

The community effects of industrialized farming: Social science research and challenges to corporate farming laws

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Abstract. Social scientists have a long history of concern with the effects of industrialized farming on communities. Recently, the topic has taken on new importance as corporate farming laws in a number of states are challenged by agribusiness interests. Defense of these laws often requires evidence from social science research that industrialized farming poses risks to communities. A problem is that no recent journal articles or books systematically assess the extent to which research to date provides evidence of these risks. This article addresses the gap in the literature. We evaluate studies investigating the effects of industrialized farming on community well-being from the 1930s to the present. Using a pool of 51 studies, we document the research designs employed, evaluate results as to whether adverse consequences were found, and delineate the aspects of community life that may be affected by industrialized farming. Of these studies, 57% found largely detrimental impacts, 25% were mixed, finding some detrimental impacts, and 18% found no detrimental impacts. Adverse impacts were found across an array of indicators measuring socioeconomic conditions, community social fabric, and environmental conditions. Few positive effects of industrialized farming were found across studies. The results demonstrate that public concern about industrialized farms is warranted. Scholars often debate whether research should be oriented around disciplines' accumulated body of knowledge or, conversely, provide critical knowledge in the public interest. Social scientists' long-term engagement in building the body of research on industrialized farming allows for accomplishment of both objectives.

Key words: Agriculture, Corporate farming, Corporate farm laws, Community well-being, Industrialized farming, Communities

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Introduction

Social scientists have long been concerned with the effects of large-scale, industrialized farming on communities. An extensive body of research from the 1930s onward addresses the risks posed to community well-being (Lobao, 1990). This same concern is shared by

states and localities particularly in the US farm belt. Nine states in the Midwest and Great Plains have statutes or constitutional provisions that restrict corporations from engaging in farming or from acquiring farm land. Although such laws cannot halt structural change in agriculture, they do control the organizational form of farm operations based on ownership arrangements

(McEowen and Harl, 2006). These laws also serve as a business climate signal, indicating that corporations may need to contend with a more stringent regulatory environment.

Recently, research on industrialized farming has assumed new importance because farm belt states are facing challenges to their corporate farming laws. Global agribusiness firms seeking to move to small, often remote rural communities along with farm organizations representing large, commercial clientele have sought to overturn existing laws. On the other side, state governments, often in alliance with family farm and environmental organizations have defended existing legislation. The clash has become one of “capital versus communities,” whereby corporations use the Interstate Commerce Clause in an attempt to override state legislation aimed at protecting family farming and communities (Pittman, 2004). A main defense of corporate farming laws hinges on social science research: to what extent does the body of research find that industrialized farming poses risks to communities? Evidence for adverse effects beyond economic lines, particularly social impacts, and across historical periods is needed to support state claims that regulating industrialized farming is warranted in the public interest. A problem, however, is that no recent journal articles systematically assess whether extant research provides evidence of these effects.

Although numerous empirical studies on the community impacts of industrialized farming exist, little published work appraises the body of research as a whole, and no study draws together findings to date about detrimental impacts. This hampers development of a cumulative knowledge base and social scientists’ ability to address a significant public issue.

Our purpose is to address the gap in the literature. We synthesize findings from eight decades of research. We document the types of studies conducted, evaluate results as to whether adverse consequences were found, and delineate aspects of community life that may be affected. The importance of these tasks is two-fold: our goal is to provide a systematic evaluation of research relevant to social scientists, and to provide states, localities, and nongovernmental organizations with a synthesis of findings useful in the public interest. First, we present an overview of the use of social science research in public debates about industrialized farming. Second, we take stock of research to date, focusing on conceptual and research design issues. Third, we evaluate findings from 51 empirical studies that address the question of detrimental impacts. The final section summarizes the results and considers future directions for research.

Although industrialized farming raises many public debates, we focus on the degree to which research provides evidence that industrialized farming jeopardizes communities. There are important reasons for this focus.

First, concern with the risks of industrialized farming is widespread across scholarly, policy, and popular audiences, as seen in the serious questions raised about agribusiness concentration, consumer health, food safety, ecosystem sustainability, as well as community well-being (Schlosser, 2001; Lyson, 2004). The most immediate public risks of industrialized farms, however, occur in communities where they are located. Second, the body of research on the community impacts of industrialized farming is motivated foremost by the question of risks. Researchers are interesting in testing – and in turn, confirming or rejecting – the hypothesis that detrimental community impacts may arise, a hypothesis first formalized by Walter Goldschmidt in the 1940s (Lobao, 1990). We seek to summarize findings with regard to this hypothesis. Third, to contribute to current litigation, it is critical to document whether adverse consequences are present or absent. The presence of adverse impacts supports states’ claims that the *intent* of corporate farm laws – to protect public well-being – is warranted in the public interest. The absence of these impacts supports the view that the state has no legitimate public interest in regulating corporate farming. Lastly, although our focus is the presence/absence of adverse outcomes, we also note studies finding positive outcomes.

Research on industrialized farming and the public interest

Researchers studying industrialized farming are concerned with a distinct structural shift, 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). Small-scale farms (defined here as those with annual gross sales less than \$50,000) made up nearly 79% of the nation’s farms in 2002 but they produced only 6% of sales, while the top 3% of farms (those with sales of over a half million dollars annually) accounted for 62% percent of all sales (National Agricultural Statistics Service, 2006). Accompanying farm scale increases are organizational changes, such as increases in the proportion of hired to family labor and use of legal incorporation.¹ Another organizational shift is a more integrated industry, whose “hallmark” is “contract production and vertical integration that links farmers to other agribusiness (Barkema and Drabenstott, 1996: 64).

In classifying farms as “industrialized” as opposed to “family” operations, the difference between the construct and its empirical measurement must be recognized. The construct, “industrial farm,” usually refers to a non-household based production unit. As with nonfarm firms, industrialized farms have a division of labor: they “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). Researchers studying industrialized farms invariably refer to both scale and organizational attributes.² Though distinct concepts, empirically scale tends to coincide with organizational attributes (Lobao, 1990; Wimberley, 1987). For the purpose of synthesizing research, we use the umbrella term “industrialized farming” when researchers refer to either scale or operating attributes of these units. We also distinguish between scale and operating attributes when useful and feasible to do so.

Social science research and public debates on industrialized farming: A brief history

Since the 1930s, social scientists have informed public debates regarding the community impacts of industrialized farming (Tetreau, 1938, 1940). However, the catalyst behind most studies is Walter Goldschmidt. Paralleling current controversies, Goldschmidt’s research involved a state law restricting industrialized farming. In the early 1940s, Goldschmidt, then employed by the USDA, conducted a study using a matched-pair of 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 purpose was to assess the effects of a California law placing acreage limits on farms. Goldschmidt (1978a: 458) notes: “Large landholders throughout the state and corporate interests generally opposed this provision while diverse church and other agrarian-oriented interests wanted this law... 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 (1978a) documented the adverse effects of large-scale farming on numerous community indicators. He found that relative to the family farming community, Arvin had a smaller middle class, more hired workers, lower family incomes, and higher poverty. There were poorer quality schools and public services and fewer churches, civic organizations, and retail establishments. Arvin’s residents also had less control over public decisions and low civic participation. Goldschmidt’s research report, though first suppressed by USDA and burned publicly in California, was later published as Congressional testimony (1968) and as a book (1978a). Although criticisms of his study exist (Hayes and Olmstead, 1984), its findings have proved quite resilient. Decades later, the Small Farm Viability Project (1977: 229–230) restudied Arvin and Dinuba, concluding: “The disparity in local economic activity, civic participation, and quality of life between Arvin and

Dinuba...remains today. There can be little doubt about the relative effects of farm size and farm ownership on the communities of Arvin and Dinuba.”

