

**Industrialized Farming and Its Relationship to Community Well-Being:
An Update of a 2000 Report by Linda Lobao**

Prepared for the State of North Dakota, Office of the Attorney General

by

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Note: This report is a response to a request from the State of North Dakota to review past social science research on the effects of industrialized farming on community well-being. This review builds upon a similar review conducted by Dr. Linda Lobao in 2000. As author of the book *Locality and Inequality: Farm and Industry Structure and Socioeconomic Conditions* (SUNY Press, 1990), Dr. Lobao is the authoritative source on the relationship between industrialized farming and community well-being. She is a professor of rural sociology in the Department of Human and Community Resource Development at The Ohio State University. This update to her 2000 review of the literature since the publication of her book focuses on the consequences of industrialized farming on community well-being irrespective of whether these effects were detrimental, positive or mixed. Thus, a comprehensive review of the literature included all studies in this area, regardless of their conclusions.

INTRODUCTION

Public concern about the consequences of non-family owned and operated, industrialized farms for communities dates back to the 1920s (Boles and Rupnow 1979).¹ The first published research on the topic appeared in the 1930s. Since then, government and academic researchers have produced numerous studies showing the potential for adverse impacts on community life. The bulk of evidence indicates that public concern about the detrimental community impacts of industrialized farming is warranted. This report summarizes results from more than five decades of research that has investigated the relationship between non-family industrialized farming and community well-being. The purposes are: (1) to document the types of studies that have been conducted on the topic; (2) to delineate their results as to whether adverse consequences were found; and (3) to document the aspects of community life that may be jeopardized by industrialized farming.

This report is based on empirical results and observations drawn from Lobao's own research as well as from that of other social scientists. Observations are grounded in her longstanding research on farm change and its impacts on communities and families (Barlett, Lobao, and Meyer 1999; Belyea and Lobao 1990; Kenney, Lobao, Curry, and Goe 1989; Lasely, Leistritz, Lobao, and Meyer 1995; Lobao 1987, 1990; Lobao and Jones 1987; Lobao and Meyer 1995a, 1995b, 1997; Lobao and Schulman 1991; Lobao, Swanson, and Schulman 1993; Lobao and Thomas 1988; Lobao and Thomas 1992) as well as her research on the broader topic of community development (Lobao 1993a,b,c, 1996, 1998; Lobao and Rulli 1996; Lobao, Rulli and Brown 1999). The previous research has been funded by major federal competitive grants programs, such as the National Science Foundation and USDA-National Research Initiative Competitive Grants Program, as well as state and regional sources, such as the North Central Regional Center for Rural Development. The previous studies are published in the top-ranked journals in several fields, sociology, rural sociology, geography, family studies, and community development. For specific empirical examples in this report, she draws primarily from her book *Locality and Inequality: Farm Structure and Industry Structure and Socioeconomic Conditions* (State University of New York Press, 1990), the most recent, comprehensive sociological volume published on farm structure and community well-being. Our comments and conclusions also are based on a systematic review of fifty six studies on the topic of industrialized farming and community well-being. For this report, we updated a review (Lobao 2000) which was an update of a previously published review (Lobao 1990) by including studies that were conducted since 2000 on the topic of industrialized farming and community well-being.

The industrialization of farming refers to the transformation whereby farms have become larger-scale, declined in number, and integrated more directly into production and marketing relationships with processors through vertical or contractual integration (Drabenstott and Smith 1996:4). In the past two decades, farms in the farming-dependent Heartland states,² which

¹ Boles and Rupnow (1979: 471) state that public concern about corporate influence in farming began in the 1920-30 period when concern about large, publicly held corporations centered on fears about the effect of mechanization, foreclosure of farm land mortgages held by corporations, and corporate monopoly of land.

² The states forming the nation's farm heartland extend from the Mississippi River to the Rocky Mountains and from Texas to Canada. These states are Colorado, Iowa, Kansas, Minnesota, Missouri Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, and Wyoming (Barkema and Drabenstott 1996:1). More than two-thirds of the nation's farm-dependent counties are located in these states.

include North Dakota, declined by roughly one-fourth while average acreage grew by one-fourth to about 750 acres (Barkema and Drabenstott 1996:62). As the number of farms declines, production becomes concentrated on larger farms. Nationally, small farms (defined here as those having annual gross sales less than \$50,000) made up nearly three-quarters of the nation's farms in 1995 but they produced only about 8% of sales, while the top two percent of farms (those with sales of over a half million dollars annually) accounted for 44% of all sales (Sommer et al. 1998:10). Half of the nation's agricultural sales are produced by three percent of farms (Sommer et al. 1998:8).

Accompanying the growth of scale of operations are organizational changes in farming. These include an increase in the relative proportion of hired to family labor and greater use of incorporation³ as a form of legal organization. Another organizational shift is the movement toward a more integrated industry from farm to grocery, whose "hallmark" is "contract production and vertical integration that is linking farmers, food processors, seed companies, and other agribusiness" (Barkema and Drabenstott 1996:64). Vertical integration refers to operation of farms by firms that also operate in at least one other stage of the food chain, such as input supply, processing, and marketing. Examples of vertically integrated firms are large livestock producer/processor enterprises, such as Seaboard Corporation and Tyson. In addition to their direct involvement in farm production, agribusiness firms contract with farmers for goods and services. Two types of contracting arrangements should be distinguished. Marketing contracts are used by independent operators to reduce their exposure to market price swings; these contracts stipulate a commodity price or pricing mechanism for delivered goods and are used mainly for crop and dairy commodities. Production contracts involve cost sharing arrangements and/or payment for operators' services usually for livestock production except for dairying. On farms using production contracts, the largest share of farm sales accrues to the contractor (an agribusiness processor and/or producer), with the operator generally receiving a fixed fee for services (Sommer et al. 1998:16-17). Production contracts extend agribusiness firms into direct farm production using the vehicle of the local farmer. To sociologists, production contract farms are an integral component of the agribusiness chain in which agribusiness firms, depending on corporate strategy, may enter farming through direct operation of their own units and/or through employing local farmers to participate in production home-work. Sociologists are concerned with contract farming because of the risks it poses to agrarian social structure, communities, and families.⁴

³ In 1995, more than 98% of the nation's 2.07 million farms were classified as family operations. Ninety-one percent were sole proprietorships and five percent were partnerships. Only three percent of all farms were incorporated, and of these, 86% were considered family-held corporations by USDA as they had ten or less stockholders (Sommer et al. 1998: iv).

⁴ Sociologists are concerned with contract farming insofar that: it alters agrarian social structure by creating a segment of farmers who are the structural equivalent of factory production home-workers; it extends the influence of industrialized farming in a community; and it erodes formally independent operators' autonomy in direct production, farm decision-making and control over assets. Sociologists also are concerned with the general well-being of contractees (operators) and their families given their asymmetrical relationship in bargaining power with agribusiness firms. There is an inherent structural imbalance in contract farming and the degree to which this imbalance is manifest will vary, given specific contract arrangements. In principle, production contracts are used to share risks and costs of production between contractee and contractor. In practice, the bargaining power of external agribusiness is likely to result in a greater share of risks and costs of production borne by contractees and their families.

In classifying farms as “industrialized” or “family” social scientists distinguish between the construct (an ideal-type concept) and its actual measurement (variables used to define the concept in practice).⁵ “Family” farms and “industrialized” farms are constructs at opposite ends of the farm continuum. To sociologists, the construct “family farm,” is that where the farm household owns and controls the majority of farm production factors, land, labor, capital, technology, and management. At the other end of the farm continuum, the construct, “industrial farm,” refers to a non-household based production unit, with absentee ownership and control over production factors. As with nonfarm firms, industrialized farms have a division of labor among owners, managers, and labor with different groups of people assigned to different positions in the production process. Industrial farms “...are owned by one group of people, managed on a daily basis by another person or group, and worked by yet another group” (Browne et al. 1992:30). Between these “ideal-type” descriptions of family and industrialized farms are other arrangements in organizing farming, such as part-owner farming (a form of family farming where the operator both owns and rents-in land). Again, these are “ideal-type” constructs whose specific definition and measurement must depend upon the time period and public context.

When social scientists refer to “industrialized” farms, they invariably are referring to both scale and organizational characteristics of the farm unit.⁶ In general, but not always, scale will

⁵ Different classifications of farms have been developed over the years because the structure of agriculture is continually changing. The term “farm structure” or “agricultural structure” “refers to a broad set of characteristics that describe U.S. farms, as well as the distribution of farm production resources and returns to those engaged in farm production activities”(Sommer et al. 1998:6). Sommer et al. (1998:6) provide a useful overview of the criteria used to classify farms:

Producing units (farms and ranches) may be categorized by farm size (value of sales or number of acres), primary output, and geographic location. Farm businesses may be delineated by form of legal organization, degree of land ownership, marketing or production contractual arrangements, and financial position. Farm operators may be described by age, education, and primary occupation. Finally, farm households may be characterized by features of their associated farm businesses and interaction with the nonfarm sector, such as off-farm employment or income from non-farm sources. Any or all of these elements can be used to construct a structural portrait of farming in the Nation.

For sociologists, family farming is identified by whether the family unit owns a majority of capital resources, such as land, machinery, buildings, makes the majority of managerial decisions, and provides the bulk of labor (Goss et al. 1980). Social scientists often use farm scale as a proxy-measure to classify farms, because it is simple, clear, and often correlated with organizational characteristics of units. A recent USDA report classifies “commercial farms” as those with \$50,000 or more in gross sales and “small farms” as those with gross sales less than \$250,000 (Sommer et al. 1998:69). Family farms (organized as sole proprietorships, partnerships, or family corporations) with gross sales over \$250,00 are classified as “large-family farms,” while “non-family farms” are any farms organized as nonfamily corporations, cooperatives, and farms operated by hired managers (Sommer et al. 1998:72).

⁶ Social scientists measure industrialized farming by both scale and organizational variables. Scale is usually measured by sales and sometimes by acreage and real estate and for livestock operations, animal inventory. The actual dollar value for scale indicators used by analysts to indicate a “large-scale” farm will obviously vary by the time period of study. In addition, what is considered a “large-scale farm” also varies by regional context and commodity. Organizational measures of industrialized farming include: vertical integration of corporations into farming; production contract farming arrangements; absentee ownership of production factors; dependency on hired labor; operation by farm managers, as opposed to material operation by family members; and legal status as a corporation (family or non-family) or syndicate.

coincide with organization. That is, large-scale farms (relative to smaller farms) are more dependent on hired labor and managers and more likely to have absentee owners, to be incorporated, and to be vertically integrated with agribusiness. For example, in 1995, mean gross sales of corporate farms were \$576,925 as compared to \$54,287 for sole proprietorship farms and \$218,795 for farms organized as partnerships (Sommer et al. 1998:15). Farms with production or marketing contracts also tend to be larger. In 1995, farms with marketing contracts (about 11% of all farms) had mean gross sales of \$242,888; while farms with production contracts (2.3% of all farms) had mean gross sales of \$617,858 (Sommer et al. 1998: 12). For the purposes of this review, we use the umbrella term “industrialized farm” to refer to both scale and operating characteristics of industrialized farms. We also distinguish between scale and operating characteristics where it is useful and feasible to do so.

The discussion below is organized in four sections. (I) The first section discusses the history of government and academic concern about the risks of industrialized farming for community well-being, from the 1930s to the present. (II) The second section summarizes the findings from Lobao’s research and that of colleagues. (III) The third section reviews findings from five decades of social science research. It is divided into several sub-sections discussing, respectively: (A) research issues involved in analyzing industrialized farming and community impacts, focusing on indicators of industrialized farming and types of consequences that a summary evaluation must consider; (B) the various research designs used to assess the consequences of industrialized farming; (C) a summary of the results of past studies as to whether detrimental impacts were found; (D) examples of recent sociological studies conducted on the topic; and (E) the potential for regional imbalances due to industrialized farming. (IV) The final section is a summary and conclusions.

