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Immigrant Vulnerability in High-Risk Industry: A Socio-Occupational Examination of Counties with Large Meatpacking Plants in Iowa and Nebraska

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**Immigrant Vulnerability in High-Risk Industry:
A Socio-Occupational Examination of Counties with Large
Meatpacking Plants in Iowa and Nebraska**

by

Mary Patricia Everist

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts
Department of Geography
College of Arts and Sciences
University of South Florida

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**Immigrant Vulnerability in High-Risk Industry:
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ABSTRACT

The decade of 1990-2000 saw a 53 percent increase in the number of Hispanics to 35.3 million, 20.6 million whom are of Mexican origin, signifying the fastest growing cohort in the U.S. today. This decade has also seen a surge in Hispanic migration to the Midwest region, particularly to communities with large meatpacking plants (LMPPs). Although overall literary consensus underscores the fact that this educationally disadvantaged ethnic group is over-represented in service and labor-based industries, few attempts have been made to empirically link their growing participation in high-risk industries like meatpacking with socioeconomic and occupational indicators of immigrant vulnerability.

To address this limitation, the thesis examines counties of Iowa and Nebraska that contain LMPPs with the objective of assessing: (1) Hispanic immigration and related socioeconomic changes in these counties; (2) the cumulative socioeconomic and occupational/industrial attributes of Hispanics living and working in these areas; and (3) the environmental justice implications of polluting meatpacking facilities. Statistical analyses of census data conducted to address the first objective indicate significantly higher Hispanic population growth in LMPP counties compared to those without LMPPs

between 1990 and 2000. The results also provide evidence of increased Hispanics/non-Hispanic socioeconomic disparities over the decade between LMPP and non-LMPP counties, particularly with income, language, and immigration. In all counties, Hispanic income and educational attainment levels are considerably lower than those for White residents. The second thesis goal incorporated worker injury rates, and animal and factory waste with socioeconomic factors to portray vulnerability in the workplace as well as the living space in an LMPP community. An integrated socio-industrial county ranking was developed to depict the aggregated ‘place vulnerabilities’ associated with social, economic, occupational and industrial influences. Finally, results from an environmental justice analysis conducted at multiple scales suggest that Hispanics, impoverished, and disabled individuals are disproportionately represented within the dangerous environs of slaughtering and meat processing facilities at the both the county and state levels. These revelations illustrate the significant strength of the U.S. segmented labor market, its detrimental effect on new arrivals, and the imbedded discrimination that continues to undermine social justice in our country today.

Chapter One

Introduction

“What I saw when I walked into the plant looked like an illustration for Dante’s Inferno. Hell can’t be any worse than what exists at this place” (Timothy Walker, former USDA inspector, describing a slaughterhouse in Bartow, FL, in Eisnitz, 1997:25). Kaplan Industries, the largest beef slaughterhouse in Florida, was under investigation for skinning cattle alive. In writing to his supervisors at the USDA, Walker warned, “I can safely say someone is going to be killed if conditions at Kaplan’s are not changed; [kill floor workers are constantly in danger from] live cows kicking wildly as they are skinned while still conscious” (Ibid: 24). This particular packinghouse, with its rural location, majority of Mexican workers, and subterranean insidiousness, symbolizes today’s meatpacking culture that thrives in a region a thousand miles northwest of Florida, in the grain and livestock center of our country, the ‘breadbasket’ of the world:

Toiling away in ‘kill and chill’ slaughterhouses clustered in America’s heartland are tens of thousands of recently arrived Mexican immigrants who are greeted by the prospect of dissecting carcasses at unprecedented line speeds for substandard wages, with no health insurance, and at a significantly higher risk of injury than any in other manufacturing industry in the U.S. (Bureau of Labor Statistics (BLS), 2003; Gardner, 2001; Schlosser, 1995). Juxtaposed against this backdrop of socio-occupational liability is the tendency of the meatpacking industry to locate plants in rural communities unprepared for the dynamics created by an influx of foreign-born employees and their families. Countervailing programs addressing the needs of those without the benefits of language fluency, higher education, and civil rights are of the essence, but have been

slow to develop (Martin *et al.*, 1996). Immigration has become, therefore, not only a product of globalization and technologization, but also a partner to them as critical factors in the continued inequitable segmentation of the U.S. labor market and social strata (Mobasher and Sadri, 2004).

The decade of 1990-2000 saw a 53 percent increase in the number of Hispanics to 35.3 million - 20.6 million whom are Mexican-American – a figure almost equal to the U.S. African-American population (U.S. Census 2000). Traditionally concentrated in the Southwest region of the U.S., an area that once was part of their own country, Mexicans have been fanning out to the Midwest over the past decade (Fix *et al.*, 2003) ostensibly for employment but undeniably to fill the void left by massive out-migration generated by agricultural restructuring and out-sourcing of manufacturing jobs. Although the overall literary consensus appears to be that this largely under-privileged population is disproportionately represented in service- and labor-based industries (Borjas and Tienda 1985; Portes and Rumbaut, 1996; Waters and Eschbach, 1995), few attempts have been made to link the degree of immigrant vulnerability with their growing participation in high-risk industries that continue to undermine legislation protecting human and civil rights in this country.

A sort of ingrained xenophobia, colored by illusions of the general public concerned about ‘being invaded by foreigners’ has only served to exacerbate the already entrenched old-timer, newcomer attitudes and conflicts in established rural communities. Ironically, the hardship and exploitation of Mexicans who have been historically over-represented and marginalized in American fields and factories is often buried beneath the

ever-prevalent perception that they are a drain on public resources and a strain on the Anglo culture. In fact, the truth remains that this ethnic group, despite various socio-spatial disadvantages, continues to contribute to the economical sustenance, if not revitalization, of faltering Midwest economies (Economist, 14 Sept 2001).

Because of this dichotomy between perception and reality, this research, focusing on Hispanics in Iowa and Nebraska counties with large meatpacking plants, has sought to further our understanding of marginalized migrant populations, many of whom are engaged in hazardous slaughtering and meat processing jobs in the Midwest. The inherent challenges faced by immigrants are well documented (Basu, 2004; Martin *et al.*, 1996; Mobasher and Sadri, 2004; Portes and Rumbaut, 1996). There has also been the occasional study of the socioeconomic and cultural trials of immigrants in the context of their participation in high-risk occupations like construction (Walter *et al.*, 2002). But the paucity of empirical research, especially on the issue of Hispanics in the meatpacking industry, beckons a more thorough appraisal of this particular immigrant-industry state of affairs, which parallels the safety and justice concerns of Hispanic workers recently addressed by a coalition of agencies (Environmental Protection Agency, National Alliance for Hispanic Health, National Safety Council, and Pan-American Health Organization, in OSHA Outlook, 2001). This historic, collaborative effort indicates the importance of the issue, and has profound implications for the huge secondary labor market in the U.S. that employs an increasing number of immigrants whose education, safety, equality and future teeter on the edge.

1.1 Thesis Objectives

“Among Hispanic/Latino families, challenges remain in understanding acute and chronic health concerns associated with disparities involving their occupations, environment, economics, education, culture, language, and migration patterns/immigration status” (Agency for Toxic Substances and Disease Registry (ATSDR), Hispanic Health Program, 2004).

Labor migration, socioeconomic disparity, occupational and environmental exposure to hazards, and cultural interrelations form the basis of this study, which analyzes the migration of the Hispanic population to the two important meatpacking states of Iowa and Nebraska. Specifically, the thesis examines counties of Iowa and Nebraska that contain large meatpacking plants (LMPPs) with the objective of assessing: (1) Hispanic immigration and related socioeconomic changes in these counties; (2) the cumulative socioeconomic and occupational/industrial attributes of Hispanics living and working in these areas; and (3) the environmental justice implications of meatpacking plants that release industrial pollutants.

An interpretation of models from related immigration and natural hazards research was employed for the construction of a vulnerability study that would provide the strength necessary to do independent quantitative analyses on specific factors, and the flexibility to allow alliances with interconnected variables in the final, integrated model. Fundamental attention to socially disadvantaged populations – a common thread woven throughout both immigration and hazards inquiry – is attached principally to new Hispanic/Latino immigrants, but also extends to disabled and low-income populations in some pathways of the thesis. The following definition was selected as the working definition of vulnerability for this project: “the differential susceptibility and capacity of

groups and individuals to deal with hazards [including occupational and environmental] based on their positions within the physical and social worlds” (Dow and Downing, 1995; Clark *et al.*, 1998).

Thus, the intersection of economic, social, and spatial dimensions familiar to transmigration research and occupational and environmental exposure to hazards was examined with the objective of providing a more comprehensive picture of immigrant vulnerability in meatpacking communities. With respect to this particular combination of analytic components, vulnerability is considered the state in which one (or a group):

- (a) has a reduced capacity to cope due to poverty, lack of education and skills;
- (b) is in a position of higher potential harm from his/her job and environment; and
- (c) where control over decision making is impaired by language, literacy, citizenship, and racial factors.

Two facets of the immigrant-industry inequity issue - personal vulnerability and occupational risk - were analyzed in this research. Socioeconomic vulnerability was assessed using those variables that have been found to have the most impact on the general coping ability and well being of new Hispanic workers, i.e. categories measuring income and poverty, education, English proficiency and immigration status. Risk factors, as they apply to industrial occupational hazards in slaughterhouses, included toxic exposure, job injuries, and worker disability. An integrated vulnerability model was constructed to reflect the interchange of cultural, social, occupational, economic and environmental factors that may influence Hispanic vulnerability in their migration to and settlement process in areas with large meatpacking plants. The application of this

integrated vulnerability model would theoretically produce a socio-occupational ranking that would not only depict the importance of considering cumulative immigrant attributes on a spatial range, but also contribute to the substantial body of knowledge about geo-political and social issues that promote equality and social justice. This study was also conceived to add a much-needed dimension – that of work environment as both socially compelling and spatially controlling– to the ever-widening scope of research on vulnerability and environmental justice concerns.

In order to apply the integrated vulnerability concept to the Hispanic meatpacking workforce in Iowa and Nebraska, the following research steps were undertaken:

- *Hispanic migration to LMPP counties and socioeconomic changes, 1990-2000:* Examination of the relationship between LMPP counties and Hispanic migration to these areas from 1990 to 2000 was conducted in order to empirically link the two. Additional longitudinal analyses were performed for selected socioeconomic characteristics relating to immigration and coping attributes via Hispanic/non-Hispanic decadal (1990-2000) change ratios.
- *Socio-Industrial ranking of LMPP counties:* Occupational and environmental traits were assessed for a depiction of vulnerability related to working in LMPP areas. Results of the socioeconomic and industrial analyses were integrated to rank LMPP counties for a cumulative portrayal of ‘vulnerability of place’.
- *Environmental justice analysis:* The inequitable exposure to toxic emissions from LMPPs was investigated on the basis of race/ethnicity, disability and poverty. A multiple-scale investigation was conducted at the state, county, and tract level to

determine whether a disproportionate burden of risk is imposed on disadvantaged groups, particularly Hispanics, in and around large meatpacking operations in Iowa and Nebraska.

1.2 Significance of the Research

“A prominent view is that Mexican migrants are temporary rather than permanent immigrants to the United States...However as temporary migrants make repeated trips northward and accumulate time in the [U.S], many can be expected to settle...After accumulating 10 years of migrant experience, 42 percent of rural migrants and 53 percent of urban migrants have settled in the United States (Massey, 1987 in Stull *et al*, 1995: 247).

The genesis of this thesis about Hispanics and their related ‘labor landscape’ in meatpacking plant counties, evolved through extensive research on transmigration issues, which eventually became more localized to encompass internal migration movements within the U.S. An intriguing aspect of our fluid society stems from the so-called step migration process that entails mainly new immigrants entering ‘gateway cities’ and after a period of adjustment, transplanting elsewhere in the country. Networks of family and friends, as well as job opportunities propel this flow to more peripheral localities. Historically, and even today, large metropolitan areas claim the majority of immigrant cohorts; however, their population distribution is becoming increasingly diverse as non-traditional states and cities become the destination point for more and more sojourners. An Urban Institute report (Fix *et al.*, 2003) highlighting this new migratory trend became the pivotal point of the research which, already on the path of U.S.-Mexican transmigration, quickly found a trajectory with the Midwestern region and its cluster of

slaughtering and meatpacking facilities (Martin *et al.*, 1996). Having once labored in an IBP packinghouse in Dakota City, Nebraska, the rest, as they say, is history, and this project was born.

The sociospatial dynamics of Hispanic expansion in the U.S. today is singularly unmatched in its political, economic and cultural implications. It is, simultaneously, a monumental movement of optimistic migrants with a unique mixture of cultural coherence and a systemic manifestation of a population making an economically beneficial contribution as an essentially marginalized population. Demographic projections point to an accelerating ethnic transformation that calls for immediate attention to the collective talents and requisites of our new residents. In the three years since the Census 2000 figure of 35.3 million was released, the Hispanic population in the U.S. had increased to almost 40 million, accounting for about one-half of the 9.4 million residents added to the nation's population during that time. Its growth rate of 13 percent over the 39-month period was almost four times that of the total population (US Department of Commerce News, 14 June 2004). About 4.2 million Hispanics are under the age of five, representing the fastest growing ethnic group among children (childstats.gov: 2000). Multicultural equity, linguistic accommodations and educational modifications must prevail in order to prevent pervasive manipulation and waste of this population known for strong work ethics and high family values.

Since the *bracero* days that saw their vital contribution to agriculture and railway industries, Mexicans in particular have increasingly been an integral part of American culture and economy. In meatpacking plants around the country, Hispanics can now be

found in force, as both managers and laborers, but primarily engaged in the riskiest, most bloody, if not most tedious jobs available. These are not faceless production robots, but individuals with hopes and dreams, livelihoods to earn, families to support. This thesis intends to clarify the plight of Hispanic immigrant packinghouse workers by linking social and industrial influences intrinsic to their workplace and living space. Although outright exploitation is difficult to quantify, risk and vulnerability can be measured as critical factors in determining socioeconomic and environmental equality on the basis of variables available in different public databases using the framework and methodology described above (Section 1.1). Hopefully, by addressing these timely and important issues, this research will have attained its imperative aim, which is to promote positive change in the way that we, as the receiving society, greet our guests and treat our neighbors, our brothers and sisters, our global family, for the greater good.