Social scientists neglected the study of industrialized farming and community well-being for decades, in part due to the controversy over Arvin-Dinuba (Goldschmidt, 1978a). By the 1970s, changes in agriculture and social science shifts toward more critical perspectives opened the topic to new scrutiny. Congress conducted inquiries in which agricultural economists and rural sociologists testified about the risks to communities posed by industrialized farming (Boles and Rupnow, 1979: 468–469). The Office of Technology Assessment also commissioned a series of studies on the topic (Swanson, 1988).

Historically, concern with industrialized farming and community well-being proceeded irrespective of commodity (Lobao and Meyer, 2001). Since the 1990s, attention has turned to large integrated livestock producer/processor enterprises (DeLind, 1998; Guess-Murphy et al., 2001; Wright et al., 2001), the current source of controversy over corporate farming laws.

The current period: Corporate farming laws and the Commerce Clause

Nine farm belt states – South Dakota, North Dakota, Oklahoma, Iowa, Minnesota, Wisconsin, Nebraska, Missouri, and Kansas – have statutes or constitutional provisions that restrict corporations from engaging in farming or agriculture or from acquiring, purchasing or obtaining land for agricultural production (National Agricultural Law Center, 2006). Other specific regulations encoded in these laws vary by state.³

When these laws have been challenged on the basis that they violate the Equal Protection Clause, Due Process Clause, Privileges and Immunities Clause and Contract Clause of the US Constitution, courts have consistently upheld their constitutionality (Pittman, 2004). In 2003, however, in *South Dakota Farm Bureau, Inc. v. Hazeltine*, the Eighth Circuit Court held that a voter-approved amendment to the South Dakota constitution was unconstitutional because it violated the dormant Commerce Clause of the US Constitution. The dormant Commerce Clause is characterized as the negative implication of the Commerce Clause, the courts interpreting it as “States may not enact laws that discriminate against or unduly burden interstate commerce” (Pittman, 2004: 3). Closely following the South Dakota decision, the US District Court of the Southern District of Iowa held in *Smithfield Foods, Inc. v. Miller* that Iowa’s corporate farming statute also violated the dormant Commerce Clause. The two cases marked the first time whereby corporate farming laws were challenged on the basis of the dormant Commerce Clause (Pittman, 2004). In both cases, the source of these challenges came from

integrated livestock producer/processors seeking to expand operations and encountering barriers due to existing legislation.

The dormant Commerce Clause creates a new use for research on the community impacts of industrialized farming: documenting the legitimate public purposes that the challenged corporate farming law serves. In deciding dormant Commerce Clause challenges to state laws, courts apply a two-tiered analysis. First, the court determines whether the challenged law discriminates against interstate commerce. Second, the court subjects the law to the “strictest scrutiny.” Here, the courts will determine the law to be constitutional only if it can be demonstrated that the law is intended to accomplish a legitimate public interest and there were no other methods to accomplish that objective. Although the court may not find the law discriminatory, it still may find it unconstitutional under the second tier of the dormant Commerce Clause (Pittman, 2004: 4). When corporate farming laws are challenged, one of the legitimate public interests postulated by their defenders is that industrialized farming can harm communities – requiring evidence as to the presence or absence of adverse community effects. In recent cases (South Dakota Farm Bureau, Inc. v. Hazeltine and State of North Dakota v. Crosslands) efforts to document the legitimate public purposes that the corporate farming law serves has fallen upon social scientists as expert witnesses who draw upon extant research investigating the community effects of industrialized farming (Lobao, 2000; Stofferhan, 2006). Another recent case (Gale and Bruning v. Jones), an appeal filed in 2006 to uphold Nebraska’s overturned corporate farm law, also draws directly from social science research on the topic.

Research on industrialized farming and community well-being

Numerous studies spanning different time periods and regions question the effects of industrialized farming. To provide a summary response, it is first important to explain the complex conceptual issues involved and research designs employed to answer the question.

Conceptual issues involved in determining the effects of industrialized farming

In assessing the effects of industrialized farming, a set of research issues must be considered. Although no one study can address all these issues, they should be considered cautionary parameters in documenting the risks posed to communities. In particular, studies may only assess direct, economic impacts of industrialized farming and overlook social impacts, providing an incomplete

response to the question of community risks that establishes the legitimate public interest component of the dormant Commerce Clause.

Industrialized farming should be studied using indicators of farm organization and not only scale

Although scale and organizational attributes overlap, analysts often employ scale alone as a simple proxy measure. Scale is usually measured by sales or sometimes acreage. As a measure of industrialized farming, scale is limited because: (1) family owned and operated farms may be large scale owing to technology; and (2) scale alone does not fully capture organizational features of industrialized farming thought to put communities at risk. Organizational measures of industrialized farming include: vertical integration of corporations into farming; contract farming arrangements; absentee ownership; dependency on hired labor; operation by farm managers as opposed to family members; and legal status as a corporation. With regard to legal status, family and non-family-held corporations should be distinguished.⁴

To adequately assess risks to community well-being, an array of outcomes should be considered

Often research centers on economic performance such as employment growth and misses other aspects of community well-being that may be at risk. Research reviewed below points to three major types of outcomes from industrialized farming impacts on: socioeconomic well-being; community social fabric; and local environment conditions. *Socioeconomic well-being* refers to standard measures of economic performance (e.g., employment growth, income levels, and business activity) and to a broader range of indicators of material conditions (e.g., poverty rates and income inequality). *Community social fabric* refers to social organization, the features of a community that reflect its stability and quality of social life. Impacts on community social fabric are seen in indicators such as: population change; social disruption indicators (e.g., crime rates, births to teenagers, social-psychological stress, community conflict, and interference with enjoyment of property); educational attainments and school quality; changes in social class structure (e.g., decline of the local middle class, in-migration of low wage workers); health status indicators; civic participation (e.g., decline in voluntary organizations and voting); changes in governance, such as loss of local control over community decision-making; and resource/fiscal pressures on local government due to increased need for public services and diversion of public funds to subsidize agribusiness development. *Environmental outcomes* include quality of local water, soil, and air, energy use, and environmentally related health conditions.

Industrialized farming has direct and indirect consequences for community well-being and both consequences should be considered

Studies limited to immediate, direct effects miss the manner by which industrialized farming fully affects communities. Although analysts recognize the potential for indirect consequences, the pathways by which these occur are still not well articulated. Here we provide a synopsis of potential direct-indirect paths, drawing from several studies (Boles and Rupnow, 1979; Lobao, 1990; MacCannell, 1988; and NCRCD, 1999).