It should be noted that public concern about industrialized farms extends beyond the well-being of states and their communities. Rather, public as well as academic concern extends to national food system issues, such as agribusiness concentration, consumer health, food safety, and sustainability of the national eco-system. The immediate effects of industrialized farms, however, are on the day-to-day lives of people residing in the places where these farms are located. It is also at this level, that social scientists have conducted a great deal of research over a long period of time. For these reasons, this report deals with the consequences of industrialized farming for well-being at the community level.

I. HISTORY OF PUBLIC, GOVERNMENT, AND ACADEMIC CONCERN WITH THE CONSEQUENCES OF INDUSTRIALIZED FARMING

More than a half century of research centers on the potential detrimental social consequences of industrialized farming. Since the 1930s, government and academic researchers have investigated the extent to which large scale, industrialized farms adversely affects the communities in which they are located. One of the first series of studies was conducted by a sociologist, E.D. Tetreau (1938, 1940), who found that large scale, hired-labor dependent farms were associated with poor social and economic well-being in rural Arizona communities.

In the early 1940s, the United States Department of Agriculture sponsored a research project on the effects of industrialized farming using a matched-pair of two California communities, Arvin where large, absentee-owned, non-family operated farms were more numerous, and Dinuba, where locally owned, family operated farms were more numerous. The report on this

project was prepared by Walter Goldschmidt, a USDA anthropologist. The purpose of the study was to assess the consequences of a California law with a provision placing acreage limitations on large farms located in California's Central Valley, so as to support family-size farms in the region. Goldschmidt (1978a: 458) notes that: "Large landholders throughout the state and corporate interests generally opposed this provision while diverse church and other agrarian-oriented interests wanted this law applied to California. The comparative study of Arvin and Dinuba...was designed to determine the social consequences that might be anticipated for rural communities if the established law was applied or rescinded." Goldschmidt later became President of the American Anthropological Association and remains one of our nation's leading anthropologists.

In his report, Goldschmidt (1978a) systematically documented the relationship between large-scale farming and its adverse consequences for a variety of community quality of life indicators. Goldschmidt (1978a) found that, relative to the family farming community, Arvin's population had a small middle class and high proportion of hired workers. Family incomes were lower and poverty was higher. There were poorer quality schools and public services, fewer churches, civic organizations, and retail establishments. Arvin's residents also had less local control over public decisions, or "lack of democratic decision-making," as local government was prone to influence by outside agribusiness interests. By contrast, family farming Dinuba had a larger middle class, better socioeconomic conditions, high community stability and civic participation. Goldschmidt's report was eventually published as Congressional testimony (1968) and as a book (1978a). Goldschmidt's conclusion that large scale industrialized farms create a variety of social problems for communities has been confirmed by a number of subsequent studies. One criticism of Goldschmidt's (1978a) research was published by agricultural economists Hayes and Olmstead (1984). They did not challenge Goldschmidt's (1978a) conclusion that large scale, industrialized farms have adverse community impacts. Rather they argued that Arvin and Dinuba were not as closely matched research sites in the 1930s as Goldschmidt had intended. Nearly four decades after Goldschmidt's study, the state of California, through its Small Farm Viability Project (1977:229-230), affirmed Goldschmidt's conclusions by re-visiting Arvin and Dinuba. They concluded that: "The disparity in local economic activity, civic participation, and quality of life between Arvin and Dinuba...remains today. In fact, the disparity is greater. The economic and social gaps have widened. There can be little doubt about the relative effects of farm size and farm ownership on the communities of Arvin and Dinuba."

As the structure of U.S. agriculture has evolved towards larger and fewer farms, and government and academic researchers have continued to investigate the extent to which large-scale, non-family owned and operated industrialized farms adversely affect communities. Congress has conducted inquiries, such as that by Senate Subcommittee on Monopoly dealing with Corporate Secrecy and Agribusiness, in which rural sociologists and agricultural economists provided testimony in 1973 about the dangers to communities posed by increasing corporate control of agriculture (Boles and Rupnow 1979:468-469). The Office of Technology Assessment (OTA), concerned that the relative growth of large scale industrialized farms might have adverse impacts on communities, commissioned a series of research papers on the topic. The OTA research came as a request from Congress and was published first as a report (U.S. Congress, Office of Technology Assessment 1986) and later as a book (Swanson 1988). Federal and state funding has been directed to at least two Agricultural Experiment Station projects that

assess the community consequences of large scale, non-family farms: Project S-148 “Changing Structure of Agriculture: Causes, Consequences, and Policy Implications” (1982-1986);” and Project S-198 “Socioeconomic Dimensions of Technological Change, Natural Resource Use, and Agricultural Structure” (1986-1990). The later project resulted in a book monograph on the consequences of industrialized farming for communities (Lobao 1990) among other publications.

In the 1990s, public concern with industrialized farming has centered particularly on large integrated livestock producer/processor enterprises. Recent studies supported by the North Central Regional Center for Rural Development (1999), the University of Missouri Agricultural Experiment Station (Seipel, Kleiner, and Rikoon 1998; Seipel, Hamed, Rikoon, and Kleiner 1998), and Duke University Medical School (Schiffman 1998) have documented a variety of adverse impacts of these enterprises on communities, households, and individuals.

In summary, there has been over fifty years of public, academic, and government concern that large-scale, industrialized farms jeopardizes community well-being. This concern has resulted in numerous studies, in government sponsored reports, and in Congressional Hearings. In the 1990s, public concern with industrialized farming has increased due to the problems posed by large-scale animal confinement operations. Social scientists have responded to this increased public concern by initiating a number of recent projects---leading to a new generation of literature on the community consequences of industrialized farming.

II. RESEARCH BY LOBAO AND COLLEAGUES

The most recent, comprehensive sociological study on the effects of industrialized and family farming on communities was conducted by Lobao (1990). This study examined relationships across more than 3,000 U.S. counties. The study used both farm scale and organization to measure farm structure; examined direct and indirect consequences of farming patterns; and examined long-term and immediate relationships for two time periods, 1970-1980. To measure community outcomes, the study focused mainly on socioeconomic well-being indicators (median family income, poverty, and income inequality between families measured by the gini coefficient⁷) but also included of community social disruption (births to teenagers) and health status (infant mortality). The study examined the effects of three different community farm structures: “smaller family farming” (small, part-time family farms); “larger family farming” (moderate-size, capital-intensive, family-operated units using little hired labor), and industrialized farming (large scale, hired-labor dependent farms). The community farming structures were constructed based on research by Wimberley (1987). Each of the measures of farm structure was a composite of scale and organizational indicators, created through a statistical technique called factor analysis. Multivariate statistical methods, regression and discriminant analysis, were used to analyze the effects of the three farm structures net of other community conditions, including non-farm industrial employment, establishment size of local businesses, human capital and demographics characteristics of the population (educational attainments, ethnicity), unemployment, social welfare payments, unionization, and spatial factors, such as region of the country.

⁷ The gini coefficient is used by the federal government to document income inequality in the United States and is the measure used most frequently in recent studies of economic development across spatial units such as counties (Lobao et al. 1999).

The findings were the following. There was consistent support that moderate-size family owned and operated farms benefit communities. Counties where these types of farms (i.e., larger family farming) predominated had better socioeconomic well-being (lower family poverty, higher median family income, lower unemployment, and lower infant mortality). The beneficial effects of this family farming were found across the U.S., for two time points, 1970 and 1980. Moreover, this type of farming continued to result in beneficial effects over time. Counties where larger family farming was greater in 1970 continued to have better socioeconomic well-being over time. This study indicates that the “high road” to community development is a farming system based on moderate-size family operations. Such farming not only increases aggregate well-being, as indicated by income levels, but it also sustains a larger middle class, as indicated by lower income inequality and poverty, and thus allows more families to benefit from income produced.

However, where industrialized farming was greater, there were mixed effects on community well-being: either detrimental or no statistically significant impacts. For example, industrialized farming had no relationship with family poverty or median family income at either of two single time points (1970 and 1980). Industrialized farming, however, was related to higher income inequality at both time points, and also to lower family income, higher poverty, and higher income inequality across time, over the decade from 1970-1980 (i.e., counties with greater industrialized farming in 1970 experienced relative declines in socioeconomic well-being over the decade). The finding that industrialized farms are associated with high income inequality indicates that this farming segments social class structure by polarizing families into richer and poorer income groups. Income polarization is related to other social problems, such as crime and other breakdowns in community social fabric. The study also found that where very small farms predominated, well-being was poorer. This indicates that researchers should distinguish between small and moderate family operated units in assessing consequences for well-being. Smaller family farming tends to predominate more in the South.

As would be expected in a post-industrial society, nonfarm manufacturing and service employment were stronger predictors of community well-being than farming. However, it is important to note the study found that farming, nonfarm industry, and other local characteristics were interrelated, mutually sustaining a population in a locale.⁸ Good quality farms and high quality local employment were interrelated, with “larger family farming” associated with greater employment in high wage manufacturing and other beneficial sectors. The study offered consistent support that when farming is an economic development strategy of choice, moderate-size family farms are best for communities.

⁸ That farming has a smaller impact on community well-being than does nonfarm industry is expected even for communities highly dependent on farming. Farming is interrelated with local nonfarm industry and other sectors, forming a community livelihood strategy which sustains a population in a locale. Communities where larger family farming predominated had greater high wage, durable manufacturing employment and greater employment in local schools and retail industries. Communities where industrialized farming predominated had greater employment in lower wage manufacturing such as food processing, less employment in education, health, and retail services, a higher minority population, and provided relatively higher per capita benefits to welfare recipients.

This research on farming systems and community and regional well-being has been elaborated in other articles (Kenney, Lobao, Curry, and Goe 1989; Lobao 1987, 1993c, 1996, 1998; Lobao and Jones 1987; Lobao and Schulman 1991; Lobao, Swanson, and Schulman 1993; Lobao and Thomas 1992).

One of the most recent sociological analysis on industrialized farming and inequality is that conducted by one of Lobao's students (Crowley, 1999; Crowley and Roscigno, 2004). This 1999 study is a Masters' thesis in Sociology supervised and reviewed by four faculty members in the Department of Sociology at The Ohio State University, including Lobao. The methodology used in the study is similar to that followed in Lobao (1990), but the indicators of farm structure differ. Crowley's research extends past work by examining the effects of farm sector concentration and by updating research to the 1990 period. It should also be noted that her work is more comprehensive than other recent research (reported below) in that she specifies direct and indirect paths by which farm concentration affect community well-being. By farm concentration, Crowley (1999) means that a few large farms hold a disproportionate share of farm property in a community. Crowley notes that concentration of business property is important to sociologists because they see concentration as conferring both economic and political power to those who control resources in a community. Concentration of farm property also constrains the options of local family farmers to pursue their interests and realize economic gains. Crowley (1999) analyzed the effects of farm concentration using several indicators, (concentration of land, value of land and buildings, and the value of equipment and machinery, indicators measured by the gini coefficient) and data for all (1053) counties in the North Central U.S. (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, North Dakota, South Dakota, and Wisconsin). She analyzed consequences of these dimensions of farm-sector concentration for local levels of family poverty and family income inequality net of other community characteristics. Using multivariate regression analysis, she controlled for the influences of labor market, demographic, spatial, and other farm structure characteristics. In counties where farm sector concentration was higher (i.e., a few large farms held a disproportionate share of local property in land and real estate), there was significantly higher poverty among families and significantly greater income polarization between families. Also, where farm concentration was higher, residents had lower education.

In the 2004 study, Crowley and Roscigno documented how concentration of agricultural resources shapes rural community stratification through the political economic process. In addition to measures of farm sector resource concentration (value of land, real estate, machinery and buildings), measured by the gini coefficient, and labor endowment (percentage of county work force employed in core, extractive, competitive, and state sectors), they included measures of political process (proportion of votes in presidential election for Democratic Party, average household payment rates, average per farm county level spending on agricultural assistance), and worker power attributes (percent of manufacturing employees that are unionized, proportion of population that are minority, percentage of 25+ population with a high school diploma, and proportion of labor force unemployed). Using data for all (1053) counties in the North Central U.S. they found that dimensions of farm sector concentration shape both poverty and inequality. Furthermore, they found that farm sector concentration is explained by political economic processes, and these processes mediate the negative effects of land concentration on economic well-being. In particular, they found that relative to large scale farms, capital concentration promotes government spending that benefits large farms while it blocks government or labor-

market programs that assists farmers whose farms it consumes and farm workers it exploits. These attempts are evident by the increased funding for agricultural research which benefits large farms, decreased redistribution efforts through transfer payments to benefit small farms and workers, decreased political consciousness through lower levels of Democratic party support, and reduced labor power through lower unionization rates and education and higher unemployment and minority representation.