1.3 Thesis Outline

The succeeding Chapters 2 and 3 summarize the empirical and hypothetical literature relevant to the research. Chapter Two addresses the overall background of the project as it relates to the thesis goals, with particular emphasis on the meatpacking workforce and environment, from transnational migration and global food economies to the day-to-day business of slaughtering and meatpacking. Its inclusion is meant to supplement the primarily quantitative approach to the thesis problem by integrating empirical and anecdotal interpretations into the structure of the project.

Chapter Three highlights the theoretical, historical, and associated applied research pertinent to the thesis. Literature reviews include information and assessments from several interrelated and relevant areas: labor market theory, immigration policy and implications, vulnerability, hazards of place, environmental justice, occupational risks/health of immigrants, impacts of large slaughterhouses on rural communities, and urban-rural migration.

Data sources and the outline of methodology used to examine the three research objectives are described in Chapter 4, while Chapters 5, 6, and 7 focus on the specific methodologies and findings for the three primary thesis objectives stated previously. Chapter Five examines LMPPs in Iowa and Nebraska, their location by county, and Hispanic migration to these areas. It also assesses the socioeconomic changes in these areas that have occurred over the period 1990 to 2000, with a particular focus on Hispanic attributes connected with income, education, language, immigration, and disability. Chapter Six contains the approach and analysis for ranking vulnerability in LMPP counties on the basis of social change and environmental quality, while Chapter Seven highlights the analysis of environmental justice and related findings. The thesis finale is in Chapter Eight, with conclusions and recommendations.

Chapter Two

Background Perspectives and Research Objectives

Because modernist moral hygiene requires that (unlike the medieval butcher's shop) the abattoir is kept confined, away from public view, then qualms inevitably arise whenever the subject of its workings or workers are raised publicly. Such workers seem morally tainted by their noisome associations...[and] the general public remains in a state of denial about its own role and its ability to hear, in the U.S. at least, is further diminished by the fact that many of those employed are themselves regarded by the dominant culture as alien (Smith, 2002:52).

Three main themes run throughout this project: Hispanic immigration to the Midwest states of Iowa and Nebraska, the disproportionate participation of Hispanics in the slaughtering and meatpacking industry, and the associated vulnerabilities of this cohort for whom dangerous working conditions serve to add to already reduced coping abilities wrought by cultural dissimilarities and socioeconomic disparities. In this study, the first item, immigration, can be best understood in the context of the second, which is the meatpacking industry. To put both in perspective, one must also take a relatively macro view encompassing world population movements, agriculture and environment.

This chapter is thus divided into two main sections: the first, containing segments on the industrialization of cattle, the globalization of food, and the displacement of people, highlights issues related to meatpacking from an international perspective. Section 2.2 has its focus on the local level, concentrating on the slaughtering and meatpacking plant milieu, which revolves around factory livestock, immigrant

meatpackers, job conditions, coping strategies, food safety, and hazardous exposures within and outside of the plant.

2.1 Global Influences

“..internationalization remains a product of the standardization of production, the reproduction of the labor process, and the valorization of capital. In slaughterhouses...the tendency is to standardize the kind of meat being produced to the detriment of rural consumers of meat; to gear production for export and the exotic institutional food market and tourist trade; and to centralize and industrialize the slaughter of cattle, removing the locus of production from ranch to urban abattoir” (Sanderson,1986 :174).

This section begins by addressing the global commodification of cattle and the implications of this phenomenon for family livestock operations in both the U.S. and Mexico. Intricately related to the standardization and institutionalization of the meat sector of world economies is the food grain versus feed grain quagmire (Section 2.1.2) that has resulted in increasing the production of heartier cattle to the detriment of millions of people who are starving around the globe. Transformations in food production have inevitably led to rural-urban population displacement and immigration, which ultimately facilitates the meatpacking industry’s strategy of planned vulnerability of its workforce (Section 2.1.3).

2.1.1 Industrializing Cattle Production

On both side of the U.S.- Mexican border, cattlemen and farmers struggle to compete with expanding technological and corporate insinuations into their fields. The internationalization of cattle production in the late twentieth century has eroded producer

control by shifting cattle-trading economies toward contract providers of feeder cattle for feedlots, many that are situated in the U.S. and run by large meatpacking conglomerates (Sanderson, 1986). Over the last twenty years, nearly a third of our nation's cattle ranchers have thrown down their branding irons, and those that remain (around 800,000) find themselves saddled with concerns about land values and taxes, volatile beef prices and supplies (competing stock from Canada and Mexico), and worst of all, the consolidation of the U.S. meat industry into well-oiled price-fixing machine (Schlosser, 2001). The "Big Four" (Iowa Beef Packers (IBP), ConAgra, Excel, and Farmland) run this machine through manipulation of cattle prices, facilitated either by owning their own enormous feed lots, or by controlling their supplies (and costs) through forward contracts (Schlosser, 2001; Stull and Broadway, 2004). Confidential dealing with the largest ranchers and feeders ensure not only an abundance of "captive supplies", but also a legally questionable control over market prices (Schlosser, 2001).

Integrated feedlot-centered beef systems are systematically replacing the traditional cow-calf operation of the independent rancher. These systems serve to promote the raising of feeders for "order buyers who may provide only finance capital to 'custom feed' calves for future sale. The rancher has, in some circumstances, joined the poultry farmer as a wage laborer for the feedlot and its intermediary customers" (Sanderson, 1986:165). According to the editor of *Livestock Market Digest*, "The packers now own some of these big feeders lock, stock, and barrel, and tell them exactly what to do" (Pitts in Schlosser, 2001:139). In Nebraska and Iowa, the meatpacking business appears to be split between beef and pork, with Nebraska packers being cattle-oriented

and Iowa packers specializing in hog processing. Part of this bifurcation of the slaughter arena may in fact be due to an Iowa law that “forbids processors from owning, controlling, or operating livestock operations” (Stull and Broadway, 2004:152).

In Mexico, a similar scenario has developed in response to the global commodification of agriculture and export production for the U.S. market, creating a high demand for feed grains, more consolidated cattle operations, and fewer farms and ranches (Magdoff *et al*, 2000; Sanderson, 1986). Assuming what is considered the riskiest aspect of the business, breeders in Mexico cater to many American feedlots and order buyers who seek to avoid actual ownership of livestock with its attending production costs and risks (Gomez and Snyder, 2000). Consequently, Mexican cattlemen are offered the most technologically advanced products to enhance their stock, from artificial insemination resources to antibiotics. Their ‘producer contracts’ are no less scientifically specific: Requirements regarding cattle quality, breed, delivery date, and confinement feeding are promoted in order to increase carcass weight (Sanderson, 1986). On the other hand, increased *carne magra* (lean beef) production for export markets “have limited Mexico’s ability to build its herd for national consumption” while generating a “dynamic by which Mexico is increasingly import-oriented [meat, food grains], as well as export dependent [feeders, feed grains] in agriculture” (Ibid: 140, 276). [Appendix A]

2.1.2 Controlling Food, Displacing People

It has been argued that agribusiness imperialism is “central to the coercive use of institutional mechanisms to monopolize control of world agriculture and flows of food”

and that it primarily serves “the interests of the corporation sector and a global minority of 600 million affluent consumers concentrated in the triadic core of the world economy: Western Europe, North America, and Japan” (McMichael in Magdoff *et al*, 2000:127). These institutional orchestrations of the global food economy are periodically consolidated in World Trade Organization (WTO) gatherings where negotiations are exchanged and concessions arranged for the maximum allocation of resources and monetary benefits to those nations with the most geopolitical muscle. Ironically, the WTO was ostensibly founded during the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) negotiations in 1994 to coordinate global political, social and environmental protections under the rhetorical umbrella of ‘free trade’ when in fact, the promotion of efficiency and market freedom has since been compromised by developed states who externalize agribusiness subsidies through such tactics as agro-export “dumping” at artificially low prices (Ibid: 126).

Often, the food requirements (dictations) of first-world countries can have deleterious effects on less wealthy countries whose growing economic dependency on external agricultural manipulation of local resources generates even greater poverty. A classic example of this has occurred within the realm of food grain versus feed grain between the United State and Mexico. Incredibly, the average North American “consumes about 1,000 kilograms (one ton) of grain annually, of which four-fifths is indirect consumption via conversion to animal products”, while in developing countries like Mexico, feed grains have gradually displaced food grains as the agricultural priority (Patnaik, 1999:401). In other words, the meat we eat has essentially consumed food that

otherwise could have fed millions, so ultimately, the grain-intensive requirements of cattle-raising have a deleterious impact on our world's food supply.

Mexico's food-grain displacement began with financially motivated politics that resulted in perhaps unintended consequences. Under the guise of economic liberalization meant to lower national debt, Mexico's agricultural sector was revamped in the 1970s to promote exports, particularly to the U.S. and other developed countries. The restructuring aggravated Mexico's balance of payments when subsequent dependence on importation of pricey wheat and maize (to offset reduced regional supplies) was met with a comparative, simultaneous fall in income from tropical exportables. Significantly, sorghum – the grain required for lean meat production – had taken over as Mexico's fastest growing commercial crop in the 20 years prior to 1978, averaging an annual increase of about 11 percent. During the same time frame, old cash crops (sugar cane, cotton, and food staples: beans, maize, wheat) remained relatively stable or experienced negative growth, signifying an unwelcome trend for the local production of national food provisions. (Ibid: 395).

During approximately the same time frame that saw the feed-grain-for-animal-production campaign heighten deficits in Mexico's food supplies, sustained rapid growth of horizontally integrated food firms in the U.S. - fueled by consolidation and expansion of operations - centralized capital and power to the widespread detriment of small and medium sized comestibles companies. Reaching near oligopolistic heights by the end of the twentieth century, companies like Tyson (parent of IBP), ConAgra, Cargill (parent of Excel) and Farmland have succeeded in corraling a stranglehold on the beef processing

industry while branching out diagonally and vertically to embrace and monopolize other food markets as well. ConAgra and Cargill in particular are among the top four agricultural commodity processing firms holding more than 40% of the market share in seven additional areas involving food production, slaughter, and milling: broilers (meat chickens), pork, sheep, turkey, flour milling, soybean crushing, and dry and wet corn milling (Heffernan, 1997 in Magdoff, 2000:65).

Along with the livestock-feedgrain-foodgrain complex that brings up problematic challenges for Mexico's economy, capital investment, demands of its own food market, and sustainability of its export market in agricultural products, the "central question of the Mexican food system since the revolution has been and continues to be the survival of the peasantry as an economic producer and social class element" (Sanderson, 1986: 178). The restructuring of rural agriculture in Mexico wrought by the thrust for agri-exports, and fortified by the intrusion of financial incentives, powerful governments, and oligarchic food conglomerates has detrimentally contributed to not only a dearth of food grains for human consumption in the pursuit of more and more feed grains for animal production, but also to the demise of many small farming and cattle-raising operations which has, in turn, led to "migrat[ion] in search of wage-paid work...swelling the army of the urban poor...and illegal entrants [to the U.S. who work for] ten dollars a day as against the minimum wage of forty dollars. No other developing country has the benefit of a common border with the USA" (Patnaik, 1999:397, 393).

Global rural population displacement between 1950 and 1990 has resulted in bloated megacities in Africa, Asia and Latin America that have experienced population

explosions averaging 300 percent. Close to a *billion* people do not have adequate shelter (homeless, slum-dweller, squatter) and “every year worldwide, ten million people die due to housing shortages and poor housing conditions” (Araghi, in Magdoff *et al*, 2000:153). This dismal scenario worsens, however, when unemployment caused by displacement is considered: 600 of the 700 million unemployed people on earth live in abject poverty; in Mexico alone, more that 50 percent are un- or under-employed. “The largest migration in world history is currently taking place. Unemployment, poverty, and overurbanization are driving millions of people out of their home countries. Between 1965 and 1995, the number of international migrants worldwide increased by 38 percent, reaching 125 million people by the mid-1990s. Of these, the ILO (International Labor Organization) estimates that at least 42 million are “guest workers, a source of cheap, unskilled and semiskilled labor in the immigrant countries...where international migration [1990-1995] accounted for 45 percent of population growth” (Ibid: 154).

2.1.3 Planned Vulnerability: Recruiting the Marginalized

“Packing plants need people whose personal situation hovers on malnutrition, misery, hopelessness, and lack of alternative opportunities: precisely that of millions of Mexican men and women” (Centro de Investigaciones Economicas y Politicas de Accion Comunitaria, 2003:6).

Exploiting the opportunity for reaping the bountiful crop of displaced agrarian workers from Mexico are a number of U.S. meatpacking plants, led by Iowa Beef Packers (IBP), the forerunner of streamlined, boxed beef assembly. No doubt realizing the value of recruiting at the source, IBP maintains a labor office in Mexico City with

concurrent radio ads and transnational bus services to entice and ensure a continuous flow of laborers for their slaughtering operations at home (Schlosser, 2001:162). The ‘success’ of these operations is predicated on low payrolls due to the instability of commodity economics, low profit margins, and regulatory requirements (Bjerklie in Stull *et al*, 1995). And the ability to offer rock-bottom wages for meatpacking jobs is partially a product of this industry’s “intensely subdivided work process” that in many ways, “pioneered American mass production methods” (Horowitz, 1997:4).

In fact, packinghouses were the original source that inspired Henry Ford’s automobile assembly line with “the overhead trolley that the Chicago packers used in dressing beef” (Ford, cited in Smith 2002). The ‘trolley’ was actually a gigantic chain that moved carcasses to the meat workers. “The first step forward in assembly came when we began taking the work to the men instead of the men to the work” (Henry Ford in Horowitz, 1997:17). No longer could people control the pace of production, but rather, this revolutionary innovation irrevocably transferred control of the production tempo directly to management. By combining this “labor intensive fragmented division of labor with a continuous-flow production process”, meatpacking companies were also able to improve production further by offering incentive pay that supplemented hourly pittances while encouraging “overwork and vicious competition among workers” who strove to top quotas standardized in these “slave-driving systems” (Ibid: 22).

More than 100 years ago, the industrial revolution propelled the first massive wave of immigrants to the U.S. from European countries (Castles and Miller, 2003). Many of these German, Polish, Lithuanian, and Bohemian sojourners found their way

into urban abattoirs where the competition for jobs was so fierce that daily crowds of desperate job-seekers formed at the doors of the meat plants (Sinclair, 1906). Inside, temperatures were extreme, work was torturous, and dangerous, and chemicals and additives were commonplace. Anyone who couldn't cut it, could be replaced by one of a thousandfold waiting on the threshold of the slaughterhouse (Ibid).

