, employees of large hog operations also own their own farms; income generated from this off-farm source helps

keep their small farms operational. Persons employed in large hog barns are not necessarily low-skilled and low paid, nor are companies necessarily looking for the cheapest workers. In most cases, hired workers are local rural residents looking for local opportunities. Employees working in large hog barns bear no financial risk, are guaranteed three weeks of holidays and earn a competitive wage.

Community Impacts

Economic Impacts

In communities across North America, the economic benefits generated by the animal agriculture sector go beyond producers. There are economic benefits for the communities and regions where business is conducted, as well as the earned income opportunities created through jobs and entrepreneurial activity. Some studies suggest animal agriculture may have positive impacts on community well-being, particularly if part of a mixed crop-livestock system. By contrast, commodity crop agriculture may have negative impacts on community well-being because of less labor due to mechanization (Flora et al., 2005; Monchuk et al., 2005).

Economic multipliers reflect the effect of changes in one sector across a whole regional economy. Each dollar generated by economic activity in animal agriculture generates additional economic activity—directly through job creation, indirectly through the procurement of goods and services, and from increases in income and spending resulting from more active markets. While the magnitude of these effects differs by sector, animal agriculture has higher economic multipliers than such sectors as mining, textiles, forestry or crop agriculture (Goldsmith and Idris, 2001). Estimates of the multipliers for agriculture range from 1.5 to 3.0. In the United States, recent work shows livestock multipliers in the state of Illinois range from 1.59 for sheep farms to 1.90 for hog operations (Goldsmith and Idris, 2001). Multiplier effects differ by commodity because each commodity generates a different amount of input, output and processing activity. Impact multipliers can be even larger for meat and dairy processing, ranging from 1.44 for poultry processing to 2.13 for butter production (Goldsmith and Kim, 2002).

Jobs, taxes and other economic benefits of animal agriculture are realized beyond the local level. Commuting distances for employment are typically greater in rural communities, and the distance employees of rural enterprises travel to their work is often more than 60 miles. Improvements in transportation technology increase the distance inputs and outputs of the sector travel over their life cycle. With increased transportation of agricultural products at all stages of production, opportunities exist for specialization, resulting in efficiency gains and increased productivity. This may affect economic multipliers by reducing historical patterns of sourcing inputs locally. However, the value of locally sourced inputs and labor would not be expected to increase as local specialization increases because local firms cannot specialize in everything—a large share of total inputs would need to be sourced from outside the community. Current volatility in energy costs may make transportation costs more important to sourcing decisions. Global trade liberalization—including inputs and products of animal agriculture—also opens communities to outside competition, new market opportunities and greater access to inputs.

Information and communication technology, including Internet access and computerized electronic infrastructure, are required to support modern production and marketing of animal agriculture products. Specialized support occupations in such areas as accounting, law, veterinary medicine, breeding, marketing, information technologies and electronics may develop clusters of expertise surrounding communities that engage in new higher technology meat and livestock businesses. These clusters of expertise create benefits for communities, including high-income employment and additional demand for information and communication technologies.

Small niche and hobby units are the largest segment of farms and are currently the fastest growing segment of farms. Operators of these units earn part of their family income from agriculture. These farms service an increasing demand for locally grown and niche market food products, including locally and regionally sourced products, organic products and such specialties as kosher/halal, non-hormone treated and natural products (Banker and MacDonald, 2005). These value-added sub-sectors can build strong local community connections through local retailing and shared marketing efforts. Support for these local and regional niches can also be found in the restaurant sector, where food attributes enhance marketing to local food and hospitality establishments. While dependent on a large population of higher income shoppers, there are opportunities for regions to maximize these advantages through tourism marketing. This trend presents economic opportunity for many regions that may not be among the leaders in volume-based animal agriculture, but have the advantage of ready access to discerning consumers.

Community/Social Impacts

The siting of large animal production operations has the potential to generate considerable local controversy. Issues of contention are potential odor problems, water availability and use, manure disposal, and the desired future of agriculture. For example, in the state of Illinois, the siting and expansion of large livestock production units is governed by the Illinois Livestock Management Facilities Act (LMFA). LMFA was created in 1996 to formalize and make uniform the process of livestock siting and expansion. The process includes a formal

informational hearing, at which community stakeholders can learn details of a proposed facility, ask questions, and enter into the record evidence supporting or opposing the plan. Transcripts of the 25 hearings that have taken place since 1996 provide information about community concerns, though reflecting only the opinions of those who participated.

A review of the transcripts revealed more than 40 concerns about large livestock operations (Pereira and Goldsmith, 2005). The most common positive aspects cited were economic development and jobs. The most commonly expressed negative issues were:

- the perceived location of recipients of economic benefits,
- the perceived poor quality of the jobs,
- the perceived demographic makeup of the work force,
- the potential impact on property values,
- the potential deterioration of infrastructure, specifically roads and bridges, and
- the potential for traffic congestion and road cleanliness problems.

An important aspect of community quality of life is social capital—the character of a community reflected in mutual trust, reciprocity, and shared norms and identity. In general, communities with greater social capital provide greater quality of life (Flora, 1998; Flora et al., 1997). Citizens of a U.S. community where large swine production units are prominent expressed negative assessments of trust, neighborliness, networks of acquaintanceship, democratic values and community involvement (Kleiner et al., 2000). In an area of the state of North Carolina that has experienced a tremendous growth in the hog industry, many citizens perceive that the interests of large pork producers dominate those of local residents at all levels of government (McMillan and Schulman, 2001; Thu and Durrenberger, 1994).

Labor Impacts

An active component of the sociology literature is skeptical of the benefits of large farm and processing units for rural communities. Their work originates in a classic study of California farm workers conducted by Walter Goldschmidt. A central conclusion of his 1940s study in the Central Valley of California was that absentee-owned, large-scale agriculture in which much of the work was done by hired workers resulted in community inequities and more limited civic life. Studies during the last 60 years suggest that agricultural communities with primarily small farms tend to generate less economic and social inequality than communities where the predominant operations are larger farms with a higher ratio of farm workers to farm operators (Goldschmidt, 1978; originally published in 1946; Lobao, 1990; MacCannell, 1998).

From this literature questions arise as to the quality of civic life in 21st century rural communities where dependency and hired labor are more prevalent. If the Goldschmidt hypothesis predicting a deterioration of civic life as economies become more integrated and coordinated is correct, research would help reveal what policies would be effective at improving rural civic life.