Industrialized farms directly influence communities: 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; and by affecting local environmental conditions. Owners/managers of industrialized farms also may directly influence local government and community decision-making in economic development and other public-interest areas relevant to local quality of life.

First-order, indirect effects on local socioeconomic conditions occur because the quantity and quality of jobs generated and purchases and sales of local goods by industrial farms affect: total community employment, earnings, and income (e.g., economic multiplier effects); the local poverty rate; and the level of income inequality. First order, indirect effects on local social fabric occur because: the quantity of jobs generated by industrial farms affects population size; and both the quantity and quality of jobs generated affect social class composition, such as when an increase in hired farm workers reduces the proportion of the local middle class. Another first-order, indirect effect stems from greater influence of outside owners/managers: local control over decision-making can erode and community conflict can increase, since the interests of industrialized farmers are often detached from or contrary to the interests of local residents.

Second-order, indirect effects on local social fabric work through first-order effects listed 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; demand for schooling, public assistance, health, and other social services; and the property tax base (Boles and Rupnow, 1979; Murdock et al., 1988; Freudenburg and Jones, 1991; NCRCD, 1999). Decline of local control over decision-making also creates problems associated with poor governance. These problems include the potential for diversion of public resources toward financial incentives for agribusiness developers and thereby the loss of public revenues to support local schools, services, and infrastructure.

Differences for social groups within the community should be considered

Changes in farming can affect social groups differently, based upon residents' age, class position, proximity to industrialized farms, and other attributes (Barlett et al., 1999). The elderly and poor may be affected by rising costs of housing and services whenever large corporations migrate to a rural community (Summers et al., 1976). In communities with large, confined animal feeding operations (CAFOs), residents who live closer to the operation often report inability to enjoy their properties and physical/psychological problems related to odor (Schiffman, 1998; Schiffman et al., 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 et al., 1998). Income generated by industrialized farms (compared to family farms) appears less likely to trickle down to different social classes, with some studies finding that income inequality is greater in communities where industrialized farming is greater (Crowley and Roscigno, 2004; Lobao, 1990). Income inequality, proximity to industrialized farms, and other measures tapping the well-being of different social groups can shed light on more diverse community impacts.

Long-term as well as short-term consequences should be considered

Industrialized farming puts a community on a path of development whose consequences are not fully manifest in one or two years. For example, Lobao (1990) found some impacts were manifest a decade later. Counties with greater industrialized farming in 1970 had significantly lower income, higher poverty, and greater income inequality the next decade, net of other local conditions.

Research designs employed to assess the effects of industrialized farming

Social scientists employ primarily four different research designs to study the impacts of industrialized farms. Each design has inherent strengths and limitations in comprehensively addressing the conceptual issues delineated above.⁵

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 communities characterized by industrialized farming are contrasted with communities with a different farming pattern (usually moderate-size, family-owned and operated farms). A comparative case study design allows communities to be matched on similar site characteristics, such as economic base and location relative to metropolitan centers, which helps to control for extraneous factors that influence the

relationship between farming type and community well-being. Examples are the studies by Goldschmidt (1978a) and NCRCRD (1999). The strengths of case studies are the following. (1) They provide detailed information about how both scale and organizational aspects of industrialized farming impact community well-being. (2) They provide detailed information about outcomes for a great many indicators of socioeconomic well-being, social fabric, and the environment. (3) They trace the direct and indirect effects of industrialized farming. (4) They can address short-term as well as long-term outcomes. The inherent limitation of case studies is that detailed findings are produced about industrialized farms in specific site communities at the expense of producing less detailed findings over a greater number of research sites. Case studies also vary as to how well extraneous factors influencing the causal relationships of interest can be controlled.

Macro-social accounting designs involve statistical analysis of secondary data from federal and other sources to document relationships in local social structure (MacCannell, 1988). Areal units such as counties, towns, and states are the research focus. To assess the consequences of industrialized farming, analysts usually compare its effects relative to smaller or moderate-size family farm units. Multivariate statistical techniques are used in order to assess the effects of farm structure net of other community conditions. Examples are Gilles and Dalecki (1988), Lobao (1990), Crowley and Roscigno (2004), and Irwin et al. (1999). The strengths of these studies are the following. (1) They provide results that are generalizable across many communities, states, and the nation. (2) They provide results about industrialized farming using measures of scale and organization. Customary scale-based measures of industrialized farming include farm size in sales, such as the proportion of farms above some gross annual sales threshold, or acreage above a certain size. Customary organizational-based indicators include: the proportion of farms organized as corporations or non-family-held corporations; proportion of farms with full-time hired labor; annual costs of hired labor per farm; and proportion of non-resident farm operators. (3) Macro-social accounting designs provide results about a variety of socioeconomic well-being and social fabric indicators and some environmental indicators. (4) They address short-term and long-term relationships between industrialized farming and community well-being. The inherent limitation of these studies is that they usually depend on secondary data which constrains measures of industrialized farming, outcomes, and time periods of study. For example, some organizational measures of industrialized farming, such as vertical integration of farm units are not available over time across communities.

Regional economic impact models use linear programming methods to estimate impacts on employment and income for regions, states, counties, and cities. These studies focus on the integration of business enterprises in markets and use statistical packages, such as variants of input-output analysis, to model backward and forward linkages with enterprises in other industries and to estimate resulting local impacts. Costs and benefits of different firm-level practices can be estimated. Examples are Heady and Sonka (1974), Marousek (1979), and Deller (2003). The strengths of regional economic impact models are the following. (1) 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. (2) They can provide projected estimates, so that impacts of not yet existing firms can be appraised. Limitations of regional economic impact, input-output models for the study of farm impacts are well known (Guess-Murphy et al., 2001). In brief, models involve assumptions about relationships not actually found in the community but depend on estimates from past years and different places. Indicators of industrialized farming and its impacts are also limited. Farm scale is analyzed, not the organization of production. These studies do not examine certain socioeconomic indicators, such as poverty and income inequality, and social fabric indicators, nor do they usually address long-term impacts.

Survey design studies use samples of populations from any number of communities. Researchers employ interviews or questionnaires to collect data on how industrialized farming affects residents or a particular social group exposed to industrialized farming as compared to those who are not exposed (such as residents in family farming communities). Multivariate statistical procedures are used to assess the effects of farm variables on individuals' well-being, controlling for other attributes. Examples of survey design studies are Heffernan and Lasley (1978), Poole (1981), Wing and Wolf (2000). The strengths of these studies are the following. (1) They provide detailed information about how both scale and organizational aspects of industrialized farming impact individuals and families. (2) They provide detailed, in-depth information about outcomes for many indicators of socioeconomic well-being and social fabric, tapping issues such as community participation, stress from local conflict, and health and environmental concerns. A major limitation is that cost considerations usually restrict surveys to specific states and communities and to one time point.