Today, eerily similar management philosophies toward meat workers distinguish a socially and culturally inert industry that for over a century has steadfastly persisted in manipulating one immigrant group after another and “culturally distinct groups of workers against one another” (Stull *et al*, 1995: 7). Applying their hugely successful formula combining unskilled laborers with little to no knowledge of English, low wages based on tasks that were broken down into the simplest component, rampant job insecurity brought on by dangerous working conditions, and an unending supply of men and women predisposed to employment under any conditions, meatpacking pundits have managed to replicate history, even in an era replete with regulatory legislation to the contrary (Schlosser, 2001; Stull *et al.*, 1995).

Although immigrants have traditionally formed the labor pool for the slaughterhouses of America, it appears that IBP has also trail-blazed more local avenues of recruitment in targeting the downtrodden and marginalized: Laotian and Bosnian refugees/asylum-seekers and “homeless people living in shelters in New York, New Jersey, California, North Carolina, and Rhode Island” (Schlosser, 2001:162). As long as IBP and other meatpackers can find enough manpower, high, continuous turnover will not present a problem. Moreover, employee turnover is seen as advantageous in this

industry where new hires do not qualify for insurance coverage until after six months on the job and vacations do not accrue until the second year. When asked by counsel whether high turnover bothered him, IBP's head of labor relations in a federal hearing in the 1980s replied, "We found very little correlation between turnover and profitability...there are some economics, frankly, that result from hiring new employees" (CIEPAC, 2003; Schlosser, 2001:161). No reference to the underlying reasons for the high turnover or human suffering that transpired daily within his domain could have been more compelling than this purely financial rationality that was as frigid as the packing plant itself. For the immediate object of food production is not the reproduction of labor or "human sustenance and well-being, but the growth of profits" (Magdoff *et al*, 2000:9).

2.2 Local Apprehensions

Many immigrants are transported from foreign lands to occupy a space tailor-made for them by the meatpacking industry, a space so alien that most people not only do not know about it, but also do not *want* to know. What goes on inside the slaughterhouses that process the meat we eat is primary thrust of this section. It examines four interrelated issues: the process of cattle 'disassembly' from the feedlot to the consumer, the working conditions inside the packinghouse, coping mechanisms for dealing with the hardships of these jobs, and the environmental degradation that proliferates both inside and outside the meat factories.

2.2.1 From Hoof to Mouth: The Evolution of Meat

“Those awaiting slaughter in the stockyards are to all intents and purposes what Heidegger refers to as a ‘standing reserve’ (*Bestand*)...It is one of modernity’s ‘little ironies’ that the first thing that happens to this particular ‘standing reserve’ on entering the abattoir is that its feet are swept from under it as it is stunned, shackled, and suspended by its rear legs from a rail before its hoofs are chopped off” (Smith, 2002: 52).

‘White-hats’, or hourly line workers, are subject to the most grueling jobs in meatpacking plants, and as one Mexican immigrant so succinctly phrased it, their work is *esclavitud*, or slavery (Stull and Broadway, 2004:84). Once hired by any given large slaughterhouse, approximately three months of probationary employment (leading to longer-term if one can tolerate and survive it) invariably entails one of the following jobs, described as the cattle disassembly process, where humans and animals co-mingle in a macabre death dance. Imagine, if you will, the progression of events that unfolds at a typical meatpacking plant - hour after hour, day after day, year after year – a cold environment dedicated to killing animals for consumption and exploiting humans for maximum production:

Cattle are calmly lowing in adjacent corrals as others are taken one by one to a wide ramp that narrows to single file entering the slaughterhouse. The first blow comes from the ‘knocker’ who uses a compressed-air gun to shoot the unsuspecting cattle in the head with the steel bolt of a captive bolt stunner. Thus knocked unconscious, (not always the case due to bad aim or malfunctioning stunner) the fallen animals are shackled and hoisted up on an overhead conveyer to join the disassembly line. Next, the carotid artery is pierced by a ‘sticker’ whose only task is to stab the necks of unconscious animals at the

rate of about six per minute (360 an hour) for an eight and a half hour shift while “standing in a river of blood” (Schlosser, 2001: 170-2). This is the ‘kill floor’, hot, fetid, and consummately treacherous.

The bloody jobs continue: various workers slice cattle in half with power saws, skin them, decapitate and eviscerate. Flowing blood is channeled through drains into enormous vats below the workers. The steamy stink of the kill floor eventually gives way to the freezing temperatures of the fabrication area as suspended sides of beef roll onward through the plant. Here, sometimes thousands of laborers are joined together in huge production areas where they perform their monotonous, prearranged assembly line jobs. Everyone wears protective mesh and wields either knives or ‘whizards’ (electric knives like extremely sharp pizza cutters with spinning blades). Unceasing repetition, incredible line speeds and sharp instruments collectively result in extraordinarily hazardous conditions for workers dedicated only to surviving the day unharmed and with their jobs intact (Fink, 1998).

Most consumers partake in the end product that meat laborers toil over without a thought to either the slaughter of the animal or the sweat and tears of the ‘processor’. Instead, it is the alarming questionability of meat quality that has triggered public outrage in recent years. Much has been written about the decaying quality of the meat we eat (Eisnitz, 1997; Midkiff, 2004; Schlosser, 2001; Stull and Broadway, 2004). Over the years, the onus for food safety has mysteriously passed from the producer to the consumer; we are now urged to properly prepare and cook our meat to avoid the effects of deadly contaminants within (Eisnitz, 1997). When questioned about this phenomenon,

a Government Accountability Project (GAP) official commented that in the aftermath of the Jack-in-the-Box tragedy that poisoned scores of people with tainted hamburger, the USDA merely warned consumers to ‘proceed at their own risk if they eat rare or medium beef’. His personal assessment: “Obviously, the [federally approved] meat’s a lot dirtier” (Ibid: 160). Meat-borne pathogens like Campylobacter, Salmonella, and Escherichia coli 0157:H7 stem from bacteria in manure and animal intestines/stomachs that erroneously find their way into more processed meat than we are led to believe (Stull et al, 2004:20). In particular, E. coli outbreaks, resulting in tragic deaths and massive recalls, have mushroomed within the past decade; “approximately half a million Americans, the majority of them children, have been made ill by E. coli 0157:H7” (Schlosser, 2001:199). In addition to attributing the problem to slovenly plant conditions and inhumane production line speeds, it has also been observed that the meat inspector cadre is increasing a rare breed in our slaughterhouses (Midkiff, 2004:130).

The United States Department of Agriculture (USDA) oversees food inspections countrywide. According to Eisnitz, “about six thousand federal meat inspectors examine the insides and outsides of more than eight billion animals each year [and have] been using the same methods for nearly ninety years – cutting into, manually examining, and visually observing carcasses and organs - relying solely on their senses of sight, smell and touch to examine the animals for signs of disease and contamination” (Eisnitz, 1997:161). Incredibly, this translates not only to more than a million animals per inspector annually, but also to an archaic inspection program that is scientifically ill equipped to screen for microscopic contaminants *before the meat reaches the public*. And

squarely on the frontline of this bacterial hotbed are the employees of meatpacking plants whom are continually exposed to and suffer from illnesses manifested by the raw materials containing these highly lethal pathogens (Stull and Broadway, 2004).

[Appendix B]

So while food safety issue is not the focus of this study, it has become imperative that we recognize and understand the entire food cycle, including the ‘hidden costs’ in the food we consume. The ‘spillover effect’ of the food system is its impact on the human system. The economic chain of relationships we build with those whom are responsible for the products we consume should be transparent and robust, not vague, abstract imaginings of faceless, nameless entities in sweatshops and factories. We need to ask, “How does our buying of this product affect their human dignity?” (Beaudoin, 2004: 13).

2.2.2 Inside the Meatpacking Plant: Treacherous Terrain.

“The ratio of cumulative trauma injuries in the meatpacking industry...is almost thirty-five times higher than the national average in the industry. Many slaughterhouse workers make a knife cut every two or three seconds, which adds up to about 10,000 cuts during an eight-hour shift. If the knife has become dull, additional pressure is placed on the worker’s tendons, joints, and nerves. A dull knife can cause pain to extend from the cutting hand all the way down the spine” (Schlosser, 2001: 173).

Overzealous production goals and inadequate safety measures are frequently cited as key contributors to the meatpacking industry’s horrific illness and injury rate (Eisnitz, 1997; Stull and Broadway, 2004). In addition to the gory barrage of injuries recounted in studies on the subject, related vignettes concerning occupational exposures/incidents, dubious medical responses, and inaccurate reportage point to a history of prevarication

and subterfuge in this disassembly business (Schlosser, 2001). The overall trajectory of rural industrialization has capitalized on the deskilling of meat labor, which even in this age of information and technologization, still involves the prolific use of knives and human participation to function.

The landscape of the slaughterhouse is really no different than that of a century ago; it is a built environment constructed to slay animals, and the enormous cost to the people working in these meat factories is - has always been - a mere by-product of the production line. Frequently cited standards in Department of Labor records of injuries and death reported by meatpacking plants (2011) are: hazards communication; electrical/mechanical; guarding floor, wall openings, holes; machines: general requirements; respiratory protection; control of hazardous energy (lockout/tagout); means of egress; occupational noise exposure; and permit required: confined spaces (BLS, 2004). In addition, BLS accounts revealed increasing illness/injury rates of Hispanic workers from 2000 to 2001, while highlighting the fact that “Total cases of over-exertion along with contact with objects, is the leading exposure resulting in a disabling condition” (BLS in UFCW.org, 2005).

Going in for her physical at an IBP pork processing plant that had hired her, undercover anthropologist, Deborah Fink, found that besides a drug test, the primary function of the medical exam was to check the strength of her hands and back. Various probes and exercises were performed to ascertain her viability as a competent production worker able to withstand continuous, repetitive physical workouts on the job. Safety and attendance were watchwords drilled into orientation attendees. The former message was

reinforced by strict consequences attached to violating safety rules, while the latter was punctuated by a “hopelessly complicated and contradictory” attendance policy handout enumerating the many and varied ways absentees could be terminated during their probationary period. Knives and meat also took the spotlight as trainees were indoctrinated into the world of sharpening and slicing, then given a brief period within which to practice their skills (Fink, 1998:9).

A hard hat, steel-toed boots, hairnet, earplugs, an assortment of gloves (nylon, cotton, rubber, mesh) to be worn in various layers, mesh arm sleeves, a hard plastic arm protector, and a hard synthetic apron are all fairly standard issue for a meatpacking worker. None of this protective gear was designed to prevent muscular wear and tear, however, and in some cases, even exacerbates repetitive stress injuries. Working in the cellar IBP’s pork processing plant in Perry, Iowa, Fink immediately experienced the pain and exhaustion of non-stop teat line trimming: “With the weight of my steel glove and the rigidity of the plastic arm guard, my left biceps ached and burned within an hour.

My right arm and shoulder were also fairly sore from holding the knife, but it was my right hand that was making me increasingly uneasy. Wrapped around the whizard, it caught the vibration of the moving knife. This was worse when I had to use the pressure to cut into a hard piece of fat, which occurred at about one out of ten pieces of belly” (Fink, 1998:20).

Later, when she complained about the ‘fierce pain’ in her right hand, her superior merely commented that it would “be okay once it’s broke in”. Less than two weeks after starting work, Fink could not hold a pencil to write and often felt numbness in her fingers. “I repeatedly awakened in the night with my hand clenched in a tight, painful

knot, and had to use my left hand to straighten the fingers one by one. The fatigue of work was all-consuming” (Ibid: 25).

Another job assigned to Fink brought a different set of hazards with it. Occasionally called upon to do janitorial duties (also in the cellar), the near freezing temperatures, drafts, and prevalence of pork fat together conspired to create a chilly and highly dangerous environment. “We frequently had trouble with ice on the floors. On some days enormous icicles formed where water and blood dripped off production areas” (1998:23). One of her tasks – pulling an unwieldy ‘combo’ filled with meat and trash up an incline to a freight elevator and then into a trash compactor built into the floor of a small room – seemed fraught with danger at every turn. The “compactor was blunt terror...my rubber boots slickened with pork fat, I imagined a dozen ways of sliding into the hole with the trash”, and the elevator a frightening conveyance as she “envisioned [her] arm or leg caught between the elevator and the shaft” while tripping the safety switch with one hand and elevator button with the other to override the malfunctioning safety door (1998:27).

Interchanging positions from custodian to meat packer was in itself a contradiction in sanitation and safety for Fink: “I could turn from a polluted janitor, prohibited from touching any meat product, into a hygienic production worker just by [changing] my blue frock [to white] (1998:33). During production times, maintenance and custodial workers are also exposed to deadly fumes and poisonous chemicals. Inhalation of toxic fumes while welding sent one IBP employee to the hospital with chills, vomiting, and diarrhea; returning to work a few days later, and perhaps “as a result

of lingering vertigo”, the same worker fell from a maintenance pole (safety harness and all), resulting in a severely traumatized back. Ammonia fumes that pervaded the plant were also a worry (1998:185).

From intestinal acids to chemical acids, workers inside the meatpacking plant are exposed to even more than the all-consuming risk of being cut, caught in the machinery, or crushed by falling carcasses.

Physical sanitation of our country’s meatpacking plants takes place in the dead of night. After a typical day’s work involving the slaughter of thousands of cattle (or swine), the plants are literally covered with blood and animal remains. From midnight to six in the morning, cleaning crews tackle the sewage by hosing down areas with a scalding diluted chlorine mixture that creates a deadly, overheated, noxious fog. The workers are on top of, under and around running conveyor belts and machinery, “climbing right into the bloody muck, cleaning out grease, fat, manure, leftover scraps of meat” (Schlosser, 2001: 177).

According to a former sanitation worker, because of the steam and noise, the crew members “can’t see or hear each other when the machinery’s running, They routinely spray each other with burning, hot, chemical-laden water. They are sickened by the fumes... ‘You feel it in your head...in your stomach, like you want to throw up’...[his friend] vomits whenever they clean the rendering area...the stench is so powerful that it won’t wash off; no matter how much soap you use after a shift, the smell comes home with you, seeps from your pores” (Ibid: 177).

A high proportion of these independently contracted sanitation workers are undocumented immigrants, per Schlosser, who also maintains that “they are the ultimate in disposable workers: illegal, illiterate, impoverished, untrained” and in some catastrophic situations, “are literally ground up and reduced to nothing” (Ibid:178). Indeed, in reviewing the incident reports filed with OSHA over the past fifteen years, one can find evidence of extraordinary deaths among the employees of the primary sanitation companies that cater to meatpacking entities of the U.S. (OSHA.gov, 2005).