A March 1998 report by the U.S. Government Accountability Office (GAO) examined changes in communities in Nebraska and Iowa that had large meatpacking work forces (GAO, 1998). The report concluded that the hiring of immigrant workers by meatpackers had demographic and economic impacts. Immigrants stabilized populations in many counties that were losing residents. Meatpacking counties typically had faster increases in per-capita incomes and retail sales than the state as a whole. There were sharp increases in the number of poor and limited-English proficient children in schools, and a very high turnover among workers—18 percent to 83 percent a year. Teachers complained that it was very difficult for children to receive the full benefits of education. The housing market for inexpensive rental housing tightened with the influx of workers.

In the United States, meatpacking has long attracted workers with relatively little education and sometimes few English language skills. Wages in meatpacking facilities located in urban areas have to be comparable with those in other manufacturing industries. Meat-processing facilities in rural areas generally do not have to compete with other manufacturers for workers, and instead often recruit workers from out of the area, especially to staff second or night shifts. Refugee resettlement in the 1970s and 1980s brought Asians to rural areas of the Midwest. The 1986 Immigration Reform and Control Act facilitated the geographic and occupational mobility of Hispanics, some of whom saw the movement from seasonal farm to year-round meat processing as a step up the U.S. job ladder. The job boom of the late 1980s offered local workers other job opportunities just as many plants were adding second work shifts.

Some plants offer cash bonuses of several hundred dollars to current workers or others who refer persons who are hired and stay on the job at least 60 or 90 days. As a result, networks have evolved to bring U.S.-born, as well as Mexican-born, Hispanic workers from areas with high unemployment rates to meatpacking plants in the Midwest and Southeast, where unemployment rates were very low in the late 1990s.

Once a core group of Asians or Hispanics is employed in a plant, network hiring occurs, with current workers bringing friends and relatives to fill vacant jobs (Griffith, 1988). Network hiring shifts most recruitment costs to currently employed workers, who bring only those who can do the work, and often act as their mentors. Critics of the meatpacking industry allege that network hiring gives managers more control

of workers, by allegedly threatening to fire an entire crew if there are problems with one worker. Some plants provide company housing, so losing a job also means losing housing.

Because there are few local workers in rural areas, the arrival of immigrant workers does not usually directly displace local workers. The availability of immigrant workers sometimes increases productivity and helps both local and immigrant workers. New plants in rural areas tend to have more labor-saving and worker-friendly technologies, such as a cleaner and safer work environment. If the availability of immigrant workers allows a second work shift, employers may invest in air- and electric-powered knives that make work easier for all workers, potentially reducing injuries and illnesses in meatpacking.

Hispanics were 15 percent of the U.S. meat industry's labor force in 1990, and 35 percent in 2000; non-Hispanic whites were 41 percent of the industry's labor force in 2000. The arrival of Hispanic or Asian workers can quickly change the face of rural areas that have not experienced significant immigration in recent years. Most areas, especially those losing people and jobs, welcome new residents because they buy homes and shop at local markets. But there are also tensions that accompany demographic change.

Positive impacts on communities from an influx of immigrant workers include:

- most workers are married,
- a higher proportion of Hispanic or Asian men work than from other population groups,
- workers do unwanted jobs that are necessary in today's society,
- repopulation of rural areas,
- a younger work force, and
- a replacement for aging baby boomers.

Potential negative issues with the changing labor force include:

- increased demand for social services in the community,
- more students with limited English proficiency,
- greater demand for health care at local clinics and emergency rooms,
- increased poverty among unauthorized migrants,
- lack of health insurance placing a strain on limited health resources in rural areas,
- a higher prevalence of infectious disease, diabetes and maternal health issues, and
- low propensity to continue education.

Many meatpackers recognize that they are hiring workers with few English language skills and little formal schooling. Some companies partner with local community colleges and high schools to offer workers classes in English, finance and other life skills. For example, one packer has an education assistance plan that reimburses 75 percent of the cost of tuition, books and fees (up to $3,500 a year) for coursework toward a degree that helps to meet the company's business needs (AP Newswire, 2005). In Nebraska, a packer built a two-classroom school near its plant in 2002 so workers could attend high school classes before and after work shifts. The local school district provided a teacher and a teacher's aide.

Many communities welcome the diversity and economic development new immigrant workers can contribute. The community of Marshalltown, Iowa, (population 29,000), has established a sister-city relationship with Villachuato, Mexico, (population 15,000). Half of the 1,900 employees at a meat-processing plant in Marshalltown plant are from Villachuato.

Proper immigration and worker documentation are challenges for all in agriculture who employ immigrant migrant workers. Influxes of immigrant or migrant workers can bring negative reactions. In January 2000, two organizations advocating less immigration, Population-Environment Balance and the Federation for American Immigration Reform, ran advertisements asserting that "quality of life is but a memory" in Storm Lake, Iowa, (population 8,800), where immigrants were recruited to work in pork-processing plants. Local residents disagreed, saying they preferred diversity to depopulation. Storm Lake's school enrollment rose 17 percent in the 1990s, while 70 percent of Iowa's schools were losing students (*Rural Migration News*, April 2001). Storm Lake's two meat-processing plants employed almost 2,000 workers in the mid-1990s, attracting Asian refugees and Mexican migrants. Many schoolchildren do not speak English, prompting increased spending for English as a Second Language (ESL) programs and bilingual teachers. Meatpackers noted that their payroll supports the local economy and schools might close if the meat-processing plants closed.

Impacts on Mexico

Immigration to the United States and Canada also creates challenges for Mexico. Salaries of U.S. jobs are and are expected to continue to be at a level above those of Mexican jobs. Mexico is balancing public policies that provide the type of mobility and opportunities that its migrating population desire. However, public policies that make the migration process easier must also benefit those who decide to stay; such policies should also be compatible with the requirements and necessities of the country where the migrants chose to reside.

The remittances sent to Mexico from Mexicans residing in the United States represent a large source of income for the families that receive them. According to some estimates, these remittances reduce the number of people in poverty by 1 percent to 2 percent annually, approximately 1 million people. These remittances have become very critical, averaging as much 44 percent of regional income in some locales.

An aspect that should not be overlooked is the migration of those possessing substantial human capital. The population of those with 12 years of school or more and under the age of 30 years equaled 46 percent of the migratory sector in the period 2000 to 2004, compared with 26 percent in the period 1990 to 1994. This trend represents a loss of important Mexican human capital. The challenge is to provide the same possibilities of social and economic movement in Mexico that can compete with those offered elsewhere in North America.