Findings from empirical studies

As shown above, any single study assessing the impacts of industrialized farming is inherently limited due to

research design and comprehensiveness. It is therefore useful to evaluate the body of work that spans different research designs, measures, regions of the country, and time points. To do so, we employ an integrative research review, an assessment across individual studies that provides a comparison and integration of empirical findings (Jackson, 1980; Cooper, 1989; Gough and Elbourne, 2002). Integrative research reviews are useful in drawing conclusions when a number of different empirical studies exist that examine the same research question.⁶ We build on such a review by Lobao (1990) who evaluated the empirical studies on the community impacts of industrialized farming conducted from 1930 to 1988.

The strengths and limitations of integrative research reviews are discussed in a growing literature (Cooper, 1989; Gough and Elbourne, 2002; Young et al., 2002). An often noted methodological issue is selection of the pool of empirical studies. As in other types of research, sampling criteria for selecting observations (i.e., individual empirical studies) varies according to the researchers' objectives, while time and resources will limit the scope of work. Integrative research reviews thus are rarely exhaustive pools. In our analysis, the selection of empirical studies was based on two criteria important to establishing the legitimate public interest component of the dormant Commerce Clause: the need to provide consistent historical evidence on the impacts of industrialized farming; and the need to draw from leading scholarly sources. In litigation on corporate farm laws, the evidence that carries the most weight in court is peer-reviewed journal articles and books. To develop the pool of empirical studies, we surveyed the literature from 1988 to the present. We first examined journals relevant to the topic, followed by books, proceedings, and other major scholarly sources currently available electronically. We found 25 empirical studies since 1988 that addressed the topic. We combined these with the 26 studies in Lobao's (1990) analysis for a total of 51 empirical studies that form the basis of our analysis. These studies represent major research on the topic, but due to selection criteria and the inherent limitations of research reviews, they are not exhaustive of past work.⁷

We followed Lobao's (1990) methodology in classifying the studies along the following criteria: research design, as described above; regions of the country analyzed; use of scale and/or organizational indicators in measuring industrialized farming; types of community well-being impacts analyzed; and results. With regard to indicators of industrialized farming, most studies examine farm scale; organizational characteristics are examined less frequently. The studies examine a wide variety of impacts as shown below. While all center on the impacts of industrialized farming, most formally seek to test the hypothesis that where farms

are larger scale or industrialized in terms of organizational characteristics, they have a negative impact on the indicator(s) of community well-being, relative to smaller and/or family-owned and operated farms. Appendix A presents each of the 51 studies classified along the criteria above.

Integrative research reviews are increasingly used to inform policy, particularly in health and education (Gough and Elbourne, 2002; Young et al., 2002). Recent litigation on corporate farm laws has ushered in the need for their extension to inform policy on agriculture and community well-being. Here, our analysis focuses on two sets of findings. We first document the types of adverse community impacts identified across studies. Then, we assess the extent to which studies in total find the presence/absence of detrimental impacts of industrialized farming.

Types of risks to communities reported across studies

Community impacts were grouped into three categories described earlier: socioeconomic well-being indicators (e.g., income levels, poverty, and unemployment); indicators of social fabric (e.g., 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. The studies analyzed 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; Heady and Sonka, 1974; Rodefeld, 1974; Flora et al., 1977; Goldschmidt, 1978a; Wheelock, 1979; Lobao, 1990; Durrenberger and Thu, 1996; Peters, 2002; Deller, 2003; Crowley and Roscigno, 2004; Lyson and Welsh, 2005).
2. Higher unemployment rates (Skees and Swanson, 1988; Lyson and Welsh, 2005).
3. Lower total community employment generated (Marousek, 1979).

Social fabric

1. Population: decline in population size where family farms are replaced by industrialized farms; smaller population sustained by industrialized farms relative to family farms (Heady and Sonka, 1974; Goldschmidt, 1978a; Rodefeld, 1974; Wheelock, 1979; Swanson, 1980).

2. Class composition: social class structure becomes poorer (increases in hired labor) (Goldschmidt, 1978a; Harris and Gilbert, 1982; Gilles and Dalecki, 1988).
3. Social disruption:
 - increases in crime rates and civil suits (NCRCRD, 1999);
 - increased general stress, social-psychological problems (Martinson et al., 1976; Schiffman et al., 1998);
 - swine CAFOs associated with areas having greater social vulnerability, high poverty and minority populations (Wilson et al., 2002);
 - greater childbearing among teenagers (Lobao, 1990);
 - deterioration of neighborly relations (McMillan and Schulman, 2003; Smithers et al., 2004; Constance and Tuinstra, 2005; Jackson-Smith and Gillespie, 2005).
4. Civic participation: deterioration in community organizations, less involvement in social life (Rodefeld 1974; Goldschmidt 1978a; Heffernan and Lasley 1978; Poole 1981; Lyson et al. 2001; Smithers et al. 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; Gomez and Zhang, 2000; Foltz et al., 2002; Smithers et al., 2004; Foltz and Zueli, 2005).
8. Reduced enjoyment of property: deterioration of landscape, odor in communities with hog CAFOs (Schiffman et al., 1998; Wing and Wolf, 1999; Wing and Wolf, 2000; Wright et al., 2001; McMillan and Schulman, 2003; Reisner et al., 2004; Constance and Tuinstra, 2005).
9. Health: neighbors of hog CAFOs report upper respiratory, digestive tract disorder, eye problems (Wing and Wolf, 1999; Wing and Wolf, 2000; Wright et al., 2001; Reisner et al., 2004; Constance and Tuinstra, 2005).
10. Real estate values: residences closest to hog CAFOs experience declining values relative to those more distant (Seipel et al., 1998; NCRCRD, 1999; Wright et al., 2001; Reisner et al., 2004; Constance and Tuinstra, 2005).

Environment

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

Conclusions reported about impacts by study

The studies above indicate the types of community conditions associated with industrialized farming. To what extent do the studies overall provide evidence of the risks of industrialized farming? As noted, with regard to public interest defense of corporate farm laws, a count of studies where detrimental impacts were found is needed. If research shows that industrialized farming may jeopardize aspects of community life, this provides evidence to support the state's claim that laws restricting it are warranted; alternatively, few or no negative impacts undermines this claim. We classified studies according to whether the researchers report: largely detrimental impacts; mixed findings (i.e., authors report only some detrimental impacts were found); and no detrimental effects. Classifying the studies is somewhat complex because each may test a number of relationships about industrialized farming. We placed studies into detrimental/no detrimental outcome categories based on whether the findings for the majority of relationships tested consistently fell into either of these two categories. Remaining studies are those where researchers found some detrimental impacts but other relationships were mixed, as described further below. Appendix A presents these results individually for each study.

Out of the total 51 studies, authors report largely detrimental impacts in 29, some detrimental impacts in 13, and no evidence of detrimental impacts in nine. Thus, 82% (42 out of 51) of the studies report finding some negative impacts of industrialized farming. Table 1 presents the classification of findings by research design.