2.2.3 New Workers, Old Business, Survival Strategies

“Today, a few corporations headquartered in metropolitan centers dictate the industry’s wages, working conditions, and production schedules. No longer can the larger food-processing plants meet their labor needs solely with workers native to the community. Whether plants relocate to new regions of the country or old plants recruit from beyond the region or even outside the nation’s boundaries, today’s food-processing plants rarely assume a benign position in relation to a community’s demographic profile, housing stock, infrastructure, or health care facilities” (Stull et al., 1995:2).

Intrinsic to the emergence and expansion of the large transnational corporations that now dominate the food industry is the fact that they represent major sources of employment and income in depressed rural areas. This is the paradox of rural America: new industrial jobs vie with unabated targeting of minorities, new immigrants, refugees and women to create a veritable quandary for community officials whom are often paying incentives to entice big business while at the same time, face increasing housing shortages, health care needs (especially of the uninsured), cultural and linguistic conflicts, and elevated crime rates (GAO, 1998; Stull *et al*, 1995).

Towns suffering the sting of population decline and poverty welcome these new fonts of prosperity. Indeed, the lure is sometimes so great that deceptions involving the myriad of benefits that will follow relocation to targeted host communities are almost commonplace. For instance, jobs promised to locals rarely materialize as recruitment of new Latino and Southeast Asians – now the cornerstone of the meatpacking plant workforce – is justified by the dangerous nature of many slaughterhouse jobs that cannot otherwise be filled at the pay scale offered (Stull *et al.*, 1995). So while development strategies founded on value added to local agricultural supplies in rural areas may be spatially compelling, plant labor forces more often than not are not indigenous populations. This creates a pool of individuals whom are simultaneously resented by others and presented with the dual vulnerability of being a ‘stranger’ constantly exposed to on-the-job dangers. Social disorders, personal injury, homelessness, isolation and marginalization mount in the wake of such corporate transitions to rural America (Fink, 1998; Midkiff, 2004; Schlosser, 2001).

In the face of foreign, oppressive conditions, immigrant networks comprised of family, friends, and coworkers have strengthened (Stull *et al.*, 1995). Deprivation and dependence have been counteracted by coping strategies that involve freedom of movement (despite stricter borders) and recuperative journeys. Migration has become a way of life for many Mexican workers who embrace every opportunity for employment. Moving between agricultural harvesting, food processing and informal economic activities (horticulture, food service, child care) maximizes income while minimizing occupational injury. Periodically returning to their sending regions is an important avenue

of escape/coping mechanism for migrants seeking to mitigate poverty and poor health; “they become cyclical migrants, moving between their low-wage jobs and regions with lower costs of living” (Ibid: 5). Cyclical migration enhances and is enhanced by social ties that are formed at home and abroad, and these networks help to offset cultural and occupational vulnerabilities (Massey, 1995).

Recognizing the benefits of transnational community formation for their own employees, agricultural companies have sought to emulate them. ‘Artificial networks’, based on corporate-sponsored transportation and housing have been developed by farm-labor contractors who “commonly assemble crews with an eye toward mimicking friendship and kinship networks, providing workers with a wide range of services” thus assuring “the continued replenishment of plant workforces by new immigrants, since they involve the growth of immigrant enclaves and anchor households to which and from which immigrant workers attach and detach themselves depending on labor market developments” (Griffith, Valdes, Pizzini, Johnson, 1992, in Stull, *et al.*, 1995:142-3).

In this regard, although LMPPs like Iowa Beef Packers (IBP) provide their own bus transportation, standard-issue work clothing, and in-house nurses for their laborers, it is not always clear for whom these ‘fringe benefits’ advantage. Housing shortages lead to workers living in another town so that they require bus transportation to work; dangers of the job require specific work clothes and equipment, not always company-paid; and company nurses and doctors have often been found to be more on the side of their employer than an advocate of what is in the best interest, or for the optimal health of the meatpacking worker (Fink, 1998).

Nevertheless, the multiple survival strategies of recent immigrants, stimulated by the prevalence of labor manipulation and recruitment designed to perpetuate a steady stream of “docile, highly productive, vulnerable workforces” (Stull *et al.*, 1995:8) have, in one way, turned the tables on corporate labor control. Instead of considering their occupations a central part of their identity, workers “allegiances, loyalty, and affiliation run in other directions, toward ‘imagined communities’ of ethnicities and diasporas” (Chavez in Stull *et al.*, 1995:9). In essence, marginality in the workplace and living space can also serve to intensify social and cultural bonds that provide a much-needed source of control over an otherwise alien environment.

Another avenue of vulnerability mitigation among U.S. workers has been organized labor. Originally formed to elevate workers’ living standards and dispel class-consciousness/racism with a united front, the Congress of Industrial Organization (CIO) has been recognized for its “sustained commitment to social justice” (Horowitz, 1997: 3). Under this umbrella, the United Packinghouse Workers of America (UPWA) also promoted anti-racism solidarity, portrayed by the symbol of an early Chicago meatpacking union showing black and white hands clasped in a handshake (Ibid: 4). According to Horowitz in his book about industrial unionism in meatpacking entitled, *Negro and White, Unite and Fight!*, the UPWA effectively dismantled racial segregation in the 1950s, “rendering important assistance to local civil rights struggles, and significantly aiding in the early efforts of Martin Luther King, Jr. (Ibid).

But despite labor’s successes in the mid-1900s, subsequent consolidations and restructuring – UPWA merged with Amalgamated Meat Cutters, then Retail Clerks

International Union (RCIU) to become part of today's United Food and Commercial Workers (UFCW) – simultaneously diluted and over-extended its efforts. As one union official put it, we've "moved from being a labor organization to becoming a small corporation...ourselves" (Ibid: 246). The erosion of organized labor within the meatpacking industry was aggravated by large meatpacking firms that sought more control over both their market and their labor pool. For instance, IBP's strategy to divest itself of unionized plants in the 1970s led to the decentralization of its boxed beef operations in the Dakota City, Nebraska, factory to newly-built slaughtering and processing facilities in Texas and Arkansas. This strategy, which drastically altered union leverage at the Dakota plant, led to the untimely and litigious expiration of IBP's labor contract in 1977 (Horowitz, 1997: 263).

However sporadic the meatpacking union's influence and power have been in the past, it still provides a critical stimulus for alliances along class lines, despite the inevitable cultural divisions that have emerged with foreign recruitment efforts. A revitalization of labor organization appears to be taking place: the UFCW has recently seen significant increases in its meatpacking worker membership: the "UFCW, which added 100,000 members during the entire 1980s, added the same amount in 1993 alone" (Judis in Stull and Broadway, 2004:258). Their promotion of safer working conditions and more equitable pay and benefits offer a much-needed antidote to nefarious corporate schemes involving worker exploitation (low wages, reduced benefits), overexertion (increased line speeds), and repression (UFCW, 2005).

2.2.4 Factory Farming, Fouled Environment

Contamination associated with today's packinghouse extends to the outside environment and beyond. Three main areas of pollution that are addressed in this paper are: (1) toxic chemicals used in processing and clean-up activities; (2) bacterial poison that incubates and develops in the animals as well as in their meat during processing; and (3) fecal and other animal waste from holding pens that accumulates and pollutes the environment. Having examined the first two health hazards in the prior sections, this section deals with the third, a relatively obscure, but consummately disturbing consequence of the recent and widespread vertical integration of meatpacking conglomerates.

One would be hard-pressed to write about meatpacking in the U.S. without referencing the parallels in Upton Sinclair's novel, *The Jungle*, relevant to today's meatpacking conditions. This exposé, written in 1906, influenced President Roosevelt's appeal for regulatory measures over the quality of meat that resulted in the Federal Meat Inspection Act that same year. Even though Sinclair 'aimed for the public's heart, but found its stomach', his message about worker rights in dangerous environments was clear. It is, also, unfortunately, still an appropriate venue for concern: there are simply too many similarities with today's immigrant in today's meatpacking milieu to ignore. As an example of the visceral and spatial impressions that greeted newly arrived Lithuanian immigrant, Jurgis, and his family as they experienced for the first time a Beef Trust stockyard/slaughterhouse in Packingtown (Chicago) one hundred years ago, Sinclair writes,

“A full hour before the party reached the city, they had begun to note the perplexing changes in the atmosphere. It grew darker all the time, and upon the earth the grass seemed to grow less green. Every minute, as the train sped on, the colors of things became dingier; the fields were grown parched and yellow, the landscape hideous and bare. And along with the thickening smoke they began to notice another circumstance; a strange, pungent odor...and they realized that they had traveled all the way from Lithuania to it” (1906:24).

Upon entering the stockyards, they saw belching blackened columns of smoke emanating from the buildings, heard the lowing and grunting of tens of thousands of cows and swine, and witnessed

“great hollows full of stinking green water...[where] children played; [and] swarms of flies hung about the scene, literally blackening the air, and the strange fetid odor which assaulted one’s nostrils, a ghastly odor, of all the dead things in the universe” (28).

Nearby dumping grounds for the city’s garbage sat adjacent to

“another great hole, which they had emptied and not yet filled up. This held water, and all summer it stood there, with the near-by soil draining into it, festering and stewing in the sun; and then, when winter came, somebody cut the ice on it, and sold it to the people of the city (1906: 29)

Yet Jurgis was eternally moved to be given a place in the tremendous enterprise, the “greatest aggregation of labor and capital gathered in one place”, to “share in its wonderful activities was a blessing to be grateful for, as one was grateful for the sunshine and the rain”. On his first day at the ‘killing beds’

“he fell to work. It was a sweltering day in July, and the place ran with steaming hot blood – one waded in it on the floor. The stench was almost overpowering, but to Jurgis it was nothing. His whole soul was dancing with joy – he was earning money at last! He was at work and earning money! (1906:41-42)

Here is the crux of the meatpacking ‘success story’ with a succession of immigrants that have slaved in the bowels of their factories over time: the willingness,

even eagerness to work under any circumstance for any amount of money. This colossal drive for a means of livelihood is what leads the Jurgises of the world to the alien, dangerous territory of the slaughterhouse, which, in many ways, is essentially the same today as a century ago:

“Upton Sinclair did his research for *The Jungle* in 1904, but were he to visit one of today’s packinghouses he would be struck with how little the industry – its work or its workers – have really changed. Knockers still start the killing, but now they use a stun gun instead of a sledgehammer. Splitters are still the most expert and highly paid workers on the killfloor, deftly cutting carcasses in half with band saws from moving platforms, where once they used massive cleavers. And, just as they did a century ago, today’s stickers and gutters, tail rippers and head droppers, chuckboners and short ribbers still wield razor-sharp knives as they turn 400 cattle an hour into meat (Stull and Broadway, 2004: 4).

Meatpacking towns today generally have a distinct odor that emanates from its slaughterhouse and permeates the air for miles around. A Lexington, Nebraska (home of an enormous IBP plant) resident described three odors that he recognized as “burning hair and blood, that greasy smell, and the odor of rotten eggs”. Hydrogen sulfide gas, as a matter of fact, rises from packing plant wastewater lagoons and can be highly damaging to respiratory and nervous systems (Schlosser, 2001:165). Violations of the Clean Air Act, Clean Water Act and a host of other legislation regulating industrial pollution are fairly commonplace; at Dakota City, Nebraska’s IBP facility, for example, as much as a ton of hydrogen sulfide per day was routinely being released from its lagoons until the U.S. Justice Department intervened and IBP consented to cover these lakes of liquid manure (Midkiff, 2004; Schlosser, 2001).

More than a decade ago, a Worldwatch Paper on ‘animal farming and the environment’ analyzed the ecological costs of livestock production and processing. From

a international perspective, it warned of environmental decline throughout the world wrought by the global livestock industry and brought about through a succession of political and economic pressures that have transformed traditional animal production into a growing entrenchment of factory farming dependent on enormous, concentrated sources of land and water. “More than 3,000 liters of water are used to produce a kilogram of American beef”, primarily because the livestock agriculture (i.e. grain and hay) that sustains beef feedlots are largely grown on land irrigated by underground aquifers, as opposed to water used by pork, poultry and dairy production concentrated in areas requiring no irrigation for grain feeds (Durning, 1991:18). And rather than fertilizing the land with nitrogen and phosphorus-rich manure, the nutrient loop has been severed, causing the reverse to happen: rivers and groundwater are being polluted by the leeching of accumulated animal wastes into their systems. A process called eutrophication then occurs whereby fast-growing algae become hyper-nurtured, flourish, and deplete oxygen in the water supplies, which, in turn, “suffocates aquatic ecosystems” (Durning, 1991; Sierraclub.org).

The ‘green pools’ in Sinclair’s Packingtown at the turn of the 20th century were most likely akin to today’s meatpacking plant ‘lagoon’ which stores the liquefied animal waste from livestock pens. These lagoons, or holding ponds are, in fact, more like toxic dumps, open to the air and prone to leeching into the land and fouling proximate rivers and other water supplies. According to Midkiff in *The Meat You Eat*, a typical cesspit for a large pig ‘finishing operation’ (1100-2500 animals housed in buildings with slatted floors through which excrement falls and is flushed out) is “roughly the size of a football

field” or “up to twenty-five feet deep and...eighteen acres in size” (2004: 63).

Eventually, the contents are used to irrigate contiguous fields as liquefied manure and urine, a practice that has ruined crops and aquatic sources alike (2004:94).

While not always ‘on location’ with packing plants, beef feedlots inevitably foul any watershed in their vicinity. One Idaho feedlot, owned by meat and potato magnate, JR Simplot, and home to over 100,000 cattle, adjoins the Snake River, listed as ‘impaired’ by the EPA (Midkiff, 2004:123). In fact, the EPA “acknowledges that pollution from agribusiness operations pose the single largest threat to this country’s waters... [that] are contaminated with nutrients from livestock operations” (Ibid: 13).

Originally, prior to railroads and interstate trucking, feedlots were part of the packinghouse operation. With advances in transportation came a separation of the two, with slaughterhouses located in large cities and farm animals, well, on the farm. Now, vertical integration of the meat industry has tightened control over the animal life cycle – from hoof to mouth –once again; but this time, the factory has moved to rural America to be closer to the animals and cheaper labor (Schlosser, 2001; Stull *et al*, 1995) as well as farther from population centers that may exert greater pressure for pollution abatement, worker health and safety measures, and corporate accountability (Midkiff, 2004).