To provide a balanced assessment of the consequences of industrialized farming, it is useful to review the past findings of other investigators, using different methodologies, for different time periods, and from different disciplines. In the following sections, we discuss the types of studies conducted on the relationship between industrialized farming and community well-being and their conclusions. On balance, the social science evidence accumulated from these and other studies supports public, academic, and government concern about the potential risks of industrialized farming. Recent research indicates the public's welfare is at risk in at least four major areas. Industrialized farming: (1) has a detrimental impact on certain aspects of socioeconomic well-being; (2) disrupts the social fabric of communities; (3) poses environmental threats where livestock production is concentrated; and (4) is likely to create a new pattern of "haves and have nots" in terms of agricultural production, whereby some communities gain large, industrialized farms (and attendant social problems) and others lose their farming base as production becomes concentrated elsewhere in the state and regional economy. (Drabenstott and Smith 1996:4)

III. REVIEW OF PAST RESEARCH ON INDUSTRIALIZED FARMING AND WELL-BEING

Over the past half century, numerous studies, spanning different time periods and regions of the county have tended to find that large-scale industrial farming has detrimental community impacts. This does not mean that every study has produced these results--but rather that:(a) empirical evidence accumulated over the years shows a repeated trend that large-scale industrialized farms have adverse impacts on a number of different indicators of community well-being; and (b) that this trend is sufficiently established in the social sciences, to the point that almost all sociological studies begin with the working hypothesis (research expectation) that large scale industrial farms will have adverse community effects. The extent to which past research supports this hypothesis is discussed below. It should be stressed that no single study can provide a definitive answer as to whether large-scale industrialized farming will or will not adversely affect public well-being in any particular region or state. This is due both to the complexity of the research question and to the lack of existing data required to fully analyze it. At best, a single study can assess the extent to which certain indicators of industrialized farming have adverse affects on certain indicators of community well-being in certain places and time periods. Therefore, the most comprehensive answer to the question of whether industrialized farming adversely affects public well-being comes not from a single study but from assessing the conclusions of decades of past research.

A. Research Issues Involved in Analyzing Industrialized Farming and Its Community Impacts

To adequately assess the consequences of large, scale-industrial farming, the following issues about indicators of industrialized farming and types of consequences must be considered.

1. *Industrialized farming should be analyzed using indicators of farm organization and not only scale.*

Scale is usually measured by sales or sometimes acreage. As a measure of industrialized farming, scale is limited for several reasons:(a) family owned and operated farms may be large scale owing to technology; (b) scale alone does not capture organizational features of industrialized farming, such as absentee ownership and non-family control over production, that are thought to put communities at risk. Organizational measures of industrialized farming include: vertical integration of corporations into farming; contract farming arrangements; absentee ownership of production factors; dependency on hired labor; operation by farm managers, as opposed to material operation by family members; and legal status as a corporation. With regard to legal status, family and non-family-held corporations should be distinguished.⁹

2. *To adequately assess consequences for community well-being, the full array of outcomes should be considered. Research points to three major sets of consequences of industrialized farming in a community: impacts on socioeconomic well-being, community social fabric, and environment.*

Socioeconomic well-being refers to standard measures of economic performance (essentially employment, income, and business activity) and to a broader range of socioeconomic indicators used by sociologists to tap material conditions of families and populations (family poverty rates, income inequality).

Community social fabric refers to social organization, the features of a community that reflects its stability and quality of social life. Impacts on community social fabric are seen in social indicators such as: population change; social disruption indicators (crime rates, births-to-teenagers, social-psychological stress, community conflict, interference with enjoyment of property); educational attainments and schooling quality; changes in social class structure (decline of local middle class, in-migration of low wage workers); health status, such as mortality rates; civic participation (e.g., declines in church attendance, voluntary organizational membership, and voting); and changes in local governance, such as loss of local control over community decision-making, and resource/fiscal pressures on local government, such as those due to increased need for social services and diversion of public funds to subsidize agribusiness development.

Environmental indicators include quality of water, soil, and air, energy usage, and environmentally-related health conditions.

⁹ It also should be recognized that farms may be incorporated because of family farmers' interests in estate planning, greater assurance of business continuity, limited liability, and income tax advantages.

3. *Industrialized farming has both direct and indirect consequences for community well-being. Both sets of consequences should be considered.*

Industrialized farms directly influence community well-being: through the quantity of jobs produced and the earnings' quality of those jobs; by the extent to which these farms purchase inputs and sell outputs locally; by affecting the quality of local environmental conditions; and by affecting local decision-making about economic development and other public-interest areas relevant to community quality of life.

First-order, indirect effects on local economic performance and general socioeconomic conditions occur because the quantity and quality of jobs plus purchases affect total community employment, earnings, and income (e.g., economic multiplier effects), the local poverty rate, and income inequality. First order, indirect effects on local social fabric occur because: the quantity of jobs created by industrial farms affects total community population size; the quantity and quality of jobs affects social class composition, such as when an increase in hired farm workers reduces the proportion of the local middle class; local control over community decision-making may erode or become conflictual, since the interests of industrialized farmers and absentee owners are detached from those of local residents.

Second-order, indirect effects on local social fabric work through first-order effects above. Population size and social class composition are related to: indicators of community social disruption, such as crime, family instability, the high school dropout rate, and conflict resulting in civil suits; local demand for schooling, public assistance, health, and other social services; and the property tax base (Boles and Rupnow 1979; Freudenburg and Jones 1991, Murdock et. al 1988; North Central Center for Regional Development 1999).¹⁰ Decline of local control over community decisions-making creates problems associated with poor governance, such as: the potential for diversion of public resources toward financial incentives supporting the interests of agribusiness developers over the community at large; and the loss of public and private revenues to support local schools, community services, and infrastructure, which contributes to a downward spiral of community social and economic conditions.

The direct and indirect paths by which industrialized farming may affect community well-being are delineated in various studies, including Boles and Rupnow (1979), Lasley et al. (1995), Lobao (1990), MacCannell (1988), and the North Central Regional Center for Rural Development (1999).

4. *Differences in impacts for diverse social groups within the community must be considered.*

Changes in farming affect social groups differently, depending upon their age, class position, and residents' proximity to industrialized farms. The elderly and poor are

¹⁰ Rapid increases in population size and poorer social class composition tend to be related to the indicators of social disruption noted above and also place increased demands on local schooling and other social services. Population decline reduces local demand for services and the property tax base..

affected by rising costs of housing and services whenever large corporations migrate to a rural community (Summers et al. 1976). Within communities with large confined animal feeding operations (CAFOs), residents who live closer to the operation report inability to enjoy their properties and physical and psychological problems associated with odor (Schiffman and others 1998; Wing and Wolf 1999; Reisner et al., 2004; Constance and Tunistra, 2005). Property closer to CAFOs has been found to fail to appreciate in value relative to places further away (Seipel and others 1998). Income generated by industrialized farming (relative to family farming and over time) also appears less likely to filter down to families of different social classes. As noted, Lobao (1990) and Crowley (1999) found that income inequality was higher in communities where industrialized farming was greater.

5. *There are long-term as well as short-term consequences of industrialized farming for communities and for regional development within a state.*

Industrialized farming puts a community on a path of development whose consequences are not fully manifest in the short term of one or two years. Lobao (1990) found that some impacts were manifest a decade later. As noted earlier, counties with greater industrialized farming in 1970 had significantly poorer well-being a decade later: these counties had lower median family income, higher family poverty rates, and higher income inequality relative to other counties and net of past county conditions.

For the heartland states, including North Dakota, economists at the Federal Reserve Board of Kansas City (Drabenstott and Smith 1996:4) indicate that differences in communities will widen over time. According to these economists:

Industrialized agriculture produces two effects on rural communities. As production increases in some “cluster” communities, it will leave others, lessening agriculture’s impacts. Communities that are home to industrialized production and processing may see jobs and income increase. But even there, the economic links will be different than under community production. More production inputs are purchased from nonlocal sources, and more of the profits go to nonlocal owners of the firm.

B. Types of Studies Conducted on the Effects of Industrialized Farming: Research Designs and Methodology

Analysts have used primarily four different types of research designs to assess whether industrialized farms have detrimental impacts on communities. Each design has inherent strengths and limitations in being able to comprehensively analyze industrialized farming and its many potential impacts noted above.¹¹

1. *Case-study designs* provide in-depth analysis of the consequences of industrialized farming in a single or multi- community site. Usually, a comparative case-study design is implemented whereby a community or communities characterized by industrialized farming are contrasted with a community or communities with a different farming pattern

¹¹ We have outlined the strengths and limitations that are intrinsic to each research design. A individual study will vary as to how the analysts have exploited the strengths or overcome the limitations of the design.

(usually moderate-size, family-owned and operated farms). A comparative case-study design allows communities to be matched on similar background characteristics, such as location near cities and dependency on farming as an economic base, which helps to “control” (or exclude) extraneous factors that influence the relationship between farming type and community well-being. Examples of case studies are Goldschmidt (1978a) noted above and the North Central Regional Center for Rural Development (1999). The strengths of case-studies are the following. (a) They provide detailed information about how both scale and organizational aspects of industrialized farming impact community well-being. (b) They provide detailed information about outcomes for a great many community indicators of local socioeconomic well-being, social fabric, and environment. (c) They trace the direct and indirect effects of industrialized farming. (d) They can address short-term as well as long-term outcomes. The inherent limitation of case-studies is that detailed conclusions are produced about the impacts of industrialized farms in specific site communities at the expense of producing less detailed findings but over a greater number of research sites. Case-studies also vary as to how well the analyst is able to partition out extraneous factors that influence the causal relationships of importance.

2. *Macro-social accounting designs* involve statistical analysis of secondary or pre-collected data from government and other sources, such as the Census of Agriculture and Census of Population, to document relationships found in regional social structure (MacCannell 1988). Community units, such as counties and townships, and states are the research focus. To assess the consequences of industrialized farming, analysts usually compare its effects relative to other farming (usually smaller or moderate-size family farm units) and over time, while controlling for other, non-farm factors known to affect community well-being. Multivariate statistical techniques, such as regression procedures and discriminant analysis, are used so that the effects of farm structure are assessed net of other community conditions. Examples are Gilles and Dalecki (1988), Lobao (1990), Crowley (1999), Crowley and Roscigno (2004) and Irwin et al. (1999). The strengths of these studies are the following. (a) They provide conclusions about true (actual empirical) relationships, which are generalizable across many communities, various states, and the nation as a whole. (b) They provide conclusions about industrialized farming using measures of scale and organization. Customary measures of industrialized farming in these studies are: for scale, farm size in sales, such as the percent of farms above some gross annual sales threshold (e.g. above \$500,000) or depending upon commodity, acreage above a certain size; for organizational indicators, percent of farms organized as corporations or non-family-held corporations; percent of farms with full-time hired labor; annual costs of hired labor per farm; and non-resident operators. (c) Macro-social accounting designs provide conclusions about a variety of socioeconomic well-being indicators (i.e., unemployment rate, poverty rate, income levels, income inequality), social fabric impacts (i.e., population change, educational attainments, health status, family disruption indicators), and about some environmental indicators (i.e., energy usage). (d) They address short-term and long-term relationships between industrialized farming and community well-being. The inherent limitation of these studies is that they depend on the availability of pre-collected data, which constrains the use of certain measures and time periods of study. Some organizational measures of industrialized farming, contract farm-

ing and vertical integration of farm units are not available over time from the Census of Agriculture or from other secondary sources across communities.