As a result of the higher levels of mortality, fertility and migration, the age structure of small communities consists of more individuals in the age groups younger than 15 years old and the elderly than in urban areas. This places more stress on those of the diminished working-age level. These small communities average 83 dependents per 100 working-aged individuals, while urban areas of more than 15,000 people average 56 dependents per 100 working-aged individuals. Unless local opportunities for employment are created, workers may continue to migrate to higher paying jobs to support families.

A recent study demonstrated the importance of raising agricultural productivity to reduce rural emigration (Goldsmith et al., 2004). Like the case of Mexico, relatively low agricultural productivity lowers the opportunity costs for young people to leave. Urban areas, or in the case of Mexico the United States, are easily attractive because rural wages are low. One example of a Mexican policy designed to increase agricultural productivity is *Programa de Certificación de Derechos Ejidales y Titulación de Solares* (PROCEDE or the Cooperative Rights Certification Program and Qualification of Land), which enlarges farmers' legal security and access to finance sources. Land owned by agricultural cooperatives can now be used as collateral for financial services such as credit, insurance or capital. The government has also established the *Fondo de Tierras* (Fund of Lands) and *Joven Emprendedor Rural* (Rural Enterprising Youth) to help support rural land-based businesses.

Safety Impacts

A number of health issues are associated with individuals who work in animal production and processing in the United States. Unfortunately, comprehensive nationally medical surveillance for agriculturally related injuries and illnesses does not exist (Kirkhorn and Schenker, 2002). But individual studies have identified a number of health issues.

1. *Injuries:* Injuries from animals, tractors, falls and machinery are major causes of non-fatal injuries (McCurdy and Carroll, 2000). Animals account for 20 percent of hospitalized injuries in Iowa (Rautiainen et al., 2002). Stock farm and feed yard workers had the highest rate of injuries in California workers' compensation data (Villarejo, 1998, in Rautiainen and Reynolds, 2002). Likewise, slaughtering operations have higher levels of injury than many manufacturing plants.

2. *Respiratory illnesses:* Livestock farmers, particularly swine producers, are considered to have high rates of lung disease resulting from exposure to organic dusts and manure generated gases (Rautiainen and Reynolds, 2002). Organic dust—which contains inflammatory endotoxins from bacteria, molds, animal dander, antibiotic residue, grain dust and feces—causes lung inflammation and is associated with chronic respiratory disease. Researchers have called for the establishment of threshold limit values (TLV) for dusts and endotoxins, and lowering the TLV for ammonia (Donham, 1995; Donham et al., 2000; Kirkhorn and Schenker, 2002).

Mechanisms to decrease dust levels, such as sprinkling canola oil in swine rooms, can result in decreased respiratory problems (Senthilselvan et al., 1997; Zhang, 1997). Other mechanisms include adequate ventilation, using wet methods to clean facilities, automated feeding, and wearing adequate personal respiratory protection during high dust-producing activities (Kirkhorn and Schenker, 2002).

3. *Hearing loss:* This is an occupational risk in farming. Noise levels above the U.S. Occupational Safety and Health Administration (OSHA) permissible exposure level have been measured in swine confinement buildings (Humann et al., 2005).

4. *Ergonomic issues:* Concerns include musculoskeletal disorders, especially chronic back pain and arthritis (Von Essen and McCurdy, 1998). The earliest mandatory ergonomic interventions occurred in animal slaughter houses, which have long been associated with such musculoskeletal disorders as carpal tunnel syndrome and tendonitis.

Livestock production and meat processing are dangerous occupations, yet government regulations, industry standards and insurance industry oversight may make these jobs less threatening. One factor encouraging people to look for employment in the U.S. agricultural sector rather than stay in Mexico is the differences in the regulatory guidelines of the two countries. For example, in the United States, OSHA establishes the requirements and rights of employees and employers, as well as health and safety conditions that should exist in the workplace. The U.S. Department of Labor establishes rules for contracting and firing a person. In the United States, these legal guidelines give certain guarantees to the employees, guarantees that may make U.S. employment more attractive than Mexican employment. However, wage differentials are probably the dominant factor influencing migration decisions.

Stakeholder and Policy Responses

Economic Development Policies and Zoning

An agricultural production/enterprise area is a zoning tool for regulatory/nuisance relief, or economic development. Security of investment in intensive animal operations can be enhanced by zoning only if those operations are already in regulatory compliance, are well-designed and are well-managed. Security of investment has not been uniformly realized with voluntary self-assessments or right-to-farm statutes, which have been voided by some courts.

Establishing comprehensive zoning—covering economic activities in all sectors, not just agriculture—prepares communities to address many types of economic development issues. When included in comprehensive zoning, animal agriculture is not considered a special case, reducing potential for court challenges.

There are a range of approaches to regulating livestock production sites. On one extreme, the Iowa legislature does not allow local governments to use zoning or public health ordinances to prevent the siting of Confined Animal Feeding Operations (CAFOs). The state of South Dakota has a statute that allows comprehensive county zoning, including agriculture. Brookings County, South Dakota, has a comprehensive zoning ordinance with five types of zones—agriculture, industrial, lakes/parks, natural resources and flood damage protection, plus an aquifer protection overlay. This ordinance and its process of public hearings are incentives for early discussions among community residents when new economic development is proposed.

Under debate in the United States is whether comprehensive zoning should be a state or county function. Critics of county authority for comprehensive zoning cite instances where county commissioners, under pressure from anti-livestock groups, have imposed moratoriums on animal facility construction or expansion. These boards are often small (three to seven members) and the majority vote on animal agriculture can change with each election cycle, increasing the regulatory uncertainty in a county. Livestock and poultry interests prefer dealing with state legislatures, where the numbers of legislators and the statewide strength of livestock and poultry organizations may lessen the potential for what they consider to be arbitrary action. Producers operating in more than one county prefer uniform regulations. One option is for state legislatures to grant comprehensive zoning authority to counties, but with statewide criteria for the zones. County zoning boards could designate geographic areas to zone, but the criteria for those zones would be set at the state level. One national consideration is that burdensome regulatory processes may contribute to agribusiness decisions to locate production and processing facilities in other countries (see Environmental Chapter for more discussion on siting regulations).