Mismanagement of herds, degradation of drylands, destruction of forests, expanded efforts devoted to feed grains instead of food grains, have all contributed to the deplorable global scenario of elevated levels of greenhouse gases, uneven and inequitable development strategies, and worst of all, widespread poverty and hunger (Durning, 1991:6). Collapsed from the world-view to the slaughterhouse level, virtually all of the

same problems proliferate in and around these factories. From piles of manure to illness and poverty, communities that host our country's meatpacking plants have been presented with the additional onus of cleaning up the chaotic and toxic spillover that these companies create. Packinghouse legal files alone are astoundingly copious (Eisnitz, 1997; Schlosser, 2001). In a Sierra Club report entitled, "The Rap Sheet on Animal Factories", a multitude of convictions, fines, pollution violations and regulatory records pertaining to America's livestock growers, slaughterhouses, and packing plants have been compiled that implicate this sector in gross environmental degradation (Sierraclub.org., 2005).

Chapter Three

Literature Review: Approaches and Applications

This research builds on the body of immigration/migration literature that accents the socioeconomic impacts of modern transmigration movements, with particular emphasis on studies incorporating vulnerability models and/or methodologies appropriate to analyzing Hispanics associated with the packinghouse milieu. To that end, this chapter attends to the various theories pertinent to immigration (Section 3.1) while also examining related research on social and physical vulnerability as they may apply to immigrants, those in high-risk jobs, and those residing in close proximity to toxic facilities (Section 3.2).

3.1 Theoretical Considerations

...the conditions that initiate international movement may be quite different from those that perpetuate it across time and space. Although wage differentials, relative risks, recruitment efforts, and market penetration may continue to cause people to move, new conditions that arise in the course of migration come to function as independent causes themselves: migrant networks spread, institutions supporting transnational movements develop, and the social meaning of work changes in receiving societies. The general thrust of these transformations is to make additional movements more likely, a process known as cumulative causation (Massey, 1993:448).

The organization of this section is meant to highlight the most applicable theoretical and historical avenues by which to understand the thesis problem. Various

immigration theories that have emerged to explain the complexities of today's global population movements, and these are discussed in Section 3.1.1, along with related spatial considerations. Section 3.1.2 reviews U.S. immigration policy and some of its unintended consequences, which are further addressed in Section 3.1.3 with respect to policy implications for Hispanic mobility. Also reviewed in this section are migration studies that give insight into our ever-changing cultural make-up, propelled by both traditional and contemporary population movements.

3.1.1 Segmented Market Structure and Spatial Ties

“As the major trump card in capitalist expansion, and as the boggy scapegoat of the bourgeoisie always ready to feed the fires of xenophobia and racism, as a pretext for a reluctantly renewed charity, as a myth in mobilizing the...left and as a source of confusion for trade unions...immigrant workers constitute both the reality of their daily oppression and in their potential social revolt, one of the most important and least known stakes in the newly emerging class struggle of advanced capitalism” (Castells, 1975: 250).

The explosion of transnational migration within the past two decades has inspired an unprecedented array of interdisciplinary research that has encompassed reassessments of traditional theories and stimulated the creation of new approaches to understanding this phenomenal movement of people throughout the world. A pioneer in this field, E. G. Ravenstein (1880s) began the journey into theoretical discourse on international migrations – in what we now refer to as the classic genre – by conceptualizing the spatial positioning of people, between or within countries, utilizing a formal, explanatory model that focused on individual determinants (Zolberg, 1989). This model, in turn, became the foundation for subsequent explanatory theories that were dominated by the spatially

confining assumption of societies enclosed within their individual cultural and geopolitical borders (Glick-Schiller *et al.*, 1992, in Mobasher and Sadri, 2004).

However, our geopolitical borders are not solidly built, rather they are porous, and even fluid, with the ebb and flow of changing nation-states, domestic and international policies, and interpersonal and cultural networks. So while traditional transmigration research addressed primarily the cause(s) of migration, another tact had to be employed in order to understand the fact that, once initiated, migration became more complex by gathering momentum over time as increasing numbers followed similar pathways from homeland to new lands. Over time, principally since the Hart-Celler Act of 1965 which fueled the immigration of 22 million individuals to the U.S. over the following 35 years, more sophisticated and complex migration theories have been put forward in order to embrace the growing network of cross-boundary, bilingual, multi-cultural transnational migrants whom are increasingly socially, economically, and peripatetically diverse (Mobasher and Sadri, 2004).

The sinuous phenomena of transmigration is therefore a process that entails the construction of networks and linkages by transmigrants whose lives, and indeed, identities span the societies of both their country of origin and country of settlement. Chain migration, return migration and circular migration result in segmented assimilation and incorporation; or, on a higher socio-economic level, in ethnic enclaves, middleman minorities, or ethnic entrepreneurial economies (Massey, 1995; Piore, 1986; Portes, 1997). In essence, this network theory posits that interpersonal support systems play an

integral role as family and friends with shared origins, culture, and experience provide a buffer against migration costs and risks, which in turn, facilitates higher migration rates.

A relatively recent and significant development of the dual labor market hypothesis is the idea of the ethnic enclave, linked to the segmented assimilation framework of Alejandro Portes (1981, 1997). While the dual labor market theory seeks to explain immigrant clustering in low-wage, menial jobs within a hierarchical business structure dominated by natives at the higher end of the earnings scale – like Mexicans in the meatpacking factories of the U.S. Midwest - the enclave economy has been found to be integrated at all levels of the cohort's enterprise (Piore, 1986). Segmented assimilation, on the other hand, points to migration currents and integration processes that differ even within particular ethnic groups, as shown by McHugh *et al.* (1997) in a study on Cubans, their Miami concentration, and increasing propensity to disperse to other US cities.

Although these interdisciplinary approaches to transmigration are widely held as the most logical explanations for this dynamic process, no one theory seems to be able to stand alone as the definitive model for today's global population movement. The network theory posited by sociologists is perhaps the most plausible in explaining modern trends of population exchange, but not without some attachment of economic inference to find completeness. The idea of the ethnic enclave as it pertains to immigrant economies or entrepreneurship addresses both economical and cultural influences, but fails in its applicability to undereducated and underpaid cohorts. Thus, Hispanic immigration and subsequent overrepresentation in Iowa and Nebraska meatpacking facilities is best

understood within the framework of the dual labor market theory which suggests industrial, and structural, transnational contexts for labor migration.

Continuous, extensive Hispanic immigration to the U.S., among whom Mexicans form an overwhelming majority, is a relatively recent phenomenon with far-reaching implications for both present and future generations. What is not recent, however, is the participation of Mexican migrants in the U.S. agricultural sector, harvesting food for local consumption and global exchange. The primary function of immigration was to provide farms laden with ripe produce with temporary agricultural workers (TAWs) - a classic example of the dual labor market hypothesis. Useful, productive, and hidden in our fields, Mexican workers have generally been an invisible part of the American economy, until now, when the sheer numbers of new Hispanic/Latino individuals across the country have finally opened a dialogue addressing previously unchallenged cultural hegemony. In the face of rapid population transformations, societal ideologies have been confounded by this change and fragmented by mythological perceptions about new immigrants (Massey, 1995; Passel and Fix, 1994).

Three issues that have gained momentum in relation to today's neo-immigration movement are employment, social welfare, and language. In all three, foreign born populations have been targeted for negatively impacting the *status quo* through garnering jobs otherwise coveted by natives and suppressing wage levels, by inflating public allocations for public services, and with an historically unprecedented propensity to retain their native language. These exaggerated claims remain largely unsubstantiated by quantitative analyses conducted over the past thirty years by a plethora of social scientists

whom have discovered weak to negative relationships between immigration and employment levels, a less than robust impact on public resources, and a trend of increasing English proficiency with the passage of time (in particular, with second generation immigrants) (Borjas and Tienda, 1985; Castells, 1975; Massey, 1995; Passel and Fix, 1994).

Assessing the applicability of the dual labor market theory requires going beyond the influence of newcomers in our midst to uncover the reason for emigration from their homeland in the first place. An obvious starting point for this issue is the role of industrial capital formation and reproduction. American capitalism nurtures its segmented labor market, creating the bedrock upon which manifestations of Hegelian dialectics flourish. While there are scores of examples, this exuberance of opposing forces can be most readily seen in the meatpacking industry. There is active recruitment of temporary immigrant workers from peripheral quarters; many of the ‘temporary’ laborers have eventually settled in the community where they work; these immigrants make a vital contribution to the local economy; they also suffer from uncertain legal status, occupational risk and vulnerabilities associated with long hours, low pay, lack of health insurance, low English proficiency, and educational attainment (Borjas and Tienda, 1985; Gardner, 2001; Martin *et al.*, 1996; Massey, 1995). [Appendix C]

Thus, the public at large - including in this case, the slaughtering and meatpacking industry – benefits from foreign-born laborers, but does not appear to care for them, or care about them. According to Hegel, this type of conflict should resolve itself when “antagonisms between contradictory elements (thesis and antithesis) are exacerbated to

the point that they can no longer co-exist, precipitating a crisis in which contrary elements are reabsorbed into a higher and qualitatively different unity, the synthesis” (Peet, 2001: 78). On less abstract terms, Marx and Engels extended Hegel’s dialectical postulate to transformations in the arena of social economics. Here, within the infrastructure of class, it was believed that the opposition of workers to controlling, oppressive social inequity would culminate in a revolutionary overhaul of both the political system and the ways and means of production (Ibid:82). However, this theory is predicated on the condition of declining economic prosperity and opportunity, a condition that may hold true for millions of disenfranchised in our society today, but is subsumed by the general vigor of a thriving economy driven by this silent minority.

Currently, with the disjuncture of American affluence and power vis-à-vis growing poverty, homelessness, and marginalization within our borders, the former is globally recognized and nationally emphasized while the latter remains politically obscure. This obscurity facilitates clandestine opportunism by industrial employers of immigrants, but does not mask concomitant conflicts with mutual spatial occupancy (of the powerful with the vulnerable, the native with the alien) or the social upheaval experienced by communities inured by historical homogeneity. This obscurity is also rendered temporally permanent by the current strength of the bifurcated U.S. labor market. There is seemingly no way up or out of the lower echelons of the American work force. Seeking empirical verification of the U.S. segmented market structure, Dickens and Lang tested its theoretical premise that factors like additional schooling and on-the-job training would catapult individuals into more desirable, lucrative employment. They

found that, “rather than allocating jobs randomly, primary sector employers discriminate against non-whites”, supporting the contention that there are non-economic barriers to non-white entry into the upper levels of employment that override upward mobility incentives (Dickens and Lang, 1985:802).

Another widely held viewpoint of the dual labor market theory is that immigration flows hinge on (uneven) economic development and the labor requirements of an expanding economy experiencing a dearth in labor force participants (Kuznets, Lansing and Mueller in Bookman, 2002). This slant is also controversial. In a study on Western European immigration that longitudinally examined the growth rate of immigrant workers in conjunction with unemployment rates and economic growth, Manuel Castells argued that:

“Immigration is not a conjunctural phenomenon linked to the manpower needs of expanding economies but a structural tendency characteristic of the current phase of monopoly capitalism...[that] has to be explained, not in terms of the technical demands of production, but by the specific interests of capital in a particular phase of its development” (Castells, 1975:256).

Thus, the internal dynamics of industrial production may actually dictate the composition of its workforce to a much greater degree than either the ‘push’ of poverty in developing nations, or the ‘pull’ of surplus jobs in developing states. Within the meatpacking industry, it is fairly apparent that Hispanics have been chosen as the preferred production worker cohort. The slaughterhouse is a built environment, socially constructed to manipulate the space of those recruited from foreign lands. So it follows that in addition to understanding the forces that drive immigration, one must also consider the problem from the standpoint of spatial relationships.

This thesis situates the industrial Hispanic in LMPP counties as a new immigrant with little or no English proficiency, low educational attainment, and an innate desire to earn money, primarily to send back to the homeland. Segmented assimilation, rendering the new Hispanic (usually of Mexican descent) indispensable to low-paying, high-risk occupations in the U.S., aids in the rapid procurement of a job. Within the immigration process, socioeconomic emancipation is sought but remains unfulfilled because it is an illusion that is simultaneously built and rendered fragile through both local and global influences. It cannot be stressed enough that the immigrant's social space is alien and the workplace dangerous. Even under these circumstances, the general feeling is that the immigrants' presence is only made tolerable and that their "contribution to the economy is deemed acceptable only if it is *Pareto optimal* (in other words, no one is made worse off, and someone is made better off)". (Bookman, 2002:93). In this rather narrow ideology, the equation of acceptance with economic contribution seems restrictive in its inattention to fundamental human rights, or the humanistic aspect of the resolve, sacrifice, and strife that must be endured in the course of transnational relocations.

However, there are spatial connections that come with the relocations, similarities in these agricultural places that may serve to mitigate loneliness and isolation: verdant fields dotted with cows, vast tracts of rural countryside, countrymen who have come before. Perhaps even working in a packinghouse provides some abstract link with one's mother country. Mexican meatpackers, in particular, may form an ironic spatial association with their product: they represent the embodiment of international exchange in their immigration to the U.S. to work in a plant that 'processes' cattle that may also

have originated from Mexican soil only to be transported here for production and consumption: immigration and importation to the U.S.; emigration and exportation from Mexico; circular, global commodification of men and meat.

Because of the complexity of the overlapping and intertwining forces of employment, family, knowledge, social and spatial empowerment and identity among all cultures and ethnicities, an integrated approach to understanding migration has increasingly been employed. Therefore, instead of merely looking at the ‘study area’ dynamics of this project, this research sought to embrace the spatial web that joins the meat factory zone of operations with some of its more significant encounters with political, institutional, and transnational processes and entities, while highlighting human vulnerability throughout.

3.1.2 Immigration Law and Social Justice

“...xenophobia and intolerance... have unfortunately exerted a powerful influence on the formulation of immigration policies. Immigration restrictions, like laws mandating racial segregation in the domestic context, have excluded those who are different in order to satisfy the intolerant preferences of some citizens” (Chang, 1997, in Brettell and Hollifield, 2000).

Just as the existence of social and economic inequities within a society create marginal populations that are disproportionately rendered more powerless and less prone to equitable treatment, so too do the principles of uneven distribution apply to migration between developing and developed countries. Immigration law is not immune to this fact as referenced by Richard Black (1996) when he contends that the social justice of

immigration is more firmly rooted in communal rights and societal duty than in human rights.