3. *Regional economic impact models* use linear programming methods to estimate impacts on employment and income for regions, states, and smaller units such as counties and cities. These studies focus on the integration of business enterprises in markets and use programs, such as variants of input-output analysis, to model the backward and forward linkages with enterprises in other industries and to estimate resulting local impacts. The costs and benefits of varying different firm-level practices can be estimated. Examples are studies by Heady and Sonka (1974), Marousek (1979), Otto et al. (1998), and Thompson and Haskins (1998). The strengths of regional economic impact models are the following. (a) They provide detail about economic performance, such as the number of jobs and total income produced by firms or industries in a region or community. (b) They can provide projected estimates, so that the potential impacts of not yet existing enterprises can be appraised. Limitations of regional economic impact, input-output models are well-known and documented.¹² In brief, most models involve assumptions about relationships not actually found in the community--that is, models depend on estimates from past years and different places. To the extent to which real (true, empirical) conditions in a particular community vary, these studies will not provide accurate assessment of impacts. Another inherent limitation is the types indicators of industrialized farming and impacts addressed. Farm scale, as indicated by sales and labor force size, is analyzed, not the organization of production. These studies do not examine certain socioeconomic well-being indicators such as family poverty and income inequality (the degree to which economic growth is shared by families throughout the community); nor do they examine social fabric or environmental indicators. Finally, input-output analyses of industrialized farming usually do not address long-term impacts, such as over the course of a decade.
4. *Survey-design studies* use samples of populations from any number of communities. These studies use interviews or questionnaires to document how industrialized farming affects residents or a particular social group exposed to industrialized farming as compared to those who are not (such as those residing in family farming communities). In contrast to macro-social accounting and economic impact models which are based usually on secondary or pre-collected data, the researchers using a survey design collect primary data directly from individuals or families. Multivariate statistical procedures such as regression are used to assess the consequences of farm variables net of other community and individual characteristics. Examples of studies based on survey designs are Hefernan and Lasley (1978), Poole (1981), Wing and Wolf (1999). The strengths of these studies are the following. (a) They provide detailed information about how both scale and organizational aspects of industrialized farming impact individuals or families. (b) They

¹² A good review of input-output analysis is provided by the recent report published by the University of Minnesota (1999) on the impacts of the livestock industry. The authors (pp. F35-F56) note that input-output models, such as IMPLAN, are limited by the quality of data used in the models, the assumptions made about regional purchase coefficients, and how economic shocks are specified. The authors note that for the present period it has become increasingly difficult to obtain data from large farms and therefore more difficult to adequately analyze costs by size of operation.

provide detailed information about outcomes for a great many indicators of personal and family social and economic well-being, including social fabric indicators, such as community participation and stress, health status, all of which allows for a more in-depth analysis of quality of life. Inherent limitations of surveys for addressing the impacts of industrialized farming are that cost considerations often restrict surveys to specific states and communities and to one time point.

C. Conclusions of Studies Examining Industrialized Farming and Community Well-being

As noted, to assess the consequences of industrialized farming, it is useful to examine the body of past work conducted by researchers from various social science disciplines, over time, and using different methodologies. Table 1 reports the conclusions from 56 studies conducted since the 1930s on the effects of industrialized farming on communities to provide the most recent findings for each of the four study designs above. This table has been updated from Lobao (2000) by adding all empirical studies published on the topic in *Rural Sociology* (the major scholarly journal in this field) since 2000. A review of articles in the *American Journal of Agricultural Economics* (the major scholarly journal in this field) over the past five years was undertaken but no empirical studies were found on the topic. In addition, the following journals were surveyed for articles relevant to the topic: *Agriculture, Food and Human Values*, *Culture and Agriculture*, *Sociologia Ruralis*, *Southern Rural Sociology*, *American Journal of Alternative Agriculture* (now the *Renewable Agriculture and Food Systems* journal), *Journal of Rural Studies* and the *International Journal of the Sociology of Agriculture and Food*. Two scholarly search engines -- *Google Scholar* and *Agricola* – were also used to find relevant articles. Some articles were located serendipitously. The programs and abstracts for the 2000-2005 annual meetings of the Rural Sociological Society also were reviewed.

In Table 1, studies are classified by: (a) methodology, referring to the research designs described above; (b) regions of the country analyzed; (c) the indicators used to measure industrialized farming; (d) types of impacts analyzed; and (e) results of the study as to whether detrimental impacts were found (discussed further below). With regard to the indicators of industrialized farming, most of the studies examine farm scale; organizational characteristics are examined less frequently. The studies examine a wide variety of impacts on community well-being. Community well-being impacts were classified as to whether they were socioeconomic well-being indicators (income levels, poverty, and unemployment); indicators of social fabric (population change, social class, civic involvement, quality and types of community services, population size and composition, and social disruption indicators such as stress and crime); and environmental impacts. In most studies (all of the sociological studies), the authors hypothesize that where farms are larger scale or industrialized in terms of organizational characteristics, they have a detrimental impact on the indicator(s) of community well-being, relative to family-owned and operated farms. These relationships are expected to be found across communities and over time.

Types of Detrimental Impacts Reported by Social Scientists

Social scientists report that industrialized farms are related to relatively worse conditions for the following community impacts:

Socioeconomic Well-being

1. Lower relative incomes for certain segments of the community: greater income inequality (income polarization between affluent and poor), or greater poverty. (Tetreau 1940; Goldschmidt 1978a; Heady and Sonka 1974; Rodefeld 1974; Flora et al. 1977; Wheelock 1979; Lobao 1990; Crowley 1999, Deller, 2003; Crowley & Roscigno, 2004; Peters, 2002; Welsch & Lyson, 2001; Durrenberger and Thu, 1996)
2. Higher unemployment rates. (Skees and Swanson 1988; Welsch & Lyson, 2001)
3. Lower total community employment generated. (Marousek 1979; Thompson and Haskins 1999)

Social Fabric

1. Population: decline in local population size where family farms are replaced by industrialized farms; smaller population sustained by industrialized farms relative to family farms. (Goldschmidt 1978a; Heady and Sonka 1974; Rodefeld 1974; Wheelock 1979; Swanson 1980)
2. Class composition: social class structure becomes poorer (increases in hired labor). (Gilles and Dalecki 1988; Goldschmidt 1978a; Harris and Gilbert 1982)
Social disruption:
 - increases in crime rates and civil suits (North Central Regional Center for Rural Development 1999);
 - general increase in social conflict (Seipel et al. 1999);
 - greater childbearing among teenagers (Lobao 1990);
 - increased stress, social-psychological problems (Martinson et al. 1976; Schiffman et al. 1998)
 - swine CAFOs located in census blocks with high poverty and minority populations (Wilson, et al., 2002)
 - deterioration of relationships between hog farmers and neighbors (Jackson-Smith & Gillespie, 2005; McMillan and Schulman, 2003)
 - more stressful, less neighborly relations (Constance & Tuinstra, 2004; Smithers, et al., 2004)
4. Civic participation: deterioration in community organizations, less involvement in social life. (Goldschmidt 1978a; Heffernan and Lasley 1978; Poole 1981; Rodefeld 1974; Lyson, et al, 2004; Smithers, 2004)
5. Quality of local governance: less democratic political decision-making, public becomes less involved as outside agribusiness interests increase control over local decision-making. (Tetreau 1940; Rodefeld 1974; Goldschmidt 1978a; McMillan and Schulman, 2003)

6. Community services: fewer or poorer quality public services, fewer churches. (Tetreau 1940; Fujimoto 1977; Goldschmidt 1978a; Swanson 1980)
7. Retail trade: decreased retail trade and fewer, less diverse retail firms. (Goldschmidt 1978a; Heady and Sonka 1974; Rodefeld 1974; Fujimoto 1977; Marousek 1979; Swanson 1980; Skees and Swanson 1988; Foltz et al, 2002; Foltz & Zueli, 2005, Smithers, 2004; Gomez & Zhang, 2000)
8. Reduced enjoyment of property: deterioration of landscape, odor in communities with hog CAFOs (Schiffman et al. 1998; Wing and Wolf 1999; Constance & Tuinstra, 2005; Reisner et al., 2004; Wright et al., 2005; Wing and Wolf, 2000; Kleiner, 2003; McMillan and Schulman, 2003)
9. Health: neighbors of hog CAFOs report upper respiratory, digestive tract disorder, eye problems. (Wing and Wolf 1999; Constance & Tuinstra, 2005; Reisner et al., 2004; Wright et al., 2005; Wing and Wolf, 2000; Kleiner, 2003)
10. Real estate values: residences closest to hog CAFOs experience declining values relative to those more distant. (North Central Regional Center for Rural Development (1999:46); Seipel et al. 1998; Constance & Tuinstra, 2005; Reisner et al., 2004; Wright et al., 2005)

Environment

1. Eco-system strains: depletion of water, other energy resources. (Tetreau 1940; Buttel and Larson 1979; North Central Regional Center for Rural Development 1999)
2. Environmental consequences of CAFOs: increase in Safe Drinking Water Act violations, air quality problems, increased risks of nutrient overload in soils. (North Central Regional Center for Rural Development 1999)

Summary of Conclusions Reported by Social Scientists by Study

In addition to showing the types of impacts reported in the social science literature, the studies also provide an overview of the consistency of evidence on the risks of industrialized farming. For each study, a number of different relationships may be tested. Authors invariably provide a summary estimation of each study's conclusion. Whether hypotheses about detrimental effects were largely supported (e.g. the authors report detrimental impacts overall); whether there were mixed findings (authors report only some detrimental impacts were found); and whether authors' report no detrimental effects. The results of the studies were then classified according to findings along those three lines: detrimental, some detrimental, or No Detrimental. Out of the total 56 studies, the researchers report largely detrimental impacts in 32, some detrimental impacts in 14, and no evidence of detrimental impacts in 10. Thus, over 82% (46 out of 56) of the studies report finding some negative impacts of industrialized farming. It is this consistency of past research which leads researchers to hypothesize that industrialized farming will jeopardize communities.

Of the thirty two studies where social scientists found predominantly detrimental impacts, the following points should be noted. First, studies reporting these impacts exist through all time periods, from the 1930s to the present. The studies show detrimental impacts for socioeconomic well-being, social fabric, and environment across communities, for both scale and organizational indicators, and throughout all regions of the country, including the North Central heartland states. These studies use five types of research designs, comparative case study, macro-social

accounting, regional economic impact models and survey. In other words, a great deal of evidence produced over time, for various regions of the country, by different researchers, and by five different research designs shows that industrialized farming has detrimental impacts.

Of the fourteen studies where social scientists report some, but not consistently negative impacts of industrialized farming, the following points should be noted. These studies provide mixed findings, in that while adverse effects on some community indicators were found, at least one of the following also occurred: (a) industrialized farming had no statistical relationship with other indicators (i.e. there was an absence of any relationship); (b) industrialized farming had a trade-off effect, with beneficial effects on certain indicators; (c) industrialized farming did not consistently produce negative impacts for all time periods or regions; or (d) industrialized farming produced beneficial effects for some groups but Detrimental to other groups. These studies were found principally in the use of four research designs: regional impact studies of economic performance, macro-social accounting, case study, and survey. Regional impact studies (e.g., Heady and Sonka 1974; Marousek 1979) have tended to show costs-benefits for economic performance indicators, with larger farms injecting greater total income into the community, but also producing less employment relative to smaller farms. In the case of macro-social accounting studies reporting mixed effects, Lobao's (1990) study is an example. For counties in the forty-eight contiguous states, industrialized farming had no relationship with family poverty or median family income at either of two single time points (1970 and 1980); however, industrialized farming was related to higher income inequality at both time points and also to lower family income, higher poverty, and higher income inequality over the decade from 1970-1980 (i.e. counties with greater industrialized farming in 1970 experienced relative declines in socioeconomic well-being over the decade).

An example of a case study showing mixed effects is Wright, et al., (2001) conducted in six CAFO counties in Minnesota. This study demonstrated the mixed impacts of CAFOs for residents in these counties. This study found that CAFOs had positive effects for farmers who expanded their operations, detrimental effects for neighbors to CAFOs who saw their ability to enjoy their property deteriorate, detrimental effects for younger and mid-sized producers unable to expand because expansion by others had restricted their access to markets, detrimental effects for older producers who mourned a loss of a way of life, and no effects for those who were not neighbors or who were not expanding. The greatest detrimental effects were the decline in social capital as trust in government agencies declined due to their inability to make decisions in a timely manner, and a decline in cultural capital because of the differing visions of agriculture and of local communities.