Of the 29 studies where social scientists found predominantly detrimental impacts, the following points should be noted. First, these studies use the four major types of research designs described earlier, comparative case study, macro-social accounting, regional economic impact models and surveys. Studies reporting detrimental impacts exist across all time periods and regions of the country. These studies report adverse outcomes for socioeconomic well-being, social fabric, and environmental conditions, using both scale and organizational measures of industrialized farming. In sum, the studies provide a great deal of evidence over many years by

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Table 1. Summary of studies examining the effects of industrialized farming on community well-being.

	Findings with regard to detrimental effects		
	Detrimental	Mixed	No detrimental
<i>Research design</i>			
Case study	5 ^a	2 ^f	0
Macro-social accounting	12 ^b	7 ^g	8 ^j
Regional economic impact	3 ^c	2 ^h	0
Survey	7 ^d	2 ⁱ	1 ^k
Other design	2 ^e	0	0 ^o
Total (<i>N</i> = 51)	29 (57%)	13 (25%)	9 (18%)

^aGoldschmidt (1968, 1978a), Small Farm Viability Project (1977), Constance and Tuinstra (2005), Whittington and Warner (2006), McMillan and Schulman (2003). ^bFujimoto (1977), Goldschmidt (1978b), Buttel and Larson (1979), Swanson (1980), MacCannell (1988), Durrenberger and Thu (1996), Lyson et al. (2001), Peters (2002), Wilson et al. (2002), Crowley and Roscigno (2004), Smithers et al. (2004), Lyson and Welsh (2005). ^cGomez and Zhang (2000), Foltz et al. (2002), Deller (2003). ^dTetreau (1938, 1940), Heffernan (1972), Rodefeld (1974), Martinson et al. (1976), Poole (1981), Wing and Wolf (1999, 2000), Reisner et al. (2004). ^eSeipel et al. (1998), Schiffman et al. (1998). ^fNCRCRD (1999), Wright et al. (2001). ^gFlora et al. (1977), Wheelock (1979), Harris and Gilbert (1982), Skees and Swanson (1988), Flora and Flora (1988), Gilles and Dalecki (1988), Lobao (1990). ^hHeady and Sonka (1974), Marousek (1979). ⁱHeffernan and Lasley (1978), Jackson-Smith and Gillespie (2005). ^jHeaton and Brown (1982), Swanson (1982), Green (1985), Buttel et al. (1988), van Es et al. (1988), Lobao and Schulman (1991), Barnes and Blevins (1992), Irwin et al. (1999). ^kFoltz and Zueli (2005).

researchers using different research designs, about the risks of industrialized farming.

Of the 13 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: (1) industrialized farming had no statistical relationship with other indicators (i.e., there was an absence of any relationship); (2) industrialized farming had a trade-off effect, with beneficial effects on certain indicators; (3) industrialized farming did not consistently produce negative impacts for all time periods or regions; or (4) industrialized farming produced effects beneficial for some groups but detrimental to other groups. Mixed findings are evident to a greater degree in regional economic impact and macro-social accounting studies (see Table 1). Regional impact studies tend 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 (e.g., Heady and Sonka, 1974; Marousek, 1979). Macro-social accounting studies often test a number of relationships, adding to the greater potential of mixed findings. Lobao's (1990) study is an example. For counties in the contiguous states, industrialized farming had no relationship with poverty and median family income at either of two 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 across time (i.e., counties with greater industrialized farming experienced declines in well-being over the 1970–1980 decade).

Other research designs also provide examples of mixed findings. An example of a case study showing mixed effects is Wright et al. (2001) conducted in six counties with CAFOs in Minnesota. This study found that CAFOs had: positive effects for farmers who expanded their operations; detrimental effects for neighbors to CAFOs whose ability to enjoy their property deteriorated; detrimental effects for younger and mid-sized producers unable to expand because expansion by others had restricted their access to markets; and no effects for those who were not neighbors or who were not expanding. A survey (Jackson-Smith and Gillespie, 2005) also found mixed effects for the impacts of large-scale, hired-labor dependent dairies on community social relations. Farm size was the strongest predictor of neighbors' complaints about dairy operations, but demographic attributes of dairy farm owners had a greater effect on their relationships with neighbors than did farm size or use of hired labor.

The nine studies that found no detrimental impacts of industrialized farming used mainly macro-social accounting designs and tended to analyze only indicators of socioeconomic well-being. Lobao's and Schulman's (1991) study is an example. They examined whether industrialized farming was related to higher family poverty across agricultural regions in the US for 1970–1980. They found no significant relationship in

any of the four regions analyzed. Finally, a recent survey design study (Foltz and Zueli, 2005) found no evidence that large farms are unlikely to purchase locally once the presence of local suppliers was taken into consideration. Instead, they demonstrated that purchasing patterns are commodity specific and determined by community attachment, and local supply considerations.

To what extent are there positive impacts of industrialized farming?

While our focus has been on the risks of industrialized farming, an alternative question is whether industrialized farming promotes community well-being. First, overall studies are more likely to report benign, that is, nonsignificant effects of industrialized farming, than they are any positive impacts. (Appendix A reports positive findings in the results column by study.) In the nine cases where no detrimental impacts are shown, six (Swanson, 1982; Buttel et al., 1988; Lobao and Schulman, 1991; Irwin et al., 1999; Flotz and Zueli, 2005; Jackson-Smith and Gillespie, 2005) find little relationship between industrialized farming and community well-being. Only three (Heaton and Brown, 1982; van Es et al., 1988; Barnes and Blevins, 1992) report largely positive effects. Second, in the 13 studies reporting mixed findings, eight (Heady and Sonka, 1974; Flora et al., 1977; Marousek, 1979; Wheelock, 1979; Harris and Gilbert, 1982; Giles and Dalecki, 1988; Skees and Swanson, 1988; NCRCD, 1999) find some positive effects for different variables and/or for different types of model specifications. Positive impacts are almost entirely limited to socioeconomic conditions. In particular, where positive impacts are found, it is usually between farm scale (not organization) indicators and greater community income (Wheelock, 1979; Harris and Gilbert, 1982; Skees and Swanson, 1988; Barnes and Blevins, 1992). In sum, if the research question were recast to appraise the benefits of industrialized farming, 11 (22%) of the 51 studies would provide some evidence of positive impacts.

Summary and conclusions

Social scientists often debate whether empirical research should be oriented around disciplines' accumulated body of knowledge or, conversely, address the public interest and provide critical knowledge to build civil society (Burawoy, 2005). The stock of research produced on the community effects of industrialized farming contributes to both objectives. Recent challenges to state corporate farming laws usher in a new need to build this body of research.

This study addresses the longstanding question, does industrialized farming pose risks to the well-being of communities, through evaluating the findings of studies from the 1930s to the present. Based on a sample of 51 studies, we found that 82% provide evidence of adverse impacts (57% reporting largely detrimental effects and 25% some detrimental effects). These impacts were reported in studies using various research designs and across different time periods and regions. Beneficial effects of industrialized farming were few and confined largely to income-related socioeconomic conditions. Twenty-two percent of studies provide evidence of these effects but only 6% (three studies) report largely beneficial effects.