Black argues that the individual right to migrate should not be viewed as synonymous with our fundamental human rights, but as a counterpart to communal rights whereby both individual and communal rights are respected: rights “such as those recognized by Walzer, of communities to exclude those who constitute a threat to the community but also rights of communities in poor and overcrowded places to relief from their plight, whether such relief is provided by ‘mutual aid’ or by some sort of controlled migration” (Black, 1996). What he neglects to address, however, is the communal *obligation* to immigrants once arrived, whether or not sanctioned by law: fundamental human rights apply to everyone, everywhere, with no exceptions for ‘threatened’ perceptions.

But the reciprocity of Black’s migration philosophy is at the root of its feasibility; individual rights need to be valued by communities (or states), and vice versa. Otherwise, something akin to ‘global apartheid’ evolves when wealthy, primarily white countries (i.e. North America, Australia, Europe) practice selective discrimination in the application of migration policies in order to protect themselves from perceived “imminent threats to their territorial integrity and privileged lifestyles” (Richmond, 1994, cited in Black, 1995: 73).

Immigration controls are thus seen as necessary to limiting migration, a hypothesis that can perhaps be inferred from Ravenstein’s classic ‘laws of migration’, as well as being a popular assumption that is multiply falsified around the world as

migration intensifies even in the face of stringent immigration policy. Furthermore, social justice, even if not an integral component of immigration policy, must be considered with the unintended consequences of such laws and their related implementation schemes, regardless of original intentions.

In direct opposition with Black's argument espousing communal rights, the United Nations has recently formed the Committee on the Protection of the Rights of All Migrant Workers and Members of Their Families to protect the human rights – regardless of legal status – of the more than 150 million migrants who live around the world (United Nations, 2004). Although it remains to be seen how extensive international participation will be, the provisions of the Convention seek to “play a role in preventing and eliminating the exploitation of migrant workers throughout the entire migrant process” (Ibid). Additionally, The Office of the High Commissioner for Human Rights (OHCHR) has been active in promoting and protecting human rights of immigrants through their Working Group on Minorities (OHCHR, 2004).

3.1.3 Policy, Mobility, and Consequences

Migrants who enrolled [in the Bracero Program] were shuttled to huge holding pens at the border, forced to await employment with numbers hung around their necks, and then stripped naked and sprayed with a delousing agent before being allowed entry into the United States. Once in this country, the braceros were all but powerless and were bound to a single employer (Schlosser, 1995:14).

Prior to the Treaty of Guadalupe Hidalgo in 1848, much of the southwest U.S. was part of Mexico, so this region has traditionally been the ‘homeland’ region with the highest spatial strength of Mexicans whom are clustered mainly in California, Arizona,

New Mexico, Colorado, and Texas. Within the past decade, both dispersal of the U.S. Mexican population away from these states and significant return migration flows have been documented (Foulkes and Newbold, 2000; Massey, 1995; Saenz and Davila, 1990). Furthermore, Mexican immigration continues to grow in all regions, primarily in the Southwest, but also indirectly through step-migration to non-traditional receiving states despite more stringent immigration policies implemented in the past two decades (Passel and Fix, 1994). [Appendix D]

Research has exposed the contradictory and often contentious nature of immigration law regarding its impact on Mexican mobility, as opposed to the intent of policy-makers and the public at large. Often, bizarre manifestations of more restrictive laws occur, as exemplified by the increase in Latin Americans entering the U.S. after the 1965 amendments to the Immigration and Nationality Act which capped Western Hemisphere immigrations for the first time in history (Massey, 1995).

Another example of the unplanned costs of immigration policy, as well as further historical fodder for present immigrant labor issues is the Bracero Program. This historical bilateral U.S.-Mexico agreement provided low-paid, temporary Mexican laborers from 1942 to 1964 to meet U.S. agricultural and railroad labor requirements, and was generally seen as a mutually beneficial arrangement for migrant guest-workers and industry alike. However, some have argued that the Mexicans were exploited and treated as indentured servants in a state that “wanted their production, not their reproduction” (Schlosser, 1995:14), while others have noted the evolution of ‘temporary worker’ status

to more permanent migration arrangements (or ‘unlawful emigration’) for many Mexicans who chose to stay (Castes and Miller, 2003).

In a study using a ‘push-pull framework’ to analyze the Bracero Program’s contemporary counterpart, the Border Industrialization Program (employment in maquiladoras, or assembly plants along the US-Mexican border), it was found that during the 1978-1982 period, Mexico’s recession coupled with economic recovery in the U.S. provided the ideal conditions for Mexican immigrant employment and expansion of maquiladora plants, which also resulted in a marked decrease in border apprehensions (i.e., higher Mexican emigrations) due to relaxation of law enforcement in the face of increased corporate labor demand and associated profit-taking (Davila and Saenz, 1990).

As a consequence of both schemes – Bracero and maquiladora – and regardless of policy or intent, migration flows have resulted in permanent settlement for many. Although Davila and Saenz (1990) found a negative relationship between maquiladora employment and apprehensions of undocumented Mexicans during this time, no evidence was found linking border industries with undocumented immigration to the U.S. On the other hand, several studies have shown that undocumented immigrants generally follow similar pathways as legal immigrants and growing numbers of foreign-born temporary workers in the U.S. are settling for permanent resident status (Bean, 2001; Kraly, 1992; Magana, 2003; Mobasher, 2004; Portes and Rumbaut, 1996).

By the mid-1990s, a reversal of the *laissez-faire* approach to immigration would materialize. Not since Operation Wetback in 1954, when over a million undocumented Mexicans were deported, did the U.S. invest so much toward immigration control. Four

major INS border fortification programs (Operation Hold-the-Line, Operation Gatekeeper, Operation Safeguard, and Operation Rio Grande) were launched during the years 1993 to 1997 to stem the tide from Mexico (Cornelius, 2001). Incredibly, these programs contributed not only to an increase in human smuggling and decline in the probability of returning home (by unauthorized migrants who find the disincentives vis-à-vis higher costs associated with border crossing prohibitive), but also, migrant mortality rates escalated in border regions. Operation Vanguard - geared toward meatpacking plants that were hiring undocumented Mexican workers - followed in 1999, targeting 'illegal aliens' for expulsion in a rare immigration law enforcement campaign (Ibid).

Of all the Latin American countries, Mexico has consistently led in numbers of immigrants to the U.S., even after the 1986 Immigration Reform and Control Act (IRCA) that effectively legalized the status of 3.3 million formerly undocumented immigrants, 75 percent of whom were of Mexican origin (US Immigration and Naturalization Service, 1991). In the wake of this effort to promote bilateral trade liberalization, and leading up to the ratification of the North American Free Trade Agreement (NAFTA) Treaty in 1993, the Mexican and the U.S. perceptions of the emigration and immigration of Mexican individuals was almost diametrically opposed. This debate, referred to as a 'poison pill', revolved around the casting of blame by government officials in both countries: for Mexico, labor market demand in the U.S. required the participation of their population; and for the U.S., dismal socioeconomic conditions in Mexico propelled unwanted immigration that contravened U.S. law (Castles and Miller, 2003).

The decade of the 1990s saw not only a marked increase in Hispanic/Latino population, but also a corresponding surge of interstate migration by Mexicans within the U.S. through established and new networks, and toward both traditional and non-traditional states (Fix *et al.*, 2003; Magana, 2003; US Census, 2000). Due to increased agricultural mechanization and the export of many manufacturing industries, Iowa and Nebraska, in particular, have experienced relentless native out-migration that has paralleled economic decline and Hispanic in-migration. Table 3.1 delineates Hispanic migration to Iowa and Nebraska compared to the aggregate Midwest migration trend between 1995 and 2000. While total net migration was negative for both states, Hispanic migration to Iowa and Nebraska far outnumbered outward flows.

Table 3.1 Hispanic Migration to Iowa and Nebraska from 1995 to 2000

	IOWA		NEBRASKA	
	Hispanics	Total	Hispanics	Total
In-Migration	15,417	214,841	17,149	154,025
Out-Migration	9,333	247,853	10,102	169,378
Net Migration	6,084	[33,012]	7,047	[15,353]
Migration Rate per 1000 (of 1995 population)	112.7	[12.1]	112.1	[9.7]
Migration From Abroad		10,068		11,301

Source: U.S. Census Bureau, 2000

Growth plans to boost rural economies have revolved around ways to promote population growth, whether through recruitment of wealthy retirees to amenity-rich areas or through embracing mobile, labor-active immigrants. The latter tactic was officially endorsed by Governor Vilsack of Iowa in 2000 to create an ‘immigration haven’ in that

state, but was rejected by 58 percent of the population as an unacceptable solution to rural decline (Iowa Governor's Strategic Planning Council Meeting, 31 January 2000; *The Economist*, 14 September 2000). Insufficient government support of immigrants can have a decisive, detrimental, and reciprocal impact on public receptivity that contributes to the "vulnerability and frequent disorientation in a foreign environment" that often plague immigrants, particularly those with origins in rural proletariat environs (Portes and Rumbaut, 1996:188).

While immigration to Iowa and neighboring states continues to mount, out-migration by natives (mostly White) continue in the reverse. From 1990 to 2000, Iowa's Hispanic population increased 152 percent or by 50,000 persons compared to the prior decade that saw only a 28 percent (7,000) change in this group (American Community Survey, 2000-2001). Iowa's rejection of immigration policy promoting growth, coupled with sustained Hispanic migration to this state, does not presently bode well, either for positive perceptions or accommodating receptions by a majority of its population.

Twenty-two new growth states as recipients of immigrant populations have been identified as alternative destinations for settlement in the traditional receiving states of California, Texas, Florida, New York, New Jersey and Illinois (Fix *et al.*, 2003). This phenomenon has not been fully researched or explained to date. Yet, prior studies on immigration flows converge on two significant, increasingly influential factors: economic need and existing ethnic networks. Which is more important, or manipulates migration more, is relative and therefore difficult to determine; thus, studies are progressively

merging social and human capital variables, especially with regard to appraisals of the spatial and social mobility of immigrants.

Various methods have been employed to integrate factors influencing migration to and within the U.S. Foulkes and Newbold (2000), for example, were able to demonstrate the differences in mobility processes among Cuban, Puerto Rican, and Mexican groups by disaggregating the Hispanic interstate migration population into the three ethnicities. Using data from the 5 percent Public Use Microdata Sample (PUMS) of the 1990 Census, the authors analyzed an expanded human capital model of migration based on personal (education, gender, marital status, English fluency, citizenship, period of arrival and age) as well as exogenous factors (coethnic presence, unemployment rate and employment growth). Comparatively speaking, and concerning the migration propensity of Mexicans, citizenship and language status were not important indicators of interstate migration, while established networks (social ties), foreign-born status, and recent arrivals (adjusting to the settlement process) were more determining factors in the course of migration (Foulkes and Newbold, 2000).

Capps *et al.* (2003), using data from the March 2002 Current Population Survey (CPS), found that low-wage, foreign-born workers in the U.S. were over-represented in two major occupation groups – private household services and farming, fishing and forestry – where 44 percent of the workers in both fields were immigrants. Although this snapshot reflects only a small portion of all U.S. low-wage, foreign-born workers, certain socioeconomic characteristics of the group were evident from this study, namely, low

educational attainment, limited English proficiency, and, in many cases, uncertain legal status (Capps *et al.*, 2003).

In addition to these personal constraints, several standard multivariate studies on the unequal educational attainment of Hispanics as the major force contributing to high percentages in low-paid jobs have determined that there is evidence of racial discrimination (Waters and Eschbach, 1995). For example, using 1980 Census data on income and controlling for age, education, English language ability, nativity, and state/metro residence, DeFrias (1991) found a gap of at least 10 percent in wages between Hispanic and non-Hispanic populations (cited by Waters, 1995). Compounding the plight of Hispanic immigrants, a study by Carnoy *et al.* (1993) attributed the recent decline in Latino relative income evident from the CPS data from select years in the 1980s not only to education and language disabilities, but also to the decline of higher-paid manufacturing jobs which has propelled the Latino growth in low-end service jobs (cited by Waters, 1995).

Immigrants hampered by language and educational disparities have experienced the additional disadvantage of displacement caused by economic restructuring, which is in turn, continually affected by technologization and out-sourcing. 'High-touch' industries, as opposed to high-tech industries are the primary beneficiaries of low-wage immigrant workers. Although Capps *et al.* (2003) found services and agricultural industries to be disproportionately arrayed with low-income immigrant employees, high-risk industries like Midwestern slaughterhouses and meatpacking plants are also attracting, indeed targeting Mexican immigrants for employment, as exemplified by

busing arrangements and radio advertisements in Mexico for employment in this U.S. industry (Gardner, Organic Consumers Association, 2001; Martin *et al.*, 1996).

Consequently, approximately half of packinghouse workers are now of Hispanic/Latino descent (Bureau of Labor Statistics, 2002).

3.2 Vulnerability and Equity Research

This section focuses on related case studies that collectively weave together the central thesis of vulnerability, including those that highlight hazards of place, environmental equity, occupational vulnerability and industrial risk, and the socioeconomic/cultural costs of migration. While both vulnerability research on physical hazards and environmental justice analyses can find an appropriate venue in the Hispanic immigrant's predicament in meatpacking plant employment, migration studies were explored for insight into approaches and data used in measuring various attributes of populations on the move.

3.2.1 Integrated Physical and Social Vulnerability

“Unfree [Mexican] workers face poverty and lack of opportunities at home. They want to work but are forced to bear labor conditions that are exploitative and dangerous. They want to keep their source of income and thus remain compliant, resigned and silent (CIEPAC, 2003:7)

Not everyone suffers equally. Many facets of vulnerability have been utilized in methodologies that have sought to address the powerlessness and marginalization aspects of the human condition, as well as the fragility of our earthly orb. Since Timmerman's geographic conceptualization of vulnerability in 1981, the idea has held fast and gained

momentum in many fields, including risk, hazard, and disaster management, global change and environment studies, and urban/megacities research (Weichselgartner, 2001). Such an overarching and widespread application of this important concept has sparked an on-going concomitant dialogue reaching for a succinct, practical definition of vulnerability (Cutter, 1996).