A survey study (Jackson-Smith and Gillespie, 2005) also found mixed effects regarding the impact of scale on social relations. When demographic variables were controlled, there was little evidence that size of farm or use of hired workers was related to relationships with neighbors, however, farm size was the strongest predictor of neighbors' complaints about a dairy operation.

The ten studies that found no detrimental impacts of industrialized farming used regional impact models, macro-social accounting, and survey designs. Most of these studies analyzed only indicators of socioeconomic well-being. The regional impact study by Otto et al. (1998) indicated that larger farms are beneficial, both in terms of injecting greater income into a community and in creating more jobs. The results of this study were later challenged by Thompson and Haskins (1998) who argued that Otto et al. (1998) failed to correctly compare

large farms with smaller farms by holding constant total output. Here the point is not to dispute either study but to note that regional impact models because of their assumptions, use of shocks (i.e. disruptions to the regional economy), and focus on scale as opposed to organizational indicators usually find net benefits for specific economic performance indicators. An example of a macro-social accounting study that found no detrimental impacts is Lobao and Schulman (1991). They examined whether industrialized farming was related to higher poverty for the four major agricultural regions in the contiguous states for 1970-1980. They found while moderate-size family farming was related to lower poverty for the North Central states, there was no significant relationship between poverty and industrialized farming in any of the four U.S. regions analyzed. Most of the macro-social accounting studies finding no detrimental impacts of industrialized were conducted using data for 1970-1980. Skees and Swanson (1988) note that the time period may be a factor why detrimental impacts are less likely to be found, because industrialized farming was more regionally confined and of less magnitude in the past than in more recent time periods. A recent survey design study (Foltz and Zueli, 2005) did not find evidence that large farms are unlikely to purchase locally when the presence or absence of local suppliers was taken into consideration, and instead demonstrated that purchasing patterns are commodity specific and are determined by community attachment, and local supply considerations.

D. Examples of Recent Sociological Research on the Consequences of Industrialized Farming

1. Macro-social Accounting: Several macro-social accounting studies provide examples of recent sociological research on industrialized farming. The most recent macro-social accounting studies on the effects of industrialized farming are by Crowley (1999), Crowley and Roscigno (2004), Welsh and Lyson (2001), Lyson et al. (2001), and Peters (2002).

The 1999 study by Crowley analyzed the effects of farm concentration using several indicators: concentration of land, value of land and buildings, and the value of equipment and machinery) and data for counties in the North Central region comprising Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, North Dakota, South Dakota, and Wisconsin. She analyzed consequences of these dimensions of farm-sector concentration for local levels of poverty and inequality, controlling for the influences of labor market, demographic, spatial, and other farm structure characteristics. As noted earlier, she found where farm sector concentration is higher (i.e., a few large farms held a large share of local property in land and real estate) both poverty and inequality are higher and education is lower.

In the 2004 study, Crowley and Roscigno documented how concentration of agricultural resources shapes rural community stratification through the political economic process. In addition to measures of farm sector concentration, measured by the gini coefficient and labor endowment, they extended the analysis to include measures of political process, and worker power attributes. Again using data for all (1053) counties in the North Central U.S. they found that dimensions of farm sector concentration shape both poverty and inequality. Furthermore, they found that farm sector concentration is explained by political economic processes, and these processes mediate the negative effects of land concentration on economic well-being. In particular, they found that relative to large scale farms, capital concentration promotes govern

ment spending that benefits large farms while it blocks government or labor-market programs that assist farmers whose farms it consumes and farm workers it exploits.

Whether people in agricultural areas in states with anti-corporate farming laws fare better on measures of economic health than do people in agricultural areas in states without such laws was studied by Welsh and Lyson (2001). In examining states with anti-corporate farming laws (Iowa, Kansas, Minnesota, Missouri, North Dakota, South Dakota, Oklahoma, and Wisconsin), they found that agriculture dependent counties in states with such laws fare better on economic measures, i.e. less families in poverty, lower unemployment, and higher percentages of farms realizing cash gains.

In the first analysis of all agriculture dependent counties, they found that agriculture dependent counties in states with anti-corporate farming laws have lower poverty rates, lower levels of unemployment, and a higher percentage of farms reporting cash gains than agriculture dependent counties in states without anti-corporate farming laws. These results were consistent for both the cross-sectional analysis (across states in same time period) and longitudinal analysis (within states across time periods). In the second analysis of states with more restrictive anti-corporate farming laws compared to states with less restrictive laws, the restrictiveness index had no effect on poverty in the cross sectional analysis (across states at the same time period) but a slight, positive association in the longitudinal analysis (within state, across time periods). That is, states with more restrictive laws have slightly higher poverty rates over time than do states with less restrictive laws. The restrictiveness index had a strong, negative association with unemployment in the cross-sectional analysis, but no association in the longitudinal analysis. That is, states with more restrictive laws have lower poverty rates at the same point in time than do states with less restrictive laws. Finally, the restrictiveness index had a strong positive association with the percentage of farms reporting cash grains in the cross-sectional analysis, but no association in the longitudinal analysis. That is, states with more restrictive laws have higher percentages of farms reporting cash gains at the same point in time than do states with less restrictive laws.

Lyson et al. (2001) found support for Goldschmidt's findings of a negative relationship between farm scale and community well-being, but these negative relationships were mediated by the presence or absence of a civically-engaged middle class. This study examined the agriculture dependent counties in the U.S. for the period 1982 to 1992. In this study, community welfare is measured by percentage of families in poverty, unemployment rates, and percentage of low birth weight babies. Civically-engaged middle class is measured by percentage of workforce that is self-employed, percentage of labor force working at home, and percentage of small commercial establishments. Farm scale is measured by percentage of sales by farms of \$500,000 in sales, percentage of farm operators residing on their farms, percentage of tenant farmers in county, and percentage of hired labor on largest farms. They concluded that the presence of a civically-engaged middle class is a more consistent predictor of rural community welfare than was farm scale. More specifically, they found that counties dominated by large scale, absentee owned, agricultural enterprises have less favorable welfare outcomes. However, the presence of a civically-engaged middle class mitigates the negative relationships and enhances positive relationships between farm scale and community welfare. Their findings did not dispute the Goldschmidt hypothesis of a negative relationship between large scale, industrial type farms and community welfare, but they argue that the relationship is not as economic and deterministic as had been typically hypothesized.

A study of the non-metropolitan counties in Iowa, Kansas, and Missouri by Peters (2002) found support for the argument that the economic structure of the agricultural, industrial and service sectors impacts socioeconomic conditions in non-metropolitan areas. More specifically, he found that areas with greater concentrations of owner-operated farms result in decreased children at risk scores. He argues that this finding supports the Goldschmidt hypothesis that family farming areas are better developed both economically and socially. Because the concentration of non-farm proprietorships did not predict children at risk scores, he suggests that it was not proprietorships in general that mattered as much as the economic nature of farming. He notes two problems with this measure: It does not differentiate between types of farm proprietorships, either by farm size, primary occupation, or management structure, and it does not identify what is unique about farm proprietorships as contrasted to other types of proprietorships that causes improved socioeconomic conditions for children. He also found that areas with greater concentrations of industrial agriculture, characterized by wage labor relations, produce worse socioeconomic conditions for children. This was one of the weakest predictors of children at risk scores, but one of the strongest predictors was percent employed in animal slaughter and meat processing which causes scores to increase. Peters argues that although not considered agricultural production, meat manufacturing is considered part of the agro-food industrial complex. When the measures of both production and of manufacturing of agricultural products are taken together as a measure of industrial agriculture, he argues they support the Goldschmidt hypothesis.

2. Case Studies: Five recent case studies (NCRCD, 1999, Seipel et al., 1999; Wright et al., 2001; Constance and Tunistra, 2005; McMillan and Schulman, 2003) document the detrimental effects of confined animal feeding operations (CAFOs), a particular kind of industrial agriculture, on community quality of life.

A comprehensive case-study on industrialized farming is that by the North Central Regional Center for Rural Development (NCRCD, 1999). This study is useful for providing documentation about relationships over time and for assessing impacts on a wide range of socioeconomic, social fabric, and environmental indicators. The study examines the impacts of a large, confined animal feeding operation (CAFO) owned by the Seaboard Corporation, which moved to Texas County, Oklahoma in 1992. Company officials indicated that Seaboard was attracted to Oklahoma because of the state's "relatively lax anti-corporate farm laws, permissive groundwater access laws, and generous public sector incentives" (NCRCD 1999:1). Public sector incentives given to Seaboard to locate in the county totaled \$60.6 million dollars, with the capital coming from publicly repaid bonds, taxes foregone, interest subsidies and grants, an investment of \$27,500 per job created. At the time Seaboard moved to Texas County in 1992, the county had an unemployment rate of 3.7% and was among the highest per capita income counties in the state. Seaboard made extensive land purchases in the county to establish corporate-owned swine production facilities as few local cattle ranchers were interested in raising pigs due to the terms of the contracts offered (NCRCD 1999:16). To analyze the effects of the CAFO, a comparative case-study design was used where changes in Texas County were compared to thirteen other farming dependent counties in Oklahoma. As a strategy of local

economic development, the CAFO performed poorly.¹³ The number of jobs, per capita income, poverty rate, number of new businesses, and total bank assets did not change at a rate significantly different from the other, comparison farming dependent counties. Consumer loans increased at a greater rate in Texas County, but increases in commercial and industrial loans were greater in the comparison counties. The economic benefits gained were increases in retail sales and property values. The community costs of the CAFO were experienced largely in social fabric and environment. With regard to social fabric, beneficial impacts were seen in increased population and school enrollment relative to comparison counties. But most other indicators showed rifts in the social fabric. Crime rates increased by 74% in Texas county, compared to a decline of 12.5% in the comparison counties over 1990-1997 (NCRCD 1999:38). Theft increased 64%, while it decreased 11% in the comparison counties. Violent crimes increased 378%, but decreased by 29% in the comparison counties. Availability of housing declined and rental rates increased to a greater degree than the comparison counties, indicating that crowding is occurring and that the elderly and poor may be priced out of the county. With regard to the environment, water quality violations were much greater in Texas County relative to the comparison counties. Livestock water use increased 66% from 1990 to 1995 in the county. Environmental impacts noted by NCRCD (1999) were in water depletion and quality, odor, and increased risks of nutrient overload in local soils.

Research by Seipel et al. (1999) elaborate on the NCRCD (1999) findings by outlining reasons why industrialized farming contributes to breakdowns in social fabric and to environmental degradation. Based on research in four Missouri communities, they note that *CAFOs tend to increase social conflict and personal and community stress for the following reasons:*

1. Some individuals and communities are exposed to the social and environmental harm of CAFOs when other people and communities are not, creating conflict between those residents that pay the costs of industrialized farming and those that do not.
2. The public has often not been involved in decision-making and has not chosen this development as a group.
3. Community residents experience loss of personal control as outsiders, politicians, and corporations are perceived as exercising control over local lives.
4. There is an infusion of new systems and people that communities must now accommodate.
5. While hog farms are a normal part of many rural areas, concentrated operations of thousands of animals confined to one location are not.
6. There is insecurity about health. Residents look to CAFOs and odor to explain personal and family health-related problems. There is increased concern about the health of children and later generations.

¹³ The NCRCD (1999:28-29) study describes how incorrect assumptions in input-output analysis led to misleading results about projected impacts of recruiting the new integrated corporate hog and pork producer to Texas county. Analysts used a figure of \$35,137 for average annual income of swine production jobs in input-output models. However, this figure was derived from research in Iowa and was nearly twice the amount earned by swine production workers in Oklahoma. Thus, the input-output analysis severely over-estimated the total income and number of jobs that would be produced in the county by recruiting the corporation.

7. There is “loss of perceived control” (an indicator related to social psychological stress and depression). There is guilt and anxiety over the inability to protect oneself and family, and a feeling of powerlessness concerning resolution of the problems brought on by the industrialized operation.
8. Residents’ perceptions about their community changes from a place of security and sense of attachment to a “a degraded space and context of conflict.”
9. There is anger and disgust with those who bring CAFOs to the community, which leads to general distrust of government.
10. There is a social stigma attached to living in a CAFO community due to the deterioration of local landscape and to odor problems.