The types of community impacts reported by social scientists were detailed earlier and are seen in the following general relationships. First, for socioeconomic well-being, industrialized farming tends to be related to higher income inequality, indicating it is less likely to sustain middle-class communities. Places with higher income inequality are also prone to other social problems because economic gaps are wider. With regard to other socioeconomic impacts, regional economic impact models are likely to report greater total income generated by industrialized farming relative to family farming. However, findings for income inequality suggest that income growth is impeded from trickling down to all community members. Second, studies assessing consequences for the social fabric of communities often find detrimental impacts. Industrialized farming affects the social fabric of communities through altering population size and social composition which in turn affects social conflict, family stability, local class structure, community participation, and purchasing patterns. Case studies report the loss of local autonomy and greater influence of outside agribusiness. Third, studies on large animal confinement operations report environment problems affecting air and water quality and human health.

Although this study provides a comprehensive summary to date regarding the impacts of industrialized farming, it has limitations. The purpose was to document the findings regarding the presence/absence of risks posed by industrialized farming to communities, to contribute to public debates and litigation regarding the public interest *intent* of corporate farm laws, and to provide an integrative research review for social scientists. Thus the study is limited in scope largely to understanding the risks posed by industrialized farming, although we do note studies finding positive effects. Integrative research reviews are inherently limited by the selection criteria of the pool of studies for analysis. As explained earlier, selection of studies was based on the need to provide historical coverage and focus on major scholarly works, particularly journal articles and books. While these selection criteria are important to

establishing the robustness of evidence in court cases on corporate farm laws, other empirical work is inherently excluded. Also, research on the topic continues to grow, limiting any global assessment. Though we have captured much of the major research, we cannot claim to have an exhaustive pool of studies.

Based on the empirical studies reviewed here, some generalizations can be drawn for researchers and government and nongovernmental organizations concerned with the future impacts of industrialized farming. First, where industrialized farming expands we can expect distinct effects on communities' socioeconomic, social fabric, and environmental well-being. Communities that receive industrialized farming are likely to increase population relative to other communities (that is, if local family farmers are not displaced). They are also likely to experience greater income inequality; government services for the poor and other disadvantaged groups are likely to be needed. These communities will encounter stresses in the social fabric, particularly increased community conflict. In the case of large livestock confinement operations, communities will be at risk for environmental and health problems, entailing the need for government intervention. Finally, 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 population decline and rifts in social fabric. These communities are likely to have declines in other local businesses and the property tax base and may require state aid for social and public services.

This study also suggests a number of directions for future research. First, our study as well as past work (Lobao, 1990; Wimberley, 1987) has argued for the need to improve the conceptualization and measurement of industrialized farming through attending to both indicators of farm organization and scale. While scale and organizational measures are often used interchangeably, researchers should explore their relationship in more depth and detail, both in terms of comparing their relative performance, and in determining the degree to which scale and organizational measures can be combined to create multi-dimensional indicators that more fully tap the complexities of today's industrialized farming.

Second, the paths by which industrialized farming affects communities are still not well-understood despite decades of research. Studies giving greater attention to conceptualizing and empirically assessing the direct and indirect paths of community influence are needed.

Third, future work should strive for a more comprehensive understanding of the types of impacts generated by industrialized farming. Most research, particularly quantitative studies, centers on socioeconomic impacts,

when our analysis shows an array of potential impacts. Community conflict and decline in civic engagement are probably the most endemic problems to be expected from industrialized farming, but their documentation is confined largely to case studies. Long-term as well as short-term consequences should be examined. Studies often assume that impacts are homogeneous across communities. By contrast, the manner by which industrialized farming affects different social groups remains an important question.

New directions for methodology should be considered. Because research designs have different strengths and limitations, multi-method studies that combine both qualitative and quantitative approaches to the research question are particularly useful. In a similar vein, future research should pursue the use of integrative research reviews. These could be used to explore the topic in a more in-depth fashion than we have here, for example, by focusing only on studies that address a few select impacts but in much greater detail; or alternatively, by casting a wider net across the scope of existing studies.

Finally, researchers should give greater attention to the community factors that mediate the effects of industrialized farming. For example, a strong civil society (Lyson et al. 2001), high quality, non-farm local employment (Lobao, 1990), a state and local context supportive of labor unions and a strong social safety net (Lobao and Meyer, 2001) have been argued to buffer the potential negative effects of industrialized farming. In a similar vein, researchers might seek to study positive exemplars: are there community contexts where industrialized farming has been harnessed to improve local socioeconomic, social fabric, and environmental conditions?

The role that corporate farming laws play in protecting rural communities has been alluded to in past research (NCRCD, 1999) but only recently addressed in a study by Lyson and Welsh (2005). They found that counties in states with anti-corporate farming laws fared better (relative to those in states without such laws) on socioeconomic indicators, such as having proportionately few families in poverty and lower unemployment. In comparing states with less restrictive and states with more restrictive laws, they generally found the same results, better conditions in states with more restrictive laws. Additional research is needed to explain these findings, such as whether corporate farming laws per se or broader aspects of the institutional regulatory environment are protecting the fortunes of local communities. It is clear, however, that within states, remote communities distant from metropolitan centers particularly need state-level protection. Remote rural communities are often targeted as operating sites by large animal confinement operations, but their governments have the least resources to cope with industrialized farming. They 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. State protection from industrialized farming is most critical in remote communities due, in part, to the fragility of local government (Lobao and Kraybill, 2005).

In summary, social science research provides substantial evidence to support the position that public concern about industrialized farming is warranted and, in turn, that states have a legitimate public interest in regulating these farms. This conclusion rests on the consistency of eight decades of 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.

Notes

1. In 2002, more than 95.8% of the nation's 2.1 million farms were classified as family operations. Almost 90% were sole proprietorships and 6% were partnerships. Only 3.5% of all farms were incorporated, and of these, 88% were considered family-held corporations by USDA as they had 10 or fewer stockholders (National Agricultural Statistics Service, 2006).
2. 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; and legal status as a corporation (family or non-family) or syndicate.
3. Some of these laws date back to the 1930s while others are of more recent origin. In addition to general provisions about corporations, some states limit absentee owned farms and contract farming, and some provide exemptions for certain types of farms and for some locales. For the regulations under each state's laws, see the Community Legal Environmental Defense Fund (2007). For a study rating the restrictiveness of each state's law, see Lyson and Welsh (2005). In addition to state laws, counties also may restrict the operation of large farms through zoning and other regulations. For a discussion of regulatory mechanisms used by counties, see the National Association of Counties (1999).
4. Farms may be incorporated because of family farmers' interests in estate planning, greater assurance of business continuity, limited liability, and income tax advantages.
5. We outline the strengths and limitations that are intrinsic to each research design. Any individual study will vary as to how the analysts have exploited the strengths or overcome the limitations of the design.
6. Integrative research reviews are systematic literature reviews, a family of methodologies that include meta-analyses. In integrative research reviews, studies center on the same research question but vary in other attributes such as those related to methodology (Cooper, 1989). The degree of similarity needed for comparison across studies varies according to the research question. In our case, we are concerned with a general question about the presence/absence of adverse impacts reported in studies using the range of methodologies common to this body of work, across regions, and across time.
7. To provide historical evidence, a sampling pool across time is needed. Hence, we used the 26 studies from Lobao's (1990) analysis, which covered the 1930–1988 period, then added studies from 1988 to the present. To compile the studies from 1988–present, we surveyed the following journals: *Agriculture and Human Values*, *Rural Sociology*, *Culture and Agriculture*, *Sociologia Ruralis*, *Southern Rural Sociology*, *American Journal of Alternative Agriculture* (now *Renewable Agriculture and Food Systems*), *Journal of Rural Studies*, *American Journal of Agricultural Economics*, and the *International Journal of the Sociology of Agriculture and Food*. Two scholarly search engines, Google Scholar and Agricola, were also used. Here we focused on the types of empirical studies given the most weight in litigation over anti-corporate farm laws: peer-reviewed journal articles, books, and other scholarly work from major national outlets. A number of reports produced for state and nongovernmental organizations exist. Some are literature reviews, not independent empirical studies, and hence are not included. Empirical studies from experiment station and extension reports were not specifically included unless the results were published as journal articles or given at professional meetings and currently available on a central website. Studies from dissertations and theses were also not included unless they too met the same criteria as above, such as Crowley and Roscigno (2004). Unpublished theses and dissertations are given less weight overall in court cases and until recently have not been widely accessible on-line so that attorneys and others can easily review findings. Theses and dissertations also raise issues with regard to quality equivalence relative to journal articles and work by senior scholars. As in any integrative research review, a limitation of the criteria used to select the pool of studies is that excellent empirical work likely exists which falls outside the scope of the analysis.