Several comparative summaries have addressed vulnerability's multiple formulations (Clark *et al.*, 1998; Cutter, 1996; Weichselgartner, 2001). From these delineations, the primary point of departure appears to be based on whether vulnerability is a systematic circumstance measured by the degree of potential or actual loss, or an attribute of individuals or groups - characterized by a range variables – that influences exposure and coping abilities (Ibid, 2001). Naturally, due to the interrelationships between the two approaches, vulnerability research has progressed to include both exposure models that identify vulnerable conditions affecting people or places in the face of extreme natural events, and the measurements of societal resistance and/or resilience, as well as an integration of the two with a focus on place vulnerability (Cutter, *et al.*, 2003).

However diverse the interpretation of vulnerability, the fundamental adhesive to all approaches is in the interactive trilogy of social, spatial and structural dimensions. In combination, these form the basis of community and individual knowledge, influencing perceptions of risk, which are further impacted by one's experience with a particular hazard (Blaikie *et al.*, 1994 in Anderson-Berry, 2003; Slovic, 1987). Along these same lines, it has been argued that vulnerability to disastrous events is not accidental, but

“deeply imbedded in ordinary life”, so that “one must rethink the very notion of ordinary, normal life as inherently hazardous” (Hewitt, 1983 in Mustafa, 1998: 291). Therefore, such analyses that treat everyday processes as the primary impact point for disasters informs responses that have wider implications for sustainability and social equality (Mileti *et al.*, 1995 in Mustafa, 1998). It is from precisely this vein that this research stems: both migration and hazards research have laid the foundation for our enhanced understanding of social vulnerability in a myriad of circumstances and attending applications, one of which is its usefulness in examining the vulnerability of indigent immigrants within the often dangerous secondary labor market in this country.

Vulnerability has frequently been ascribed to environmental hazards as the potential loss of property from the pre-existing conditions of biophysical forces Mustafa, 1998). Accordingly, proximity to threats (e.g., flood zones, fault lines) has been the basis of locationally dependent analyses forwarded by geographers and environmentalists (Cutter, 1996). Over time, this concept has expanded from having a purely spatial causal structure to embracing socially constructed vulnerabilities that may affect one’s ability to resist and recover from hazards, which go beyond biophysical risks to include virtually any process – social, political, historical, economic – that creates ‘unsafe conditions’.

“Vulnerability is best defined as an aggregate measure of human welfare that integrates environmental, social, economic, and political exposure to a range of potential harmful perturbations. Vulnerability is a multi-layered and multi-dimensional social space defined by the determinate, political, economic, and institutional capabilities of people in specific places at specific times” (Bohle *et al.*, 1994 in Weichselgartner, 2001).

Thus, social resilience and potential exposure have been integrated with spatial coincidence to form the underlying basis of *hazards of place*, or riskscapes; that comprise the “mosaic of risks and hazards that affect people and the places they inhabit” (Cutter *et al.*, 2000:716).

Social vulnerability within riskscapes has been demonstrated in various ways through studies using socioeconomic indicators/quantifiers that normally include age, disabilities, family structure and social networks, housing, and income. Detailed summaries of vulnerability themes/studies have been conducted by Clark *et al.* (1998), Cutter *et al.* (2000), and Hewitt (1997). Less explicitly dealt with in the environmental hazard/vulnerability literature are the variables of immigration status, English proficiency and education levels, although some basic inferences can be made through other factors influencing hazard perception and experience (Mitchell, 1984 in Clark, 1998).

In addition to these key themes, ‘occupation’ has occasionally been included, but only in relation to exposure to natural and technological hazards, not in terms of an employee’s chronic or acute exposure to on-the-job illness and injury. Going beyond the population vulnerabilities in the event of some biophysical, technological or environmental calamity, there are indeed other demoralizing forces that have and will continue to readily inflict themselves on those less than able to cope with them. This includes, but is not limited to: 1) increasing occupational illness and injury exposure through higher participation in high-risk industry; 2) decreasing socioeconomic mobility due to lower job expectations leading to concentration in the secondary labor market; and 3) marginalization and social isolation brought upon by a combination of debilitating

socioeconomic and racial factors, especially English language barriers, in a society that continues to be discriminatory (Adeola, 2000; Capps *et al.*, 2003; Massey, 1995; Portes and Rumbaut, 1996; Schlosser, 2001; Walter *et al.*, 2002).

Clark, *et al.* (1998) applied a creative and analytically appealing method of assessing population vulnerabilities vis-à-vis riskscape in order to obtain a scalar index of coping ability based on both absolute and relative measures. The spatial variability of the resulting maps of coastal communities examined served to highlight the fact that the “threat of physical vulnerability is differentially compounded by social vulnerability” (1998:74). From this notion of vulnerability as an incapacity to deal with life’s perils due to one’s position in both the physical and social worlds, an adaptation entailing environmental and occupational exposure with the attending resistance/resilience capabilities is not altogether unrealistic. Indeed, the feasibility of the approach lays in the basic premise that with any type of hazard - whether floods, nuclear fallout, or the consequences wrought from working on a high-speed slaughtering line, in freezing temperatures, with extremely sharp knives - one is thought to be more susceptible to loss of life and limb as vulnerabilities, or disabling sociospatial attributes increase.

Social vulnerability has been most widely acknowledged as a key factor in understanding how natural hazards are transformed into unmitigated disasters (Tobin and Montz, 1997; Wisner *et al.*, 2004). Ben Wisner’s “Pressure and Release” (PAR) model illustrates the process of pressure-building that arises from systemic root causes, is further agitated by social dynamics (poverty, gender, state), gains momentum with the existence of unsafe conditions, and ultimately encounters a natural hazard, resulting in a

full-blown calamity (Wisner, 2004: 217). Although structural practitioners rightly stress the systematic origins of vulnerability (e.g., global capitalism, racism, government debt, migration, urbanization, and environmental degradation), others find that defining vulnerability on a more personal level facilitates a more practical approach to measuring its influence (and identifying intervention points) on a variety of spatial scales (Clark *et al.*, 1998; Wisner *et al.*, 2004).

As an extension of the paradigm of social vulnerability to environmental hazards, a growing number of geographers have utilized various social vulnerability indices to spatially measure socioeconomic characteristics associated with people's ability to resist (access to resources), cope with (resilience), or bounce back (recovery) from a catastrophic event, or in the case of the proposed study, illness or injury sustained through involvement in a high-risk job (Chakraborty *et al.*, 2004; Clark *et al.*, 1998; Cutter *et al.*, 2000, 2003; Emrich, 2000). These vulnerability quantification endeavors have emerged through the inevitable combination of two underlying themes in vulnerability research: the identification of conditions that make people vulnerable (qualitative assessment of exposure) and the measurement of this socially-constructed phenomenon in terms of resistance and resilience to hazards in a particular place or region (Cutter *et al.*, 2003).

Five studies that indexed vulnerable characteristics of people in specific locations were reviewed in order to determine the best approach to creating a social vulnerability ranking for Iowa and Nebraska large meatpacking counties. Cutter *et al.* (2000) calculated a social vulnerability index in a study on multiple hazards in Georgetown

County, South Carolina. This model was adapted and applied by Emrich (2000) for indexing socioeconomic variables in Hillsborough County, Florida. Chakraborty *et al.* (2004) used a different version of the Cutter approach to assess hurricane and flooding evacuation needs of select population groupings in the same county through the creation of a Social Vulnerability for Evacuation Assistance Index (SVEAI). Clark *et al.* (1998) grouped related vulnerability elements – using factor analysis - into five key themes that were then integrated with the physical risk of flooding in an evaluation of the coastal town of Revere, MA. Finally, Cutter *et al.* (2003) developed a Social Vulnerability Index (SoVI) – also using factor analysis to reduce variables to the most significant - for all counties in the U.S.

With the exception of the Cutter (2003) study, the aforementioned research integrated their respective social vulnerability indices with the geophysical risk in a specific area to show the compound relationship that exists between physical hazards and the human-use system. This study similarly integrated social and physical vulnerability, except by way of capturing a degree of occupational and environmental exposure instead of susceptibility to natural hazards wrought by proximity to/frequency of the risk.

One of the difficulties inherent in research of this kind is the fluidity of social vulnerability. Never a static measure, it not only changes naturally over time according to the movement of people and the perpetually evolving nature of their human condition, but also can be influenced by modifying just one of its components (Chakraborty *et al.*, 2004; Emrich, 2000; Tobin and Montz, 1997). An on-going debate among social scientists regarding the contributing factors of vulnerability continually sparks innovative

applications of differing theories, but there is a general consensus about some key determinants, namely, access to knowledge, political power, social capital, networks and lifelines, mobility, resources and acceptance (Tobin and Montz, 1997; Wisner *et al.*, 2004). Census variables that parallel some of these themes, and thus are commonly used in social vulnerability studies, are age, gender, poverty, race/ethnicity, disabilities, and educational attainment, as well as structural attributes like housing type and renter versus owner-occupied residences (Clark *et al.*, 1998; Emrich, 2000).

3.2.2 Hazardous Facilities: Environmental Justice

In May 2001, federal officials released the results of a 29-month air emissions study conducted in Dakota City [IBP slaughterhouse location] that “demonstrated a direct association between elevated levels of toxic hydrogen sulfide in the air and an increase in respiratory illnesses among children. [Area hospital visits] rose by from 20 percent to 40 percent after periods of high levels of the potentially fatal gas in the air.” A second study is under way looking at possible neurological problems caused by hydrogen sulfide emissions (Sierra Club Report on “Least Wanted Farm Factories”, 2004).

In hazard analysis, *vulnerability zones* are generally depicted as physical areas most likely to be affected by natural calamities or technological disasters, and thus subject to emergency preparedness activities should such events occur (Cutter *et al.*, 2000). Potential exposure to toxic substances, for example, has been analyzed through isotropic dispersion and plume-based buffer approaches that take into consideration a complex array of chemical attributes, local meteorological information, and wind speed/directions (Chakraborty, 2001).

The resulting spatial patterns of exposure to accidental releases have then been compared with racial and economic characteristics of residential populations to determine

the extent of environmental inequity caused by the proximity of certain disadvantaged groups to the hazardous facilities (Bullard, (1983), Mohai and Bryant (1992), and United Church of Christ, (1987) in Cutter, 1995). Empirical support for the environmental inequality hypothesis, in turn, implies a compound liability wherein vulnerable individuals are additionally beset by further hardships arising from the perception (and possible reality) of living in zones often prone to multiple, cumulative effects of potentially lethal toxins.

Most environmental justice studies, like migration analyses and hazards research, have inexplicably stopped short of evaluating the environmental and occupational hazards exposure to vulnerable populations *while at work*. Part of the reason can be attributed to Census data, which represents nighttime populations and not diurnal distributions that would be necessary to incorporate daytime risk (Chakraborty, 2001). Another key impediment arises with the collection of indoor air pollution and on-the-job risks data, which is limited to self-reported occupational illness and injury information provided to the Bureau of Labor Statistics.

In a longitudinal study of Los Angeles, Laura Pulido (2000) asserts that environmental racism is a dynamic sociospatial process and emphasizes the highly segregated nature of the urban landscape where Whites continue to dominate the periphery while the inner city remains primarily non-White. The explanation for this was found in three interrelated factors – immigration, residential mobility, and economic restructuring – that were critical in illuminating why “Latinos, in particular, are disproportionately exposed to industrial pollution” (2000:13, 31). An earlier Los Angeles

study investigating the spatial coincidence of industrial manufacturing facilities with minorities and poor also found that Hispanics are the most vulnerable subpopulation in this city with regard to proximity to toxic exposures (Burke in Cutter, 1995).

Although the research of Burke (in Cutter, 1995) and Pulido (2000) points to residential rather than occupational environmental inequity, the idea is both applicable and central to the uneven distribution of vulnerable minorities (including immigrants) in low-paying, high-risk industries. In fact, *both* residential and occupational environmental equity is questionable with regard to slaughterhouses, their employees and community residents. For example, Iowa Beef Packers, Inc (IBP), the world's largest meatpacker, consistently reports the use, storage, and emissions of toxic substances, including ammonia, chlorine, phosphoric acid, sodium hydroxide, and sulfuric acid (EPA Toxic Release Inventory (TRI), 2003) from processing as well as routine, 'horrendous' sanitizing and custodial procedures (Schlosser, 2001:177).

3.2.3 Measuring the Cost of Culture and Susceptibility

The majority of immigration research has revolved around comparative analyses using human and/or social capital approaches that attempt to explain both emigration decisions and subsequent survival tactics at one's foreign destination. Human capital models normally assume favorable migration selectivity associated with labor efficiency, which in turn, is highly influenced by human capital components like schooling, language skills, motivation, and ambition (Chiswick in Brettell and Hollifield, 2000).

Alternatively, the social capital concept helps to explain why and how some transnational

sojourners with little perceived human capital investment continue to relocate around the world. Kinship, networks of friends and information sources, and ethnic community ties are all forms of social capital that can substantially reduce the risks of – and therefore, stimulate – international immigration (Hollifield, 2000).

Econometric studies have quantified the value of culture through income analysis to determine how networks leading to ethnic concentrations affect earnings. Regression analysis of Mexican work income has consistently found a negative relationship between the geographic concentration of Mexicans and income earned (Bartel and Koch, Bean and Tienda and Borjas, in Gonzales, 1998). In a study of Mexicans in Texas and California, when the cost of rent was incorporated into the model containing income - along with age, education, citizenship, and housing - it was found that not only lower income, but also higher rents could be expected with increasing enclave sizes. This is thought to be the ‘price of culture’, or the compensating differential Mexican immigrants invest in for the benefits of cultural amenities, e.g. information networks, family ties, and communicating in one’s native language (Gonzales, 1998).

Interestingly, these studies do not seem to address occupation, which may go further toward explaining wage variances; in fact, Gonzales’ use of the term enclave takes on the flavor of geographic concentration rather than the more common usage in relation to entrepreneurial enclaves or enclave economies. Furthermore, it could be argued that Mexican immigrants are being paid less for work and paying more for housing not because they are in an expanding ethnic enclave, as Gonzales and others have pointed out, but because they are foreign-born, non-White, and easily manipulated

in their quest for employment (Capps *et al.*, 2003; Waters and Eschbach, 1995). For example, a comparative study of Mexicans in the U.S. labor market in 1990 showed that while about 70 percent of those over 16 years old were employed, only 2.6 percent of these individuals were represented in managerial or professional occupations compared to the national average of 14 percent (Portes and Rumbaut, 1996). Thus, while theoretically attractive, the primary utility in the econometric approach for this research was in the actual definition and measurement of such a nebulous subject as *culture*. In a very similar way, vulnerability was quantified using many of the same socioeconomic variables described above, albeit with negative relationships representing decreasing coping abilities, or increasing defenselessness.