Communication is a crucial factor. In 1996, the Cass County (Iowa) Rural Development Action Committee designed a "Quality of Life/Economic Self Assessment" for animal production systems. It urged producers seeking to build or expand their operations to voluntarily ask, answer and share with community neighbors information ranging from expected odor emissions to truck traffic, numbers of jobs and real estate taxes to be paid. The program has been successful, and at least two other Iowa counties now have similar good-neighbor policies.

Communities attract businesses by streamlining the regulatory, permitting, building codes and licensing processes. In exchange, firms must abide by specified best management practices (BMPs). Many times this involves coordinating the work of state agencies to improve the regulatory experience and designate BMPs or performance requirements for the firms. Agricultural streamlining may involve making the process of starting or expanding an operation specific, transparent and speedy. Illinois LMFA, discussed earlier, is such a program.

Regional tax authorities might reduce property taxes in specific areas to spur economic development, offset changes in land use or provide compensation to homeowners for reductions in property values that might occur. A variety of tax-relief options are also used as incentives for economic development.

Guest Workers and Immigrants

Mexico and the United States are examining options to improve the legal movement of workers between the two countries. In February 2001, U.S. President George W. Bush and Mexican President Vicente Fox established a bi-national migration working group to create "an orderly framework for migration that ensures humane treatment [and] legal security, and dignifies labor conditions." Topics for the working group included legalization, a guest-worker program, ending border violence and exempting Mexico from visa quotas.

At the same time, Mexican and U.S. officials have also discussed improving conditions for unauthorized Mexicans in the United States. Several proposals to legalize these workers have been introduced in the U.S. Congress, but debate stopped after the September 11, 2001, terrorist attacks. In January 2004, President Bush proposed Fair and Secure Immigration Reform (FSIR), which would permit unauthorized foreigners in the United States with jobs—estimated at 8 million of the 11 million unauthorized foreigners in the United States—to become temporary legal residents. They would be free to travel in and out of the United States, to get Social Security numbers, to obtain a driver's license, and to apply for immigrant visas.

FSIR would match willing foreign workers with willing employers when U.S. workers could not be found for jobs. For unauthorized migrants already employed illegally in the United

States, FSIR would consider the no-available-U.S.-worker requirement fulfilled. FSIR offers no clear path from guest worker to immigrant. Surveys show that many unauthorized Mexican workers would sign up for six-year visas allowing them to enter and leave the United States legally, but there is considerable doubt about how many would leave at the end of six years.

Proposed by the Democrats, the Safe, Orderly, Legal Visas and Enforcement Act (SOLVE) is similar to 1987-88 legalization allowing unauthorized foreigners to become legal immigrants if they have been in the United States at least five years, worked at least two years, and can pass English, security and medical checks. Unauthorized foreigners in the United States for less than five years could apply for five-year transitional status, allowing them to work, eventually apply for regular immigrant status or leave. The Secure America and Orderly Immigration Act, introduced in May 2005 by Sen. John McCain (R-Ariz.) and Sen. Edward Kennedy (D-Mass.), combines elements of the FSIR and SOLVE proposals.

The three proposals would apply to workers in all sectors of the economy. By contrast, the Agricultural Job Opportunity, Benefits and Security Act (AgJOBS) would apply only to agriculture, ensuring that farm workers were legally authorized to work in the United States. AgJOBS is supported by worker advocates, who hope legal status will encourage farm workers to join unions and press for wage increases. Farm employers anticipate easier access to legal foreign workers under provisions of the act.

As of January 2005, there is no consistent U.S. workers' compensation program for agricultural workers. This places a burden on local communities if animal agricultural workers are injured or are ill. Workers' compensation varies from providing the same coverage that applies to other industries (14 states/jurisdictions), establishing limitations not applicable to covered employees (28 states/jurisdictions), and, in 11 other states/jurisdictions, permitting agricultural employers to offer voluntary coverage (USDA, 2005). Lack of a sufficient workers' compensation program in agriculture makes it difficult to assess the impact of injuries on the agricultural work force or develop measures to prevent injuries and illnesses.

Canadian employers hiring temporary seasonal workers under SAWP must meet a list of criteria including: demonstrate efforts made to hire Canadian agricultural workers and unemployed Canadians; offer foreign workers the same wages paid to Canadian agricultural workers doing the same work; pay airfare to and from Canada and immigration visa cost recovery fee (a portion of these costs can be recovered through payroll deductions); provide free, seasonal housing to approved foreign workers; ensure that the worker is covered by workers' compensation and has private or provincial health insurance during his/her stay in Canada; and sign an employer-employee contract outlining wages, duties and conditions. The Canadian employer may also be required to pay a non-recoverable fee to two nonprofit corporations that assist with the processing of foreign workers in Ontario, Quebec, Nova Scotia, Prince Edward Island and New Brunswick.

Health Insurance

Rural health care facilities and organizations are being strained by the inability of employers to offer health insurance, employees' lack of access to state programs, or employees' refusal to purchase available insurance. Many migrant and immigrant workers send money back to their families rather than buying health insurance, even if it is offered by employers. According to the human resources director at a meat processor in Wisconsin, 80 percent of their employees are Hispanic, and only 20 percent purchase the health insurance provided by the employer.

Obtaining health insurance to cover immigrant agricultural employees, particularly undocumented workers, is problematic even for motivated employers. A large dairy farm in Wisconsin with a stable Hispanic work force has been unable to find health insurance for these employees. The employer has been told the employees do not qualify for the state health insurance product or private health insurance, as they cannot provide a valid driver's license or a valid visa. Allowing agricultural employees access to valid means of identification would increase access to health insurance coverage.

In the United States, comprehensive enforcement of immigration laws and a strict no-guest worker policy would likely drive up wages in meat processing, spur automation and perhaps encourage the shift of some facilities to Mexico or other locales in Latin America. Some rural communities could see plants close, contributing to declining asset values, a loss of jobs and high costs for farmers to transport livestock to processors. The other extreme would be to acknowledge that meat processors have become dependent on out-of-area workers and institute policies that provide workers in a manner that minimizes community integration costs.

Summary

Livestock and poultry production and processing industries are important employers for many rural areas in North America. These industries have undergone an economic restructuring to fewer and large firms that are more geographically concentrated (see Economics and Environmental Chapters). The restructuring has created more jobs and economic activity in communities where the firms expand, but less in communities with declining animal inventories or that have had plants close.

At the same time, industry growth has created challenges for some communities that are seeing more livestock facilities built,

often with heated debate regarding site selection and neighbor issues. In the United States, states differ on how best to regulate livestock facilities, including how much authority resides with the county. Many processing plant communities have grown rapidly as plants expanded or added a second shift. Immigrants make up a disproportionately higher share of employees in cattle-, hog- and poultry-processing plants. While immigrants come from Africa, Asia and Eastern Europe, most in North America come from Mexico and other Latin American countries.