Appendix A. Summary of 51 individual studies examining the effects of industrialized farming on community well-being

Study	Methodology	Region	Measures of industrialized farming	Community well-being indicators	Results
Goldschmidt (1968, 1978a)	Comparative case study: two communities	California	Scale/organization	Socioeconomic and social fabric (class structure, local services and organizations, politics, retail trade)	Detrimental: variety of community indicators
Tetreau (1938, 1940)	Survey design study: 2700 households	Arizona	Scale/organization	Socioeconomic and social fabric (class structure)	Detrimental: increased class inequality, rise in number of poor farm workers
Heffernan (1972)	Survey design study: 138 broiler producers, contract farming	Louisiana	Organization	Social fabric (social psychological indicators, community involvement)	Detrimental: poorer social psychological well-being, less community involvement
Heady and Sonka (1974)	Regional economic impact: 150 producing areas	Continental US	Scale	Socioeconomic	Mixed: large farms generate less total community income but also lower food costs
Rodefeld (1974)	Survey design study: 180 producers from 100 farms	Wisconsin	Scale/organization	Socioeconomic and social fabric (class structure, services, population size)	Detrimental: variety of community indicators
Martinson et al. (1976)	Survey design study: 180 producers	Wisconsin	Organization	Social fabric (social psychological indicators)	Detrimental: community isolation of farm workers
Fujimoto (1977)	Macro-social accounting: 130 towns	California	Scale	Social fabric (community services)	Detrimental: fewer and poorer quality services
Flora et al. (1977)	Macro-social accounting: 105 counties	Kansas	Scale/organization	Socioeconomic and social fabric (class structure, retail sales, crime)	Mixed: industrialized farming related to income inequality and crime but also to higher income; other relationships less consistent
Small Farm Viability Project (1977)	Comparative case study: reanalysis of Arvin and Dinuba	California	Scale/organization	Socioeconomic and social fabric (class structure, services)	Detrimental: variety of community indicators
Goldschmidt (1978b)	Macro-social accounting: states	Entire US except Alaska	Scale	Social fabric (agrarian class structure)	Detrimental: poorer class structure

Appendix A. continued

Study	Methodology	Region	Measures of industrialized farming	Community well-being indicators	Results
Heffernan and Lasley (1978)	Survey design study: 36 grape producers	Missouri	Organization	Social fabric (community social and economic involvement)	Mixed: industrialized farmers less involved in community socially but not more involved in economic control
Whelock (1979)	Macro-social accounting: 61 counties	Alabama	Scale	Socioeconomic and social fabric (class structure, population size)	Mixed: rapid increases in farm scale related to decline in income, population, and white collar workers, but scale also positively related to income in a cross-time model
Marousek (1979)	Regional economic impact: one community	Idaho	Scale	Socioeconomic	Mixed: large farms generate less community employment but also greater income
Buttel and Larson (1979)	Macro-social accounting: state-level data	Entire US	Scale/organization	Environment (energy usage)	Detrimental: industrialized farming conserves less energy
Heaton and Brown (1982)	Macro-social accounting: county-level data	Continental US	Scale/organization	Environment (energy usage)	No detrimental: industrialized farming conserves more energy
Swanson (1980)	Macro-social accounting: 27 counties	Nebraska	Scale	Socioeconomic and social fabric (population size)	Detrimental: variety of community indicators
Poole (1981)	Survey design study: 78 producers	Maryland	Scale	Social fabric (involvement in community organizations)	Detrimental: large farms related to less community involvement
Harris and Gilbert (1982)	Macro-social accounting: state-level data	Continental US	Scale/organization	Socioeconomic and social fabric (class structure)	Mixed: industrialized farming produces poorer community class structure but also greater local income
Swanson (1982)	Macro-social accounting: 520 communities	Pennsylvania	Scale	Social fabric (population size)	No detrimental: farm size has little effect on change in population size
Green (1985)	Macro-social accounting: 109 counties	Missouri	Scale/organization	Socioeconomic and social fabric (services, population size)	No detrimental: farm size/organization have little effect on community indicators

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Appendix A. continued

Study	Methodology	Region	Measures of industrialized farming	Community well-being indicators	Results
Skees and Swanson (1988)	Macro-social accounting: 706 counties	Southern US, excluding Florida, Texas	Scale/organization	Socioeconomic	Mixed: large farms related to higher unemployment and also to poorer conditions over time, but cross-sectional models show some positive effects on income Detrimental: variety of community indicators
MacCannell (1988)	Macro-social accounting: 98 counties	Arizona, California, Florida, Texas	Scale/organization/capital intensity	Socioeconomic and social fabric (population size, local trade, local government)	
Flora and Flora (1988)	Macro-social accounting: 234 counties	Great Plains and West	Scale	Socioeconomic and social fabric (local retail trade, population size)	Mixed: large farms related to lower retail sales and population decline but not related to poverty or income No detrimental: farm organization has little effect on community indicators
Buttel et al. (1988)	Macro-social accounting: 105 counties	Northeast	Organization	Socioeconomic and social fabric (housing, retail trade, property taxes)	No detrimental: farm scale/organization have little effect; in a few areas, large farms related to higher income
van Es et al. (1988)	Macro-social accounting: 331 counties	Corn belt	Scale/organization	Socioeconomic and social fabric (population size)	Mixed: farm organization (hired labor) related to poorer conditions but larger scale related to better conditions
Gilles and Dalecki (1988)	Macro-social accounting: 346 counties	Corn belt and central Plains	Scale/organization	Socioeconomic	Mixed: industrialized farming related to higher income inequality and births to teen agers, and over time to higher poverty and lower income, but other relationships not significant
Lobao (1990)	Macro-social accounting: 3037 counties	Continental US	Scale/organization	Socioeconomic and social fabric (teenage fertility, infant mortality)	No detrimental: industrial farming has little relationship to poverty
Lobao and Schulman (1991)	Macro-social accounting: 2,349 rural counties	US and four regions	Scale/organization	Socioeconomic	