Seipel et al. (1999) note the following general environmental problems related to hog CAFOs:

1. Algae growth and oxygen depletion of surface waters
2. Contamination of wells and groundwaters
3. Contamination of surface water drinking supplies
4. Risk of drinking water contamination due to pathogens such as fecal coliform
5. For workers on CAFOs, the risks of health problems include: asthma, organic dust toxic syndrome, upper airway inflammation, and bronchitis
6. For neighbors of CAFOs, environmental health problem risks include: upper respiratory and digestive track disorders, headaches, nausea, and burning eyes.

Case studies conducted by Wright, et al., (2001) in six CAFO counties in Minnesota demonstrated the mixed impacts of CAFOs for residents in these counties. In these studies they found that CAFOs had positive effects for farmers who expanded their operations, detrimental for neighbors to CAFOs who saw their ability to enjoy their property deteriorate, detrimental for younger and mid-sized producers who were unable to expand because expansion by others has restricted their access to markets, detrimental for older producers who mourned a loss of a way of life, and no effects for those who were not neighbors and who were not expanding. The greatest detrimental effect was the decline in social capital as trust in government agencies declined due to their inability to make decisions in a timely manner, and a decline in cultural capital because of the differing visions of agriculture and of local communities.

A case study by Constance and Tuinstra (2005) found that the quality of life was more stressful and less neighborly in communities with chicken CAFOs. The strain between neighbors and CAFO owners was evident in their perception of the issues. While neighbors focused on substantive concerns of odor nuisances, water pollution, health problems, property values and community disruption, CAFO owners minimized these concerns by saying that it was either neighbors’ jealousy or their impractical views of rural land use was the basis for their complaints. Some neighbors had been interested in becoming contract producers, but they had been turned off by Sanderson Farms’ hard sell and did not think the contract Sanderson held out was a good business decision. Others realized that once the contract had been signed and chicken houses had been built, growers were locked into long term commitments. Thus, the community was at an impasse over the chicken CAFOs which polarized community relations.

As in the previous example, McMillan and Schulman (2003) also found that CAFOs reduced the quality of life and increased community conflict. Neighbors complained about odor nuisances, voiced concerns about the environmental consequences, worried about health related

concerns, thought they had been betrayed by hog producers, and felt the government had been unresponsive. Producers contended that swine CAFOs provided economic benefits to a depressed community, blamed the media for sensationalizing the concerns about CAFOs, and dismissed neighbors' concerns about quality of life, environmental and health issues as being irrational or overstated. Activists were concerned about the impact of the hog industry on health, the environment, local economic opportunities, community neighborliness and cohesion. They were especially concerned about its effects on the environment and human health through contamination of drinking water.

3. Regional Economic Impact Models: Results of analysis from several recent economic impact models (Gomez and Zhang, 2000; Deller, 2003; Foltz, et al., 2002) indicate that industrial agriculture poses detrimental effects to community well being.

The results of one study in Illinois (Gomez and Zhang, 2000) found that large hog farms actually hinder economic growth in rural communities. In a study of 2240 non-metropolitan US counties, Deller (2003) found that large scale agriculture, measured in sales and value added, and counties' dependence on agriculture, tends to result in lower levels of economic growth. He suggests that as agriculture expands either in terms of farm size or overall share of the economy, it would place downward pressure on regional growth rates. A study of dairy farms in Wisconsin by Foltz, et al. (2002), showed that scale (measured in herd size) had a negative effect on share of input purchases made locally. While one model suggests that community attachment increases local expenditures, another model indicates that that effect is described by distance. Demographic variables did not explain where dairy farmers make their purchases either. Both of the economic models show a significant negative effect for larger farm sizes (herd size) on the share of purchases made locally.

4. Survey Research: Several recent Survey Design Studies demonstrate the effects of industrialized farming on community quality of life. The most recent survey research on the effects of industrialized farming are by Reisner et al., (2004), Smithers et al. (2004), Foltz and Zueli, (2005), and Jackson-Smith and Gillespie (2005). Reisner et al. (2004) focuses on the strain on relations between neighbors and CAFO owners. The remaining three studies focus on how industrial agriculture affects relationships with neighbors or farm purchasing decisions.

The research by Reisner et al., (2004) documented the extent to which CAFOs increase the social tensions between neighbors and owners of swine farms in the community as well as the completely different definitions of the problem by neighbors and swine CAFO owners. While both residents and CAFO owners agreed on the presence, level and length of the controversy, residents were much less satisfied and perceived much less support for CAFOs than did the owners. Additionally, while the owners blamed many groups for the controversy over building or expansion of swine CAFOs, the neighbors identified themselves as the source of the controversy. Neighbors felt that large scale farming was a *fait accompli*, but they were much less satisfied with the presence of CAFOs than the owners thought they were. The greatest differences between neighbors and owners was about the degree of effect of the large-scale swine farms. Neighbors reported more days with detectable odors than did owners and were more likely to believe that there were problems with water pollution and more likely to report that CAFOs were causing their homes to decline in value.

Three survey design studies also discussed the extent to which industrial agriculture has affected social relationships between large scale farmers and their neighbors, or between large scale farmers and their communities. Smithers et al., (2004) in their survey of Ontario farmers, found that those classified as being in the expansionist mode were constrained in their ability to participate in social activities and organizations, were more likely to not purchase their inputs locally but instead sought the cheapest source, and viewed the community instrumentally in regards as to the goods and services it could provide the farm.

Foltz and Zeuli (2005) did not find that large scale farms (in terms of herd size) purchased less locally than did small farms. They did find that the presence or absence of local marketing or supply outlets and attachment to community influence the decision to purchase locally. Generally, they found that purchasing patterns are commodity specific and not determined by farm size or other farm-level characteristics. Attachment to a community affects purchasing decisions only where there is a choice available to farmers.

Jackson-Smith and Gillespie (2005) were also interested in the relationships between large scale dairy farmers (in terms of herd size) and their neighbors. In the multivariate analysis, demographic variables were associated with knowing neighbors well. When demographic variables (age, children at home, length of time operating the farm) were controlled, there was little evidence that size of farm or use of hired workers was related to relationships with neighbors. Farm size, however, was the strongest predictor that neighbors had complained about a dairy operation. These results, they suggest, indicate that regardless of a dairy farm's household social ties, building a large operation will generate conflicts with neighbors. In regard to community participation, they found that both demographic and farm structural variables determine participation. More specifically, age, education, children at home, use of hired workers, and plans to remain in dairy farming are positively related to involvement in community organizations.

Finally, one study used neighborhood level analysis to test the relationship between exposure to concentrated animal feeding operations and perception of CAFO impacts on rural communities, the economy, and the environment. Kleiner (2003) argues that the neighborhood and not the county is the unit of analysis that is more appropriate for understanding the impacts of industrialization of agriculture. Using GPS technology, she identified households for their actual distance from a swine CAFO in two counties characterized by large-scale, corporate-owned and operated swine CAFOs. She compared responses to rural residents in a control group county without such CAFOs. Her analysis found that proximity to large-scale livestock facilities is associated with people's perceptions of CAFOs impacts, especially environmental impacts. The lower mean scores on overall community impacts and environmental impacts for residents in the neighborhood closest to a CAFO of a county characterized by high concentration of CAFOs were expected when compared to mean scores derived from the combined data from the three counties. Furthermore, attitudes about current regulations for CAFOs were found to be more negative for the residents in the neighborhood in the county characterized by a high concentration of CAFOs compared to the combined scores for the three counties. When the types of impacts were analyzed separately, she found that economic impacts are more obvious to residents than perceived social and environmental impacts. This explains, she contends, why residents of corporate CAFO counties are more likely to perceive CAFO impacts more positively than residents of the non-corporate CAFO county which have less direct experience with them. The findings suggest that negative CAFO impacts perceived by residents in close proximity tend

to impact behavioral patterns in and around the home, especially in the county where CAFOs are most concentrated.

E. Industrialized Farming and Regional Imbalances in Opportunities to Engage in Farming and Well-Being

Thus far this report has focused on impacts occurring in communities. Another way that industrialized farming may adversely affect public well-being is through creating differences within a region. Until recently, the historical predominance of moderate-size family farms in the Heartland helped create a stable region economy with middle class farming communities (Flora and Flora 1988; van Es et al. 1988). This is now changing. For the Heartland states, economists at the Federal Reserve Board of Kansas City indicate that differences in communities within any given state will widen over time with regard to communities' ability to participate in commodity agriculture. It is useful to quote at length from their analysis (Drabenstott and Smith 1996:4).

Agriculture is a common ingredient to the rural economy throughout the Heartland. The 12 Heartland-states are home to more than two-thirds of the nation's farm-dependent counties. Historically, agriculture has been a primary engine of growth for rural communities. A large number of mid-sized farms have created significant economic multiplier effect for agriculture, enhanced by any local agricultural processing in rural areas.

Today, that picture is changing. Heartland agriculture has moved quite rapidly to fewer, bigger farms. The largest farms in the United States, those with annual sales greater than \$500,000 a year are just 2.5% of all farms; yet they account for 40 percent of farm output. A similar pattern is found in Heartland states.

As agricultural production has moved to bigger farms, agriculture's links with local rural communities have weakened. Large farms tend to procure their inputs, including financial capital, from more distant places that can offer more products and lower prices. In addition, large farms often have direct marketing relationships with processors, by-passing local buyers.

More recently, a pickup in the industrialization of agriculture has further weakened linkages to local rural communities. Industrialization refers to the movement toward more direct production and marketing relationships between producers and processors, a trend now symbolized by the broiler industry. Under industrialization, processors attempt to secure a stable supply of consistent product while exploiting the economies of scale in new production and processing methods. The result is a further concentration of production, as production shifts to bigger firms and clusters around processing plants much more than in the past.

Industrialized agriculture produces two effects on rural communities. As production increases in some "cluster" communities, it will leave others, lessening agriculture's impacts. Communities that are home to industrialized production and processing may see jobs and income increase. But even there, the economic links will be different than under community production. More production inputs are purchased from nonlocal sources, and more of the profits go to nonlocal owners of the firm.

Agriculture remains important to the Heartland. But its economic impact is much different than in the past. Commodity agriculture remains, but it is in bigger hands. And the advent of industrialized agriculture creates a new pattern of agricultural haves and have-nots. And even in those communities that have industrialized agriculture, the economic links are different than in the past.

Barkema and Drabenstott (1996:72) note that while some communities in the region will lose farms and farmers due to production concentration in other communities, those gaining new agribusiness, at least in the meat industry, are not likely to realize great economic gains.

While the region's meat prospects are good, the corresponding economic impact may be low. Wages in the meat industry are relatively low. Moreover, the value added in meat processing is low. The average value added for all food products is 39 percent, for meat products it is just 21 percent. Thus, the region's solid prospects for expanding meat processing are unlikely to provide a wide-spread economic tide for Heartland

Barkema and Drabenstott's (1996:72) conclusion is supported by the NCRCRD (1999) study above that found no appreciable gains in per capita income and employment growth where CAFO recruitment occurred relative to comparison counties in Oklahoma where it did not occur. In the industrial sociology and economic geography literatures, food processing is considered part of the peripheral manufacturing sector (Lobao et al. 1999). Production here is routinized, wages are relatively low-wage compared to durable manufacturing and certain services, and firms tend to be more footloose in seeking out low-costs labor. In sum, reliance on meat processing is not likely to enhance community development over the long-term.

Relatedly, communities that look to industrialized farming to solve economic development problems will not only confront the problems noted above in terms of social fabric and environment but also are pursuing a strategy that may be costly in terms of long-term development. While it is often noted that smaller farms (as all smaller businesses) fail more often than larger farms,¹⁴ analysts rarely consider the opposite side of the coin: when large vertically-integrated farm corporations fail they are likely to do a great deal of community damage, particularly if scarce public resources have been used to attract them. NCRCRD (1999) details the extensive public sector incentives such as tax increment financing, tax exemptions, interest-free loans, and grants given to recruit CAFOs. Public resources and community well-being are at risk should such farms underperform in their agreements with local governments or fail overall.