Meatpacking and meat processing are more dangerous and lower paying than other manufacturing jobs. In the United States, many of the workers are undocumented immigrant workers and may not have health insurance. A large number of immigrant workers in a community often stretches thin such local resources as health care and schools' English as a Second Language programs. Mexican workers send a significant amount of money back to their families in Mexico. In 2000, the average income for rural Mexican households receiving remittances from family members working in the United States was $3,250 pesos per month, compared with $1,662 pesos/month for those not receiving money from the United States. Some estimate that remittances reduce the number of people in poverty in Mexico by 1 percent to 2 percent annually. This cash flow from North to South provides income in rural areas. These small rural communities average 83 dependents per 100 working-aged individuals.

Future Options and Implications

Economic Development

Rural communities in North America compete in a global environment. Provinces, states, regions and communities seeking investment need to assess how their location will potentially make animal agriculture operations globally competitive. This is challenging in a world of varied wage and regulatory conditions.

Industry has a responsibility to the community in which it does business. Industry needs to be proactive and a responsible citizen, providing leadership in creating positive experiences for communities. If they are unable to create these positive community experiences, there will be an increasing inability to site or expand.

This phenomenon, whereby communities oppose the siting or expansion of livestock and meat facilities, is no longer unique to the United States. The opposition is structural and can be found in many communities around the globe. It reflects larger concerns about globalization, new technologies, large farms and multinational food companies. At its heart, communities are seeing a loss of local control and rapid change. In response, they seek a reactionary course of action that preserves traditional norms and institutions.

The implication for the industry is that it needs to enhance the numerous economic benefits it brings with a set of positive social impacts as well. Some communities will always oppose the industry, but many would welcome a partner to help them socially and economically develop.

Potential strategies are:

- Government bodies should consider comprehensive industrial policies, so animal agriculture is not singled out. Effective development and community impact policies are needed.
- Streamline regulatory processes.
- Develop industry strategies to create positive community impacts.
- Focus on rural economic development, not just animal agriculture development.
- Make use of provincial, state or regional economic development resources.

Zoning ordinances and the processes they prescribe are one tool to enhance open communication between stakeholders in the animal agriculture industry. City zoning provides legal and procedural precedent for well-designed and managed comprehensive rural zoning. Statewide uniformity in regulations is another consideration. A variation of that is to have criteria for zones set at the state level, and the geographic designation of the zones set at the county level. A multi-county board to establish uniform zone criteria for a region is another option. Consistency of zoning rules within a state could increase certainty and reduce risk for producers, processors and citizens.

Another community issue is competing demands on water resources. Use of fiduciary bonds is one option when uncertainty exists about how high-demand usage will affect water availability and quality (Goldsmith et al., 2003). Fiduciary bonds are used when there is uncertainty about the nature of a public risk posed by a private firm, i.e., the impact of a livestock farm on a community's water supply. An independent body sets the bonding level, a sum of money that would be needed to rectify any future problems if they should arise. The private firm normally sets aside only a small portion of the amount, with the rest, if needed, managed through insurance markets. The bonding level can change over time as the level of uncertainty and risk changes.

There is potential for animal agriculture to use many of the tools used in industrial sector economic development:

- property tax reductions for neighbors;
- service and infrastructure improvements for the community;
- fiduciary bonds to dissipate risk borne by communities, such as demand on water resources;
- appropriately scaled infrastructure;
- enhance water supply, road and bridge load rates, traffic flow, highway access; or

- compensate parties harmed by animal agriculture operations, as is done with other industries.

Small or mid-size operations may use some form of network to provide services and enhance profit potential. Focusing on specialized or niche markets may enhance profitability for some small operators. Off-farm employment—in agriculture or non-agricultural enterprises—will continue to be crucial for many small and mid-size operations. Business tools that might increase economic development include:

- A community facilitator can help coordinate among producers. Example: *Initiative for the Development of Entrepreneurs in Agriculture*, *http://web.extension.uiuc.edu/iidea*.
- MarketMaker™ is a Web-based tool for rural suppliers and entrepreneurs to interact with firms in other locales, *http://www.marketmaker.uiuc.edu*.
- Direct state intervention in a niche market ventures could combine alternative business strategies with public policies. For example, South Dakota and Iowa are developing branded beef products that target consumer demand for information on how animals are raised, treatment of animals and traceability of products.

Labor

Reducing labor turnover has benefits for employers, as well as the communities in which they operate. Options for strengthening human capital include using the workplace as a location for classes to strengthen English language, finance and banking skills, or to provide health services. Partnerships with local high schools or community colleges are one alternative for implementation.

The United States might consider a program similar to Canada's SAWP to address seasonal worker shortages, though seasonality of work is not as common in the livestock sector.

Governments need to consider maintaining immigrant worker programs that ensure an adequate labor supply to the animal agriculture industry. Helping immigrant workers adjust to a new location and culture and helping communities adjust to new immigrant populations can be advantageous to employers. Fostering integration may help immigrants be more productive workers, help immigrants advance in their workplace, help workers' families and reduce opposition to newcomers. These actions can provide a more stable work force and community.

Animal agriculture often is perceived to offer jobs rather than careers, prompting suggestions that foreigners should be brought to the United States as guest workers rather than legal and illegal immigrants. Guest worker programs can admit temporary workers for temporary jobs, as do the U.S. H-2A and H-2B programs or Canada's SAWP. U.S. legislative proposals have not advanced, and enactment of a guest worker program may not occur in 2006.

There are increasing needs for the animal agriculture industry to engage in private and public-private partnership programs to enhance labor and community relationships. Potential benefits include enhancing human capital, improving the well-being of employees, reducing turnover and fostering good relations with the community at large, which has become a strategic stakeholder. As the firm grows, it places demands on the community. Proactive labor policies can be an important signal of a firm's commitment to its community.

Agriculture can pose threats to worker health and safety. Government agencies are challenged by the dimensions of regulation enforcement regarding worker safety and immigration. Areas for potential improvement include engineering, training and education, health service, surveillance, and safety, and understanding culture differences. Particularly in animal production facilities, improvements can be made in the surveillance of non-fatal injuries and illnesses, controls to decrease organic dusts and manure-generated gases, improvements in the functionality and comfort of personal respiratory protective devices, and strategies to provide affordable workers' compensation programs for agricultural employers. Further research in these areas is needed (Kirkhorn and Schenker, 2002; Rautiainen and Reynolds, 2002). This could result in reduced worker injuries and diseases, lowering industry and government health care costs.