Appendix A. continued

Study	Methodology	Region	Measures of industrialized farming	Community well-being indicators	Results
Barnes and Blevins (1992)	Macro-social accounting: 2,000 rural counties	US	Scale	Socioeconomic	No detrimental: larger farms related to higher income and lower poverty, but controls for hired labor show detrimental impacts
Durrenberger and Thu (1996)	Macro-social accounting, 99 counties	Iowa	Scale, hog farms	Social fabric (food stamp need)	Detrimental: large farms related to greater need for food stamps
Seipel et al. (1998)	Hedonic price analysis: one county	Missouri	CAFOs (concentrated animal feeding operations)	Sales prices of farmland parcels with and without homes	Detrimental: reduction in property prices of \$144 per hectare within 3.2 km of a hog CAFO
Schiffman et al. (1998)	Quasi-experimental design: 88 matched individuals who vary by residence near CAFOs	North Carolina	CAFOs	Social fabric (social-psychological distress)	Detrimental: residents living near hog CAFOs are more depressed due to psychological and physical effects of odors
Wing and Wolf (2000)	Survey design study: 155 residents, three communities	North Carolina	CAFOs	Social fabric (health status, quality of life)	Detrimental: residents of hog CAFO community report greater respiratory and gastrointestinal problems and eye irritations, poorer quality of life
NCRCRD (1999)	Comparative case study: 14 farm dependent counties, one which recruited a hog CAFO	Oklahoma	CAFOs	Socioeconomic, social fabric (population size, retail sales, school drop-out rates, crime, social conflict, property values, and other well-being indicators), and environment	Mixed: detrimental on most social fabric and environment indicators; no appreciable gains in per capita income and jobs; beneficial effects for a few indicators (increases in population size, retail sales, and property values)
Irwin et al. (1999)	Macro-social accounting: 3024 counties	Continental US	Organization	Social fabric (residential stability)	No detrimental: industrialized farming has little relationship to non-migration
Gomez and Zhang (2000)	Regional economic impact models: (1,106 towns and cities)	Illinois	Scale, focus on hog farms	Social fabric (retail spending)	Detrimental: larger farms related to less retail spending, weaker economic growth

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Appendix A. continued

Study	Methodology	Region	Measures of industrialized farming	Community well-being indicators	Results
Lyson et al. (2001)	Macro-social accounting: 433 counties	US all agriculturally dependent counties	Scale/organization	Socioeconomic and social fabric (civically engaged middle class, crime, low birth weight babies)	Detrimental: industrialized farming related to a less civically engaged middle class, low birth weight babies, and greater crime; the civically engaged middle class also mediates other effects of industrialized farming
Wright et al. (2001)	Case study: six counties with CAFOs	Minnesota	CAFOs/scale	Social fabric: (quality of life, community interaction, social capital)	Mixed: for quality of life, negative effects for neighbors, younger and mid-sized producers; positive effects for those who expanded operations; no effects for those who are not neighbors or not expanding. Community social capital and interaction quality declines
Foltz et al. (2002)	Regional economic impact models: 100 dairy farms in three communities	Wisconsin	Scale	Social fabric (farm input purchases made locally)	Detrimental: larger farms related to less input purchases made locally
Peters (2002)	Macro-social accounting: all agriculturally dependent counties	Iowa, Kansas & Missouri	Organization	Social fabric (children-at-risk, composite index of health, education, and general welfare)	Detrimental: industrialized farming related to higher children-at-risk scores
Wilson et al. (2002)	Macro-social accounting: census blocks in rural counties with swine CAFOs	Mississippi	CAFOs	Social fabric (environmental injustice)	Detrimental: CAFOs more likely to be located census block with poor African Americans
Deller (2003)	Regional economic impact: 2249 nonmetro counties	Nonmetro US counties	Scale	Socioeconomic	Detrimental: large farms related to slower growth in per capita income

Appendix A. continued

Study	Methodology	Region	Measures of industrialized farming	Community well-being indicators	Results
Reisner et al. (2004)	Survey design study: 109 stakeholders in 52 counties with swine CAFOs	Illinois	CAFOs	Social fabric (perceptions of community problems caused by CAFOs)	Detrimental: residents reported greater dissatisfaction with CAFOs, odors, loss of values of homes, and water quality problems
Crowley and Roseigno (2004)	Macro-social accounting: 1054 counties	North Central States	Scale/organization	Socioeconomic	Detrimental: industrialized farming related to higher poverty and income inequality
Smithers et al. (2004)	Survey design study: 120 farmers in two townships	North Huron County, Ontario	Scale	Social fabric (community involvement, purchasing behavior, perceptions of community)	Detrimental: farmers expanding in scale participated less in community activities and organizations and were less committed to sourcing locally
Lyson and Welsh (2005)	Macro-social accounting: 433 agriculturally dependent counties	US all agriculturally dependent counties	Scale/organization	Socioeconomic	Detrimental: industrialized farming related to greater poverty and unemployment, with corporate farming laws mediating these effects. Counties in states with weak or no anti-corporate farming laws have poorer conditions
Constance and Tuinstra (2005)	Case study design: three clusters of rural communities with poultry CAFOs	East Texas	CAFOs	Social fabric (general quality of life, stress, odor, water quality, health, property values)	Detrimental: deterioration of quality of life along a variety of indicators experienced by those living closer to CAFOs
Whittington and Warner (2006)	Case study design: two communities with large-scale dairies	Ohio	Scale	Social fabric: (perceptions of local capacity to manage risks of large-scale dairies)	Detrimental: residents report weak capacity of local institutions, feelings of hopeless to address problems
Jackson-Smith and Gillespie (2005)	Survey design study: 836 residents from nine dairy-dependent rural areas in seven states	New York, New Mexico, Texas, Minnesota, Utah Wisconsin, and Idaho	Scale	Social fabric (farmers' and neighbors' relationships, community involvement, neighbors' complaints about odor, flies, and noise)	Mixed: dairy farm size has little relationship to most variables, but it is the strongest predictor of neighbors' complaints

Appendix A. continued

Study	Methodology	Region	Measures of industrialized farming	Community well-being indicators	Results
Foltz and Zueli (2005)	Survey design study: 141 dairy farmers in three dairy dependent Wisconsin towns	Wisconsin dairy dependent towns	Scale	Social fabric (farm input purchases made locally)	No detrimental: little evidence that large farms are less likely to buy locally. Purchasing patterns are commodity specific and not determined by farm size
McMillan and Schulman (2003)	Case study: two CAFO counties, four focus groups	North Carolina	CAFOs	Social fabric (relations with neighbors, health and environmental concerns, enjoyment of property, local democratic participation, community cohesiveness)	Detrimental: variety of community indicators

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