As vertically integrated production in agriculture is new to many communities, its failure rate is yet to be adequately assessed, particularly over the long-term. Public concern with large confinement operations is demanding that these farms adhere to ever higher standards of social and environmental responsibility. Whether the operators of these farms have the skills and expertise to succeed in a climate demanding increased consumer and public accountability and at the same time remain competitive is unclear. In Ohio, for instance, the German owner of Buckeye Egg Farm (one of the country's largest egg producers with nearly 15 million hens in three Ohio counties) was banned from professional contact with animals in his native Germany. His operations in Ohio have faced a continual series of "serious environmental, regulatory, financial and public- relations problems" in the 1990s (Columbus Dispatch, November 7, 1999: 2g). The Ohio EPA recently filed a lawsuit accusing the company of violations of Ohio's solid-waste, water-pollution-control, safe-drinking-water, air-pollution and nuisance laws (Columbus Dispatch, December 22, 1999: 1h-2h).

The diversion of state and local resources toward regulating the operation of large farms confining many animals to a single location must be considered in assessing the impacts of industrialized farming. The problem is compounded in rural areas, because rural local governments are already disadvantaged in staff and fiscal resources needed to adequately serve their

¹⁴ Sociologists again would point out that moderate-size farms are not inherently less efficient producers but that they are disadvantaged in competing with large farms that have transaction costs advantages in terms of buying and selling.

populations. They do not have the resources to engage in endless rounds of litigation to protect the well-being of their residents.

IV. SUMMARY AND CONCLUSIONS

Based on the evidence generated by social science research, we conclude that public concern about the detrimental community impacts of industrialized farming is warranted. In brief, this conclusion rests on five decades of government and academic concern with this topic, a concern that has not abetted but that has grown more intense in recent years, as the social and environmental problems associated with large animal confinement operations have become widely recognized. It rests on the consistency of five decades of social science research which has found detrimental effects of industrialized farming on many indicators of community quality of life, particularly those involving the social fabric of communities. And it rests on the new round of risks posed by industrialized farming to Heartland agriculture, communities, the environment, and regional development as a whole.

In this report, a review by Lobao (2000) was updated to 2006 so that the findings of past and recent research on industrialized farming could be systematically documented. The conclusions from fifty six studies (32 detrimental effects and 14 some detrimental effects) examining the consequences of industrialized farming for communities were evaluated. Approximately 82 percent of these studies found adverse impacts on indicators of community well-being. The types of indicators and the number of studies reporting these are discussed in Table 1 and in the text. Analysts have tended to find the following impacts.

For socioeconomic well-being, researchers noted that industrialized farming was related to higher income inequality and to lower community employment, relative to moderate-size family farming. Higher income inequality indicates that industrialized farming is less likely to sustain middle-class communities. Places with higher income inequality also are prone to other social problems because the gap between affluent and poor is greater. With regard to other socioeconomic impacts, such as total income injected into the community, regional economic impact models were likely to report beneficial impacts. However, the findings for income inequality suggests that income growth is impeded in trickling down to families.

Studies assessing consequences for the social fabric of communities were likely to find detrimental impacts. Industrialized farming affects the social fabric of communities through altering population size and social composition which affect crime, social conflict, family stability, the local class structure, community participation, and local shopping patterns. Case-studies reported the loss of local autonomy, in which communities become increasingly subject to the influence of external business owners whose interests may not be compatible with their own. More recent studies reported environment impacts. Because large animal confinement operations house densely concentrated livestock, they are prone to a host of negative environmental impacts on water, air, and human health.

Given the relative consistency of past research, the studies such as Crowley's (1999), Crowley and Roscigno's (2004), and Welsh and Lyson's (2001) which specifically analyzed North Central states, including North Dakota, and research focused on neighboring states in the region, there is every reason to expect that the conclusions drawn here apply to North Dakota. From the social science literature, we can anticipate four sets of impacts of industrialized farming for farming-dependent communities in Heartland states such as North Dakota: impacts

on socioeconomic well-being, social fabric, the environment, and regional imbalances.

Communities that receive industrialized farming are likely to increase population relative to other communities (that is, if local family farmers are not displaced). These communities may increase employment and per capita income but as shown by the NCRCD (1999) study, this may not be at a rate significantly different from comparison locales.

Communities with industrialized farms are likely to experience greater income inequality; government services for the poor and other disadvantaged groups are likely to be needed in these locales.

Communities that gain new industrialized farming will encounter stresses in the social fabric; community decision-making is likely to be more subject to corporate farm interests; and in the case of large livestock confinement operations, communities will be at risk for environmental and health problems, entailing the need for state and local government intervention.

Communities that lose moderate-size family farms, in part because of transaction cost advantages (e.g., volume buying-selling) and public incentives given to industrialized farms, will lose a base of middle class producers and experience rifts in social fabric, including population decline. These communities are likely to have declines in other businesses and in the local property tax base and may require government aid for social and public services.

Regional clustering of agricultural production is likely to occur (Drabenstott and Smith 1996:4). While some communities will gain industrialized farming (and its attendant costs and benefits) others will continue to lose their family farm base as production clusters closer to large processors. Within states, there is thus likely to be greater inequality between communities over time.

Not discussed in this report are alternative economic development strategies that farming dependent communities can pursue. Notwithstanding arguments that vertical integration into farming and production contracts are the only options left to keep American farmers farming, there are alternatives and some working examples are discussed in NCRCD (1999).

From a sociological standpoint, government plays a role in the types of consequences that industrialized farming will have for community well-being. It establishes the legal-institutional framework for regulating these farms. It establishes the incentive structure offered to agribusiness firms in their location decisions. It provides the public services needed to mop up the destabilizing impacts of industrialized farming, such as a rising crime rate, increased social conflict, and the need for social services to cope with a changing population. And government will need to provide the social services related to population decline and poverty alleviation in communities which lose family farming.¹⁵

Prior to Welsh and Lyson's (2001) research, the role that laws regulating corporate farms have in countering detrimental community impacts of industrialized farming had only been alluded to by some researchers. Lobao and Schulman (1991:596) postulated that one of the reasons why a few studies have found that industrialized farming has had less adverse effects in the North Central Heartland region (relative to the South and West) is due to its agrarian history

¹⁵ In non-farm dependent communities, government intervenes in a number of ways when paid employment, such as in manufacturing and mining declines: through programs such as unemployment insurance, various income transfers, such as welfare payments, for which independent farm operators are generally not eligible due to property ownership; through re-training programs, such as for workers who lose jobs because of NAFTA; and through enforcement of community rights in plant closure laws. Because of their farming base, farm-dependent communities usually cannot make as full use of these social safety nets as can other communities.

of protection of family farming and regulation of corporate farming. NCRCRD (1999:1) also indicated that “relatively lax anti-corporate farming laws, weak environmental regulations and permissive groundwater access laws” not surprisingly encouraged large, animal confinement operation to locate in Kansas. When Welsh and Lyson (2001) examined states with anti-corporate farming laws (Iowa, Kansas, Minnesota, Missouri, North Dakota, South Dakota, Oklahoma, and Wisconsin), they found that agriculture dependent counties in states with such laws fare better on economic measures, i.e. less families in poverty, lower unemployment, and higher percentages of farms realizing cash gains. In the comparison of states with less restrictive vs. states with more restrictive laws, they generally found the same results as with the comparison of states with anti-corporate farming laws and states without such laws.

Remote rural counties appear to be targeted as recent operating sites by large animal confinement operations. Research by Wilson et al. (2002) demonstrated that census blocks in Mississippi with high percentages of African Americans or people in poverty were much more likely to be the locations of swine CAFOs. Of all local governments, remote rural counties have the least resources (staff, economic development, and social service budget) to cope with industrialized farming. These governments are in weak positions to bargain successfully with external corporations, to regulate their operations once they are in place, and to protect community social life and environment overall. Remote rural counties are the places where state protection from industrialized farming is most critical due, in part, to the fragility of local government.

From a social science standpoint, the farming system in place today has been created from both market forces and government policy and programs. It is thus logical that government can also be an instrument in transforming this system toward greater public accountability.

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Table 1. Summary of Studies Examining Industrialized Farming and Community Well-Being*

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Goldschmidt (1968, 1978a) (1944, original)	Comparative Case Study, two communities	California	scale/organization	Socioeconomic/Social Fabric (class structure, services, population, politics, retail trade)	Detrimental
Tetreau (1938, 1940) (one study, two articles)	Survey Design Study, 2700 households	Arizona	scale/organization	General Socioeconomic Indicators/Social Fabric (class structure)	Detrimental
Heffernan (1972)	Survey Design Study, 138 broiler producers	Louisiana	organization	Social Fabric (social psychological indicators, community involvement)	Detrimental
Heady and Sonka (1974)	Regional Economic Impact Model of 150 producing areas	continental U.S.	scale	Socioeconomic: Economic performance (income, employment generation)	Some Detrimental: large farms lower food costs but generate less total community income
Rodefeld (1974)	Survey Design Study, 180 producers from 100 farms	Wisconsin	scale/organization	Socioeconomic/Social Fabric (class structures, services, population size)	Detrimental
Martinson et al. (1976)	Survey Design Study, 180 producers	Wisconsin	organization	Social Fabric (social psychological indicators)	Detrimental
Fujimoto (1977)	Macro-social Accounting, 130 towns	California	scale	Social Fabric (community services)	Detrimental

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Flora et al. (1977)	Macro-social Accounting, 105 counties	Kansas	scale/organization	Socioeconomic/Social Fabric (class structure, services)	Some Detrimental: industrialized farming is related to greater income inequality but other relationships not clearly supported
Small Farm Viability Project (1977)	Comparative Case Study, reanalysis of Arvin and Dinuba	California	scale/organization	Socioeconomic/Social Fabric (class structure, services)	Detrimental
Goldschmidt (1978b)	Macro-social Accounting, states	entire U.S. except Alaska	scale	Social Fabric (agrarian class structure)	Detrimental
Heffernan and Lasley (1978)	Survey Design Study, 36 grape producers	Missouri	organization	Social Fabric (community social and economic involvement)	Some Detrimental: operators of nonfamily farms less involved in community activities but little support for other relationships
Wheelock (1979)	Macro-social Accounting, 61 counties	Alabama	scale	Socioeconomic/Social Fabric (class structure, population size)	Some Detrimental: rapid increases in farm scale related to decline of population, income, and white collar labor force; other relationships mixed.
Marousek (1979)	Regional Economic Impact, one community	Idaho	scale	Socioeconomic: Economic performance (income, employment generation)	Some Detrimental: large farms result in greater regional income but produce less employment than small farms

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Buttel and Larson (1979)	Macro-social Accounting, state-level data	entire U.S.	scale/organization	Environment (energy usage)	Detrimental
Heaton and Brown (1982)	Macro-social Accounting, county-level data	continental U.S.	scale/organization	Environment (energy usage)	No Detrimental
Swanson (1980)	Macro-social Accounting, 27 counties	Nebraska	scale	Socioeconomic/Social Fabric (population size)	Detrimental
Poole (1981)	Survey Design Study, 78 farmers	Maryland	scale	Social Fabric (involvement in community organizations)	Detrimental
Harris and Gilbert (1982)	Macro-social Accounting, state-level data	continental U.S.	scale/organization	Socioeconomic/Social Fabric (class structure)	Some Detrimental: large farms result in more lower class farm personnel but have positive total effects on rural income
Swanson (1982)	Macro-social Accounting, 520 communities	Pennsylvania	scale/number of farms	Social Fabric (population)	No Detrimental
Green (1985)	Macro-social Accounting, 109 counties	Missouri	scale/organization	Socioeconomic/Social Fabric (services, population size)	No Detrimental