Knowledge Gaps and Research Needs

Historically, government has been involved in economic development and regional planning in urban areas. What do these programs and policies look like when applied to rural communities and animal agriculture? What are the economic development, infrastructure and government service needs of today's less agrarian and more industrial rural economies?

Animal production and processing create employment and economic activity in rural communities. How does the structure of the industry impact employment and the multiplier effect? More specifically, what are the economic activities associated with animal production and processing for comparable supply chains, and what are the wealth distribution effects? The results of such a study might be development of a tactical road map for communities to partner with industry to achieve mutually beneficial outcomes. More research is needed to document how the quality of rural civic life has changed in communities where modern livestock businesses operate. What are the experiences with various models for community conflict resolution initiatives?

A continuing debate is whether federal, state or local governments can best regulate livestock and poultry operations. What are the consequences of alternative regulatory structures or zoning models for rural communities? What is the cost to the industry and county or district that imposes and enforces the policy? What policy tools and regulations can be used to improve the competitiveness of the business environment for animal agriculture?

Finally, immigration goals and policy are important to all three North American countries. Currently, the U.S. and Canadian packing industries rely on immigrant labor for a significant share of the work force. Mexican individuals and communities benefit from the remittances flowing from the United States to Mexico. But there is concern about the continued migration of workers, particularly better educated ones, to the United States. Is a NAFTA labor-migration summit needed to examine potential new policy tools? What is the impact of emigration and associated remittances on Mexico? What are the specific needs of the migrant work force in terms of better understanding their behaviors and investment in the community? What are the labor market needs for animal agriculture, and how will specific immigration reform legislation impact the industry?

References

AAFC. (1988-1996). “Profile of the Canadian Dairy Processing Industry.” SIC, 1041(49).

Agriculture and Agri-Food Canada. (2004, May). “Overview of the Canadian Agriculture and Agri-Food System.” Strategic Research, Policy and Planning Team.

AP Newswire. (2005, June 10). “Meatpacking industry providing education to workers.”

Banker, D.E. and J.M. MacDonald. (2005, March). “Structural and Financial Characteristics of U.S. Farms: 2004 Family Farm Report.” Agriculture Information Bulletin No. AIB797.

Bureau of Labor Statistics – U.S. Department of Labor. (2005, March). *Survey of Occupational Injuries and Illnesses*, 2003. Available at *http://www.bls.gov/iif/oshwc/osh/os/ossm0014.pdf*.

Craypo, C. (1994). Meatpacking: Industry Restructuring and Union Decline. In P. Voos (Ed.), *Contemporary Collection Bargaining in the Private Sector* (pp. 63-96). Industrial Relation Research Association.

DeLind, L. (1995). “The state, hog hotels, and the ‘right to farm’: A curious relationship.” *Agriculture and Human Values* 12, 34-44.

DeLind, L. (1998). Parma, a story of hog hotels and local resistance. In K. Thu & E.P. Durrenberger (Eds.), *Pigs, profits, and rural communities* (pp. 23-38). New York: State University of New York Press.

Donham, K.J. (1995). “Health hazards of pork producers in livestock confinement buildings.” In McDuffie, H.H., J.A. Dosman, K.M. Semchuk, S.A. Olenchock, and A. Senthilselvan, eds. *Agricultural Health and Safety: Workplace, Environments, Sustainability*. Boca Raton, FL:CRC Lewis.

Donham, K.J., D. Cumro, S.J. Reynolds, and J.A. Merchant. (2000). “Dose-response relationships between occupational aerosol exposures and cross-shift declines of lung function in poultry workers.” *Journal Occupational and Environmental Medicine*. 42(3):260-69.

Flora, C.B. and J.L. Flora. (1987, Winter/Spring). “Agricultural Technologies, Farm Structure, and Rural Communities: Livestock Counties in the Great Plains.” *High Plains Anthropologist*, 7, 6-11.

Flora, C.B. and J.L. Flora. (1988). Public Policy, Farm Size, and Community Well-Being in Farming Dependent Counties of the Plains. In L.E. Swanson (Ed.), *Agricultural and Community Change in the U.S.: The Congressional Research Reports* (pp. 76-129). Boulder: Westview Press.

Flora, C.B., C. Mayda, J. Hernandez, and M. Lawrence. (1999). Bringing Home the Bacon. A Report to the Kerr Center, North Central Regional Center for Rural Development. Available at *http://www.kerrcenter.com/publications/hog_report1.pdf*.

Flora, C.B., S. Carpenter, C. Hinrichs, M. Kroma, M. Lawrence, and K. Pigg. (1999, September). "Generic Environmental Impact Statement on Animal Agriculture: A Summary of the Literature Related to Social/Community (A)." Prepared for the Minnesota Environmental Quality Board. Available at *http://www.eqb.state.mn.us/geis/LS_Social_Summary.pdf*.

Flora, J.L., J. Sharp, C. Flora, and B. Newlon. (1997, Fall). "Entrepreneurial Social Infrastructure and Locally-Initiated Economic Development." *Sociological Quarterly*, 38(4), 623-645.

Flora, J.L. (1998, December). "Social Capital and Communities of Place." Rural Sociology, 63(4), 481-506.

Flora, J.L., C.J. Hodne, W. Goudy, D. Osterberg, J. Kliebenstein, K.M. Thu, and S.P. Márquez. (2002, February). Social and Community Impacts. In Iowa State University and the University of Iowa Study Group, *Iowa Concentrated Animal Feeding Operations Air Quality Study: Final Report* (pp. 147-163). Presented to the Iowa Department of Natural Resources. Available at *http://www.public-health.uiowa.edu/ehsrc/CAFOstudy.htm*.

Flora, J.L., Q. (Lily) Chen, S. Bastian, and R. Hartmann. (2005, October). "CAFOs, Feedlots, and Packing Plants: Measuring Their Impact on Four Types of Capital in Iowa's Counties." Draft prepared for Iowa Policy Project, Iowa State University Sociology Department.