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Skees and Swanson (1988)	Macro-social Accounting, 706 counties	Southern U.S., excluding Florida, Texas	scale/ organization	Socioeconomic/Social Fabric (services)	Some Detrimental: moderate-size farms produce greater employment; large and very small farms related to higher unemployment; some detrimental impacts of large farms over time
MacCannell (1988)	Macro-social Accounting, 98 counties	Arizona, California, Florida, Texas	scale/ organization/ capital intensity	Socioeconomic/Social Fabric (population size, retail trade, local government taxation and expenditures)	Detrimental
Flora and Flora (1988)	Macro-social Accounting, 234 counties	Great Plains and West	scale	Socioeconomic/Social Fabric (retail trade, population size)	Some Detrimental: medium-sized farms relative to large farms enhance community well-being
Buttel et al. (1988)	Macro-social Accounting, 105 counties	Northeast	organization	Socioeconomic/Social Fabric (population, retail trade)	No Detrimental
van Es et al (1988)	Macro-social Accounting, 331 counties	Corn Belt	scale/ organization	Socioeconomic/Social Fabric (population size)	No Detrimental
Gilles and Dalecki (1988)	Macro-social Accounting, 346 counties	Corn Belt and Central Plains	scale/ organization	Socioeconomic	Some Detrimental: counties with greater numbers of hired laborers tend to have lower socio-economic well-being; other relationships for scale not supported

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Lobao (1990)	Macro-social Accounting, 3037 counties	Continental U.S.	scale/ organization	Socioeconomic/Social Fabric (income, poverty, income inequality, teenage fertility, infant mortality)	Some Detrimental: moderate-size family related to better socioeconomic conditions. Industrialized farming related to greater income inequality and births to teenagers, and over time to greater poverty and lower family income, but not to other indicators
Lobao and Schulman (1991)	Macro-social Accounting, 2,349 rural counties	U.S. and four regions	scale/ organization	Socioeconomic (poverty)	No Detrimental: moderate-size family farms related to lower poverty, most regions, industrialized farms have little relationship to poverty in any region
Barnes and Blevins (1993)	Macro-social Accounting, 2,000 rural counties	U.S.	scale/ organization	Socioeconomic (poverty, median income)	No Detrimental

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Durrenberger and Thu, (1996)	Macro-social Accounting	Iowa	Scale: farm size in acres, total county hog inventory, farms with hogs, farms with more than 1000 hogs, net agriculture sales	Socioeconomic (people living in poverty, people receiving food stamps)	Detrimental: The more large scale operations, the fewer small and moderate farms and the more people who use food stamps. Most hogs in Iowa are produced in small and moderate sized integrated operations. Since total hog operations are related to a decline in small and moderate sized operations. The more farms that produce hogs, the fewer people who use food stamps.
Otto, et al. (1998)	Regional Economic Impact Study: pork operations	Iowa	scale	Socioeconomic: economic performance	No Detrimental: larger units create more local jobs and income
Thompson and Haskins (1998)	Regional Economic Impact, pork operations	Iowa	scale	Socioeconomic: economic performance	Some Detrimental: larger units create fewer local jobs than smaller units
Seipel, et al. (1998)	Hedonic Price Analysis, one county	Missouri	concentrated animal feeding operation	Sales prices of farmland parcels with and without houses	Detrimental: reduction in property prices of \$144 per hectare within 3.2 km of a CAFO
Schiffman, et al. (1998)	Quasi-experimental Design: 88 matched individuals	North Carolina	concentrated animal feeding operation	Social Fabric (social-psychological distress)	Detrimental: residents living near swine operations are more depressed due to psychological and physical effects of odors, reduced enjoyment of property

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Wing and Wolf, One study, (1999, paper) (2000, article)	Survey Design Study: 155 residents, three communities	North Carolina	concentrated animal feeding operation	Social Fabric (quality of life, health status)	Detrimental: residents of CAFO community report greater respiratory and gastrointestinal problems and eye irritations, lower quality of life, reduced enjoyment of property
Seipel et al. (1999)	Survey Design Study: 780 residents in four counties with pork production	Missouri	concentrated animal feeding operation	Social Fabric (attitudes toward increasing government regulation of corporate swine production)	Detrimental: majority of residents support increased regulation, strongest determinants of this position due to perceived detrimental economic, social, environmental impacts on community
North Central Regional Center for Rural Development (1999)	Comparative Case Study, 14 farm dependent counties, one of which recruited CAFO	Oklahoma	CAFO county compared to others	Socioeconomic: well-being, social fabric, Environment	Some Detrimental: Detrimental on social fabric and environment (e.g., greater crime), no appreciable gains in per capita income and jobs relative to non-CAFO counties; beneficial effects for a few indicators (increase in population, school enrollment, retail sales and property values)
Irwin et al. (1999)	Macro-social Accounting: 3024 counties	Continental U.S.	organization	Social Fabric (residential stability)	No Detrimental

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Crowley (1999)	Macro-social Accounting: 1053 counties in NC states	12 north central states	organization	Socioeconomic (poverty rate, income inequality)	Detrimental
Gomez & Zhang (2000)	Regional Economic Impact Models: (rural hog producing towns located in 76 rural cos. and 26 non-metro urban cos. with < than 50K hogs sold annually)	Illinois	CAFO/Scale	Social Fabric: Annual change in inflation-adjusted "real" retail spending	Detrimental on lower economic growth
Welsh and Lyson (2001)	Macro-social Accounting: 433 agric. dep. cos. in states with anti-corp. farming laws and in states without such laws.	Iowa, Kansas, Minnesota, Missouri, North Dakota, Oklahoma, South Dakota vs. states without anti-corp. farm laws	Scale/ Organization	Socioeconomic: percentage of families in poverty, unemployment rate, farms realizing cash gains	Detrimental on agric. dep. cos. in states without anti-corp. farming laws or in states with weaker anti-corp. farming laws.
Lyson et al., (2001)	Macro-social Accounting: 433 Ag. Dep. Cos. in the U.S	Ag. Dep. Cos. in the U.S.	Scale/Organization	Social Fabric: Civically engaged middle class, participation & involvement in civic affairs, community welfare	Detrimental are mediated by presence of civically engaged middle class. Communities in agric. dep. areas in which a high percentage of persons work for them- selves or operate independent businesses have higher levels of social welfare.

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Wright et al., (2001)	Case Study: Six CAFO counties – Pennington, Clearwater, Rock, Goodhue, Sterns, Morrison	Minnesota	CAFO/Scale	Social Fabric: social & community well-being – quality of life, community interaction, social capital	Some: Detrimental effects for neighbors, younger and mid-sized producers. Positive effects for those who expanded operations; No effects for those not neighbors or not expanding. Detrimental due to lack of trust in gov't. agencies and differences in shared vision of agric. & of local communities.
Foltz, et al., (2002)	Regional Economic Impact Models: 100 dairy farms in three dairy dependent communities – Athens, Chilton, and Richland	Wisconsin	Scale	Social Fabric: Share of local input purchases made locally	Detrimental: Significant negative effect for larger farm sizes (herd size) on share of input purchases made locally.
Peters, (2002)	Macro-social Accounting: All agric. dep. cos.	Iowa, Kansas & Missouri	Organization	Socio-economic: Children at risk -- % of children enrolled in free-reduced price meals, low birth rate infants,	Detrimental: Areas with lower concentrations of farm proprietorships results in increased children at risk scores. Areas with greater concentrations of industrial agriculture production results in increased children at risk scores.
Wilson et al., (2002)	Macro-social Accounting: Census blocks in rural counties with CAFOs	Mississippi	CAFOS (Swine)	Social Fabric: Whether swine CAFOs were located in high poverty/high Black census blocks	Detrimental: Swine CAFOs 2.4-3.6 times more likely to be located census block with poor African Americans.

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Deller, (2003)	Regional Economic Impact Models: 2249 non-metro U.S. cos.	Non-metro U.S. cos.	Scale	Socioeconomic: Growth rates in per capita income	Detrimental: Counties dominated by larger-scale agriculture experience slower growth rates in per capita income. As agric expands in terms of farm size or share of local economy, downward pressure is placed on regional growth rates.
Reisner, et al, (2004)	Survey Design Study: 22 newspapers covering 52 cos.	Illinois	CAFOs Swine	Social Fabric: Perceptions of source of controversy over swine CAFOs, of frequency of swine CAFO odors, & problems caused by CAFOs	Detrimental: Residents were far less satisfied with presence of facilities than farmers thought, reported more days with odors, were more likely to believe that CAFOs contributed to water quality problems, and report loss of value of homes near CAFOs
Crowley & Roscigno, (2004)	Macro-social Accounting: All counties in North Central States -- IA, IL, IN, KS, MI, MN,MO, NE, OH, ND, SD	North Central States	Scale/Organization	Socioeconomic: Percent of population living below poverty & inequality of income distribution among families	Detrimental: Dimensions of farm sector concentration shapes both poverty and inequality of income.

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Smithers, et al., (2004)	Macro-social Accounting	North Huron County, Ontario	Scale	Social Fabric: Community involvement, purchasing behavior, perception of community support by expanding, stable, and contracting farms	Detrimental: Farmers in the expansionist trajectory were constrained in their ability to participate in social activities & organizations, sought inputs at lowest cost, were less committed to sourcing locally, and saw the community in terms of what it could do for them rather what they could do for it.
Kleiner (2003)	Survey Design Studies: Three counties in MO, two characterized by swine CAFOs & one by independent hog production	Missouri	CAFOs	Social fabric: Effects of CAFOs on rural communities including economic, social and Environmental	Detrimental: Proximity to large-scale livestock facilities is associated with perceptions of CAFO impacts, especially environmental impacts.

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Constance and Tuinstra (2005)	Case Study Design; Three rural clusters of communities -- Normangee and Flynn Leon Co. and Midway in Madison Co.	East Texas	CAFOs (chicken broilers)	Social Fabric: Odor, water quality, health, property values, source of conflict, social effects	Detrimental: Quality of life deteriorated as it became more stressful and less neighborly. Neighbors focused on issues of odor nuisances, water pollution, health problems, property values, & community disruption. Growers minimized complaints by saying that neighbors' jealousy was the root cause of discomfort or suggested they were city folks with impractical views of rural areas.
Whittington & Warner (2006)	Case Study Design: Two communities with large-scale dairies (under 700 cows) Jackson Twp. in Wyandot Co. and Liberty Twp. in Wood Co.	Ohio	Scale	Social Fabric: Knowledge of and attitudes towards managers of risk of large scale dairies	Detrimental: Community members unable to identify managers of risk, felt hopeless to act, personal experience in agric. leads to understanding of issues, large-scale animal agric. is a cultural shift, two-way communication is essential, safety precautions by CAFO leads to greater community acceptance.

Study	Methodology	Region	Measures of Industrialized Farming	Community Well-Being Indicators	Results
Jackson-Smith & Gillespie (2005)	Survey Design Studies: Nine dairy farm dependent rural communities in seven states	Dairy dependent areas in NY, WS, MN, TX, UT, ID, & NM	Scale	Social Fabric: Relationships between farmers & neighbors; how well they know their neighbors; if they had ever had complaints about odor, flies, or noise; level of involvement in local community organizations & activities;	Some: Demographic variables are related to knowing neighbors well. When these are variables are controlled, there is little evidence that size of farm or use of hired workers was related to relationships with neighbors. Farm size is strongest predictor of likelihood that neighbors have complained about a dairy operation.
Foltz and Zueli, (2005)	Survey Design Studies: 141 dairy farmers in three dairy dependent WS towns – Athens, Chilton, and Richland	Wisconsin dairy dependent towns	Scale: Farm size measured by size of dairy herd	Social Fabric: Annual quantity of expenditures per unit for various farm inputs and supplies	No Detrimental: Very little evidence that small farms are more likely to buy locally than large farms. Purchasing patterns are commodity specific and not determined by farm size or farm-level characteristics. Presence of local marketing outlets affects decisions to purchase locally. Community attachment affects purchasing decisions when there is a choice available locally.
McMillan and Schulman (2003)	Case Study: Two CAFO counties, four focus groups (Citizens, Leaders, Producers, Activists) and anti-hog informants interviews	No. Carolina	CAFOs	Social Fabric: neighbor relations, environmental concerns, health concerns, enjoyment of property, quality of democratic participation, community cohesiveness	Detrimental: Increased community conflict and tensions between neighbors, reduced quality of life due to CAFO odors, increased worries about health concerns related to CAFO odors, and worries about environmental consequences