GAO. 1998. Community Development: Changes in Nebraska's and Iowa's Counties With Large Meatpacking Work Forces GAO/RCED-98-62, February 27. Available at *http://www.gao.gov/new.items/rc98062.pdf.*

Goldschmidt, W. (1978). "Agribusiness and the Rural Community." In W. Goldschmidt, *As you Sow: Three Studies in the Social Consequences of Agribusiness* (pp. 279-451). Montclair, NJ: Allenheld, Osmun and Co.

Goldsmith, P.D., and H. Idris. (2001, November). "The Economic Impact of Illinois' Livestock Industry." Special Report # 94, College of Agricultural, Consumer, and Environmental Sciences, University of Illinois at Urbana-Champaign.

Goldsmith, P.D., A. Salvador, D. Knipe, and E. Kendall. (2002). "Structural Change or Logical Incrementalism? Turbulence in the Global Meat System." *Journal of Chain and Network Science*, 2(2), 101-115.

Goldsmith, P.D. and J. Kim. (2002, July). "The Economic Impact of Illinois' Livestock Industry: Supply Chain Linkages." Special Report # 95, College of Agricultural, Consumer, and Environmental Sciences, University of Illinois at Urbana-Champaign.

Goldsmith, P.D., C. Pomar, Z. Tao, and J. Rivest. (2003). "Social Welfare and the Selection of the Optimum Hog Slaughter Weight." *The Canadian Journal of Agricultural Economics*, 51, 259-279.

Goldsmith, P. D., K. Gunjal, and B. Ndarishikanye. (2004). "Rural-Urban Migration and Agricultural Productivity: The Case of Senegal." *Agricultural Economics*, 31, 33-45.

Griffith, D. (1988). "The Impact of the 1986 IRCA on the U.S. Poultry Industry. A Comparative Analysis." Mimeo. September.

Hassan, Z., D. Herath, and M. Trant. (2004). "Statistics Canada, Industry profile (Canada's food processing industry)." Statistics Canada, Catalogue No.: 15-515-XWE.

Heffernan, W., M. Hendrickson, and R. Gronski. (1999, February). "Consolidation in the Food and Agriculture System." Report to the National Farmers Union. Available at *http://www.foodcircles.missouri.edu/whstudy.pdf*.

Hendrickson, M., W.D. Heffernan, P.H. Howard, and J.B. Heffernan. (2001, January). "Consolidation in Food Retailing and Dairy: Implications for Farmers and Consumers in a Global Food System." Report to the National Farmers Union. Available at *http://www.foodcircles.missouri.edu/whstudy2.pdf*.

Hendrickson, M. and W.D. Heffernan. (2005, January). "Concentration of Agricultural Markets." Department of Rural Sociology, University of Missouri-Columbia. Available at *http://www.foodcircles.missouri.edu/CRJanuary05.pdf*.

Human Resources and Skills Development Canada Web site. *http://www.hrsdc.gc.ca/en/epb/lmd/fw/seasagri.shtml*.

Humann M.J., K.J. Donham, M.L. Jones, C. Achutan, and B.J. Smith. (2005) Occupational noise exposure assessment in intensive swine farrowing systems: dosimetry, octave band, and specific task analysis." *J Agromedicinee* 10(1):23-37.

Illinois Livestock Management Facilities Act (LMFA). (n.d.). Retrieved 2005 from *www.agr.state.il.us/Environment/LMFA/*.

Industry Canada. Available at *http://strategis.ic.gc.ca/canadian_industry_statistics/cis.nsf/IDE/cis3116wage.html*.

Keith, B. (2003). "More than just farming: employment in agriculture and agri-food in rural and urban Canada." *Rural and Small Town Canada Analysis Bulletin* 4(8). Available at *http://www.statcan.ca/english/freepub/21-006-XIE/free.htm*.

Keystone Conference on Agricultural Health and Safety. (2004). Personal communication, Keystone, CO.

Kirkhorn, S.R., and M.B. Schenker. Current health effects of agricultural work: respiratory disease, cancer, reproductive effects, musculoskeletal injuries, and pesticide-related illnesses. 2002. Journal Agricultural Safety and Health. 8(2):199-214.

Kleiner A.M., J.S. Rikoon, and M. Seipel. (2000). "Pigs, participation, and the democratic process: The impacts of proximity to large-scale swine operations on elements of social capital in Northern Missouri communities." Paper presented at the Annual Meeting of the Rural Sociological Society, Washington, DC.

Lobao, L.M. (1990). *Locality and Inequality: Farm and Industry Structure and Socioeconomic Conditions*. Albany, NY: State University of New York Press.

Lohr, L. (n.d.). "Perceptions of Rural Air Quality: What Will the Neighbors Think?" *Journal of Agribusiness* 14(1), 109-128.

MacCannell, D. (1998). "Industrial Agriculture and Rural Community Degradation." In Louis E. Swanson (Ed.), *Agricultural and Community Change in the U.S.: The Congressional Research Reports*. Boulder, CO: Westview Press.

McCurdy, S.A. and D.J. Carroll. (2000). "Agricultural injury." *American Journal of Industrial Medicine*. 38(4):463-80.

McMillan, M. and M.D. Schulman. (2001). Hogs and citizens: A report from the North Carolina front. In W. Falk, M.D. Schulman, A. Tickamyer (Eds.), *Communities of Work Athens*. OH: University Press.

Monchuk, D. C., J. A. Miranowski, D. J. Hayes, and B. A. Babcock. (2005, April). "An Analysis of Regional Economic Growth in the U.S. Midwest," Working Paper 05-WP 392, Center for Agricultural and Rural Development, Iowa State University, Ames, IA. Retrieved October 2, 2005, from *http://www.econ.iastate.edu/research/webpapers/paper_12294.pdf*.

Passel, Jeffrey S. (2005). Estimates of the Size and Characteristics of the Undocumented Population. *http://pewhispanic.org/files/reports/44.pdf*.

Passel, Jeffrey S. 2006. Size and Characteristics of the Unauthorized Migrant Population in the U.S.: p. 12. *http://pewhispanic.org/reports/report.php?ReportID=61*.

Pereira, F. and P.D. Goldsmith. (2005, May). "From Negative Externalities to Industrial Illegitimacy, an Empirical Analysis of the Illinois Livestock Industry." Presented at the annual meeting of the Eastern Academy of Management Association, Springfield, MA.

Pew Hispanic Center. "Unauthorized migrants: numbers and characteristics." Retrieved June 14, 2005 at *http://pewhispanic.org/files/reports/46.pdf*.

Rautiainen, R.H. and S.J. Reynolds (2002). "Agricultural Safety and Health Conference: Using past and present to map future actions."

Reynolds S.J., K.J. Donham, P. Whitten, J.A. Merchant, L.F. Burmeister, and W.J. Popendorf. (1996). "Longitudinal evaluation of dose-response relationships for environmental exposures and pulmonary function in swine production workers." *Am J Ind Med, 29, 33-40*.

Rural Migration News. April 2001. Vol 7. No 2. Poultry, Meatpacking Labor. Available at *http://migration.ucdavis.edu/rmn/more.php?id=498_0_2_0*.

Senthilselvan A., Y. Zhang, J.A. Dosman, E.M. Barber, L.E. Holfedl, S.P. Kirychuk, Y. Cormier, T.S. Hurst, and C.S. Rhode. (1997). "Positive human health effects of dust suppression with canola oil in swine barns." *American Journal of Respiratory Critical Care Medicine*, 156, 410-417.

State of South Dakota. (n.d.). Available at *http://www.state.sd.us*.

Statistics Canada. (2004, June). "Immigrants in Rural Canada: an update." *The Daily*.

Stull, D.D., M.J. Broadway, and D. Griffith. (1995). *Any Way You Cut It: Meat Processing and Small-Town America*. Lawrence: University Press of Kansas.

Thu, K.M. and E.P. Durrenberger. (1994). "Industrial agricultural development: an anthropological review of Iowa's swine industry." Twentieth Annual National Association of Rural Mental Health Conference.

Tyrchniewicz, E. and H. Gregory. (2003, June). "Manitoba's Pork Value Chain." Agriculture and Agri-Food Canada.

U.S. Department of Agriculture - Economic Research Service (USDA-ERS). (accessed 2005, August)."Coverage of Agricultural Workers." USDA-ERS. Retrieved at *http://www.dol.gov/esa/regs/statutes/owcp/stwclaw/tables-pdf/table3.pdf*.

U.S. Statistical Abstract. (2004-05). Table 982. *http://www.census.gov/prod/2004pubs/04statab/domtrade.pdf*.

Van Kleek, R.J. and N.R. Bulley. (1985). "An assessment of separation distance as a tool for reducing farmer/neighbor conflict." Proceedings of the Fifth International Symposium on Agricultural Wastes. American Society of Agricultural Engineers, St. Joseph, MI.

Vogelzang, P.F.J., J.W.J. van der Gulden, H. Folgering, J.J. Kolb, D. Heederik, M.J.M. Tielen, and C.P. van Schayck. (1998). "Endotoxin exposure as a major determinant of lung function decline in pig farmers." *American Journal of Respiratory Critical Care Medicine* 157,15-18.

Von Essen, S.G. and S.A. McCurdy. (1998). "Health and safety risks in production agriculture." *Western Journal Medicine*. 169(4):214-20.

Wing S. and S. Wolf. (2000). "Intensive livestock operations, health, and quality of life among eastern North Carolina residents." *Environmental Health Perspectives*, 108, 233-238.

Zhang, Y. (1997). "Sprinkling oil to reduce dust, gases, and odor in swine barns." *Agricultural Engineering Digest*. 42:1-8.

Zjeda J.E. and T.S. Hurst. (1994). "Respiratory health status in swine producers relates to endotoxin exposure in the presence of low dust levels." *Journal Occupational Medicine*. 36(91):49-56.

Table 1. **U.S. Food Manufacturing Employment (2002-2012)**

U.S. Food Manufacturing Employment, 2002

	Employment	Percent Change
	(1000's)	2002-2012(%)
Total	1,525	5
Animal slaughtering and processing	520	15
Bakeries and tortilla manufacturing	295	3
Fruit and vegetable preserving and specialty food manufacturing	182	-1
Other food manufacturing	152	2
Dairy product manufacturing	137	-9
Sugar and confectionery product manufacturing	83	-3
Grain and oilseed milling	62	-1
Animal food manufacturing	52	1
Seafood product preparation and packaging	44	-8

Source: U.S. DOL, *www.bls.gov/oco/cg/print/cgs011.htm*

Table 2. **Average Earnings($), Production Workers, Food Manufacturing (2002)**

Average Earnings($), Production Workers, Food Manufacturing, 2002

	Weekly	Hourly
U.S. private industry	506	14.95
Food manufacturing	497	12.54
Grain and oilseed milling	802	18.14
Beverages	684	17.38
Dairy products	639	15.83
Sugar and confectionery products	597	15.08
Fruit and vegetable preserving and specialty	514	12.83
Other food products	503	12.77
Bakeries and tortilla manufacturing	453	12.30
Animal slaughtering and processing	442	10.91
Seafood product preparation and packaging	334	9.70

Source: U.S. DOL, *www.bls.gov/oco/cg/print/cgs011.htm*

Table 3. **Unauthorized Workers in Agriculture/Animal Production (1,000s)**

Occupation	Total Numbers	Unauthorized	Unauthorized Migrant Workers (%)
All Workers	148,615	7,255	4.9%
Ag Workers	839	247	29.4%
Butchers	322	87	27.0%
Food Preparation	758	128	16.9%
Cooks	2,218	436	19.7%

Source: Passel, 2006

Table 4. **Employment in Canadian Food Processing**

Number of establishments and work force, by food processing industry group, Canada, 2001

Food processing industries[1]	Establishments	Production workers	Administration, office and other non-manufacturing employees	Total work force
Animal food manufacturing	562	10,252	2,954	13,206
Grain and oilseed milling	177	6,525	1,633	8,158
Sugar and confectionery product manufacturing	189	9,872	1,748	11.620
Fruit and vegetable preserving and specialty food manufacturing	372	20,849	3,737	24,586
Dairy product manufacturing	434	15,024	5,190	20,214
Meat product manufacturing	769	58,680	9,229	67,909
Seafood product preparation and packaging	700	31,743	3,096	34,839
Bakeries and tortilla manufacturing	1,779	30,972	5,108	36,080
Other food manufacturing	563	16,449	4,683	21,132
All food manufacturing	5,545	200,366	37,378	237,744
All manufacturing	54,031	1,602,958	373,147	1,976,105

1. North American Industry Classification System, four-digit groups 3111 to 3119.

Source: Statistics Canada, Annual Survey of Manufacturers, CANSIM, Table 301-0003. Statistics Canada, Industry profile (Canada's food processing industry) Industry profile (Canada's food processing industry), Statistics Canada, Catalogue no.: 15-515-XWE Hassan, Zuhair; Herath, Deepananda; Trant, Michael.