3.2.4 Perilous Environments: Immigrants in High-Risk Occupations

If the core-periphery model in the movement of manpower is utilized, it appears that the farther away the periphery is in terms of skills and culture, the easier the control of the migrants at the core and the more difficult their access to participation in the sociopolitical life, even if the critical variable of legal status is not taken into account (Tomasi, in Kritz *et al.*, 1981).

Another important interpretation of vulnerability was constructed through an ethnographic study of undocumented day workers in San Francisco by Walter *et al.* (2002) who concentrated on the interface between the social context of this mostly construction-employed population and their experiences with work injury and health care. Except for the industry and setting, much of this research closely parallels the social vulnerabilities and occupational risks of the Mexican/Hispanic meatpacking contingent in Iowa and Nebraska, of whom up to 25 percent are thought to be undocumented workers (Cornelius, 2001; Martin *et al.*, 1996). Through triangulation of

data and subsequent analysis, the authors ascertained five areas contributing to Mexican immigrants' vulnerability to injury:

- Increasingly arduous and dangerous border crossings, primarily on foot and prohibitively expensive (i.e., \$1400 for a 'coyote' or guide), resulting in indebtedness leading to virtual indentured status in high-risk jobs.
- Local dynamics consisting of unpredictable work arrangements in high-turnover temporary jobs; dispensability of the old, the weak and the injured; susceptibility to robbery and assault without legal recourse due to undocumented status and lack of street skills, along with the emotional stress of isolation and feeling despised by society.
- Workplace risk for injury compounded by lack of training, experience and safety equipment, exacerbated by economic need; this resulted in a conundrum of conflict whereby avoiding hazardous workplaces was synonymous to avoiding work altogether and reporting an injury was perceived as tantamount to dismissal.
- Psychological pressures of family dynamics: the patriarch versus the provider functions of most Mexican male workers meant that supporting their families in Mexico through employment in the U.S. constantly vied with the position of family leader; this spatial split between two vital places caused internal tension that was magnified by worker injury.
- Injuries and experiences with health care: physical injuries were most commonly related to acute and chronic back pain, 'overuse' syndromes (carpal tunnel), injuries due to falls, burns, and lacerations; while psychological fallout from all

stressors frequently led to anxiety, depression or drug and alcohol abuse (Walter *et al.*, 2002:226).

Reluctance by injured Mexican day workers to avail of publicly funded health clinics was found to be rooted in inexperience and trepidation about seeing a physician, taking time off to do so, and anxieties about registering for institutional care found to be influenced by socioeconomic factors in conjunction with length of stay in the U.S. that significantly impacted the ability to overcome a range of “literal and perceived barriers to accessing care” (Walter *et al.*, 2002:227). Two studies focusing on this geo-cultural vulnerability in the context of reception that have dealt with the *mental* health aspect of Mexican immigrants (San Joaquin Valley, CA agricultural laborers and Mexican women in San Diego, respectively) have revealed that not only are these individuals more susceptible to depression than the general population due to marginality and other socioeconomic variables, but are also in a relatively inaccessible position to seek professional help for mental health problems (Vega *et al.*, 1985 in Portes and Rumbaut, 1996: 176).

Of the body of literature reviewed, the only quantitative study that encompassed the racial, spatial and industrial components of Hispanics in Midwestern meatpacking plants— albeit with immigrant vulnerability as a very peripheral issue - was a 1998 U.S. Government Accounting Office (GAO) community development report entitled, “Changes in Nebraska and Iowa’s counties with large meatpacking plant workforces”. The very existence of this report is due to local constituents’ concerns about population changes, school enrollments (i.e. Spanish speaking students requiring bilingual teachers

and/or 'English as a second language' accommodations), health care costs, crime rates, housing conditions of plant laborers and their families, and the hiring of 'illegal aliens' in areas with meatpacking operations. Findings indicated many county-wide increases in minority populations, school enrollments, number of students with limited English proficiency, Medicaid recipients, economic well-being, and crime rates, with rather ambiguous reportage on housing and undocumented worker status (GAO/RCED-98-62).

Very little information was presented in the GAO report that was not already available through Census avenues, and the ethnic link to meatpacking employment was not explicitly made despite all the institutional resources at the disposal of the Government Accounting Office. Additionally, although it offered a fine starting point for assessing general demographic and socioeconomic conditions in the target geographic arena, several omissions rendered this issue ripe for further study, beginning with a more thorough appraisal of factors altering the socially constructed landscape of rural meatpacking plant locales, which would include more current and detailed data, a focus on the sociospatial susceptibilities of new Hispanics to the area, and an environmental and industrial injury analysis of meatpacking plants.

In a somewhat similar report issued by the Farm Foundation (1996), the meatpacking industry was not only depicted as the key industry changing established, relatively homogenous middle-class towns in the Midwest, but also as the orchestrator of meat manufacturing consolidation and automated processing which led to weakened unions, sharply reduced wages and benefits, and perpetuated the need for recruiters to hire laborers from far-flung states and workers from foreign countries (sometimes paying

'bounties' for worker referrals until a 1991 Iowa law began regulating the recruitment of non-English speaking individuals from more than 500 miles away). This was apparently due to the combination of high turnover and the fact that the resulting (unplanned) transformations had become a subject of contention: "meatpackers are more interested in getting workers on the line than they are in ensuring that there is housing in the area for new arrivals, schools for their children, or bilingual...personnel to deal with the newcomers" (Martin *et al.*,1996).

From the perspective of the immigrant meatpacking worker, however, an even more grisly portrait has been painted. Job injuries are rampant and rarely reported; disincentives involve fear of unemployment, lack of health insurance, and enticing bonuses to foremen and supervisors for a 'safe workplace' record (Eisnitz, 1997; Horowitz, 1997; Schlosser, 2001). As Schlosser avers, "Missing fingers, broken bones, deep lacerations, and amputated limbs are difficult to conceal from authorities. But the dramatic and catastrophic injuries in a slaughterhouse are greatly outnumbered by less visible, though no less debilitating, ailments: torn muscles, slipped disks, pinched nerves" (Schlosser, 2001:175). Slaughterhouses have been hiring immigrants for a century, and literature points to ongoing exploitative practices that are inversely related to the strength of unions and OSHA enforcement in this highly dangerous disassembly business (Horowitz, 1997).

While the meat offered for public consumption today undergoes radically reduced USDA inspections for unhealthy additives like animal feces, worms, E-coli bacteria, pieces of glass, and growth hormones (Eisnitz,1997; Midkiff, 2004; Schlosser, 2001;

Stull and Broadway, 2004), a similar downsizing has occurred in the wake of the deregulation spree of the 1980s within the ranks of the Department of Labor's Occupational Safety and Health Administration (OSHA). Like the largely 'self-regulated' meat inspections, a new policy of voluntary compliance—resulting in a 20 percent cut in OSHA staff – has replaced mandated health and safety checks by government officials protecting workers from dangerous working conditions.

In *Fast Food Nation*, Eric Schlosser described the general atmosphere of nonchalance and malfeasance that accompanied OSHA policy changes: even before the cutbacks, the agency was “under funded and understaffed: its 1,300 inspectors were responsible for the safety of more than 5 million workplaces across the country. A typical American employer could expect an OSHA inspection about once every eighty years”. Spot inspections became a thing of the past as injury rate ‘records’ became the key vehicle to official entry: any plant showing a lower rate of injury than the national average was exempt, safe from prying eyes. Having successfully garnished autonomy from OSHA, some meatpacking companies cleverly concocted ways to bury damning evidence of health and safety violations. A senate investigation of OSHA's voluntary compliance policy found that it encouraged firms to “understate injuries, to falsify records, and to cover up accidents”. Double sets of injury logs helped provide companies like IBP with the opportunity to scam OSHA (and the public), but only up to a point. Inevitable congressional investigations revealed not only the dual injury-record scheme, but astronomical discrepancies in the real versus ‘doctored’ set of books: 1800 as opposed to 160 illnesses and injuries respectively, in only a 3-month period in 1985 at the

Dakota city IBP plant. Another meatpacking conglomerate – Monfort, owned by ConAgra – was also exposed for corrupting injury citations, as one of its safety directors testified. Corporate prevarications and document shredding were punctuated by Monfort’s corporate philosophy (as testified by one of their former safety officers): “The first commandment is that only production counts...The employee’s duty is to follow orders. Period. As I was repeatedly told, ‘Do what I tell you, even if it is illegal...Don’t get caught’” (Schlosser, 2001:179-182).

Summary termination by whistleblowers and behind-the-scenes renegotiations for reduced fines combine with the self-insured status of powerful, privately owned companies like IBP and ConAgra (insulating them from the transparency demanded by insurance companies who could impose workplace changes through the threat of higher premiums) to enable blatant circumvention of responsibility for worker safety and health. Furthermore, in order to camouflage ‘lost workdays’ reported to OSHA for the Bureau of Labor Statistics, and to avoid an obvious mismatch between worker injuries and absences, meatpacking plants routinely coerce ill/hurt employees into returning to the job immediately after seeking medical attention, if only to be counted as present:

“Raoul was born in Zapoteca, Mexico, and did construction work in Anaheim before moving to Colorado. He speaks no English. After hearing a Monfort ad on a Spanish-language radio station, he applied for a job at the Greeley plant. One day Raoul reached into a processing machine to remove a piece of meat. The machine accidentally went on. Raoul’s arm got stuck, and it took workers twenty minutes to get it out. The machine had to be taken apart. An ambulance brought Raoul to the hospital, where a deep gash in his shoulder was sewn shut. A tendon had been severed. After getting stitches and a strong prescription painkiller, he was driven back to the slaughterhouse and put back on the production line. Bandaged, groggy, and in pain, one arm tied in a sling, Raoul spent the rest of the day wiping blood off cardboard boxes with his good hand” (Schlosser, 2001: 187).

Regardless of company or location, the meat workers' plight revolves around the same struggle to receive proper medical care, the same fear of speaking out, the same underlying corporate indifference. The sentiment was echoed repeatedly to Schlosser: "We are human beings", more than one person told me, "but they treat us like animals" (2001:179-186). The same machines that gut and grind up animals along the disassembly line have also mutilated the unsuspecting and untrained meatpacker. Many deaths and dismemberments in the slaughterhouse could have been avoided through proper training, safety equipment, and other modern manufacturing strategies. But as long as American slaughterhouses preside over their fortresses of imperious domination, concealed by tiers of secrecy and lawlessness, both their product (animal) and their producers (human) will continue to be assaulted by the crippling machines of the industry.

This concludes the portion of the thesis that has been devoted to theoretical, historical, political, industrial, social, and cultural considerations relevant to Hispanic migration and the meatpacking industry. The following four chapters detail the thesis analysis which quantitatively supplements and substantially reinforces the existing literature on immigrant vulnerability in high-risk industry.

Chapter Four

Data and Methodology

There are three main tenets in vulnerability research: the identification of conditions that make people or places vulnerable to extreme natural events...the assumption that vulnerability is a social condition...and the integration of potential exposures and societal resilience with a specific focus on particular places or regions (Cutter, 2003).

This chapter focuses on describing the information sources and overall research design, and outlines the key definitions, assumptions, and data organization methods used in this project. It begins with a brief summary of the research methodology that addresses the three research goals outlined in Chapter One concerning immigration, ethnic inequity and vulnerability, and environmental justice. This is followed by a discussion of the project scope, components, and sources used in the overall analysis of the study objectives.

4.1 Methodology for Thesis Objectives

The first thesis objective concerning the relationship of Hispanic migration and large meatpacking counties in Iowa and Nebraska entailed a threefold approach. The first step consisted of analyzing the spatial relationship between immigration and destination choice associated with Hispanic migration to the Midwestern states of Iowa and Nebraska for determining where the largest relative gains in Hispanic population had occurred between 1990 and 2000. The next step was to conduct an in-depth study of meatpacking

plants in these states to establish the parameters for defining large meatpacking plant (LMPPs) counties in the study area. This step involved a cross-referencing operation to examine locations, ownership, employee numbers, and annual production rates. The final step, linking Hispanic population growth and the existence of one or more large meatpacking facilities in a particular county, was made via the longitudinal evaluation of Hispanic population changes in Iowa and Nebraska counties between 1990 and 2000. The theoretical expectation was that increased Hispanic in-migration to Iowa and Nebraska would be shown to have occurred primarily in counties with large meatpacking plants. As an adjunct to this portion of the project, unemployment rates were analyzed to add credence the belief that immigrants were not taking jobs from natives, i.e. low unemployment rates would prevail in LMPP counties.

The second research objective involved a comparison of the socioeconomic characteristics of Hispanic individuals with those of non-Hispanic residents in counties with LMPPs to determine the existence and/or extent of socioeconomic disparities. Based on prior studies reviewed in Chapter Three, it was predicted that socioeconomic vulnerabilities had increased in tandem with the growth of Hispanic population in Iowa and Nebraska counties. Longitudinal change ratios, portraying 1990 to 2000 variations in Hispanic/non-Hispanic relationships pertaining to income, education, language, immigration, and disabilities were measured for a depiction of social vulnerability in LMPP counties. Similarly, current environmental quality denominations were calculated for animal waste, factory pollution, and worker injury and illness rates to illustrate actual and potential hazards confronting laborers, as well as families living in nearby

communities. The collective findings of the socio-industrial investigation were integrated into a quantitative ranking scheme that incorporates the economic, social, and spatial attributes of Hispanic immigration depicted in the study's framework of vulnerability, with reference to socioeconomic characteristics and industrial/occupational risks associated with large meatpacking counties of Iowa and Nebraska. A variation of Cutter's (2003) 'vulnerability of place', the resulting socio-industrial hierarchy was designed to be efficacious in clarifying personal vulnerability and industrial risk for Hispanics migrating to meatpacking plant locales.

Taking the research efforts to a more localized level, the third thesis objective centered on examining the environmental justice hypothesis, based on an equity analysis of the spatial distribution of people with respect to sources of industrial pollution. Population attributes deemed important indicators of social vulnerability were employed in this final section of the analysis, including minorities (African Americans and Hispanic origin), employment disabled, and individuals with an annual income below the federal poverty level. Based on these population attributes, census tracts containing LMPPs (host tracts) were compared with their respective counties, and counties hosting LMPPs (host counties) to their respective state. It is generally believed that: 1) Hispanics are over-represented in the slaughtering and meatpacking industry; 2) they are more likely to suffer work-related illness and injury in packinghouse employment than any other racial/ethnic group; and 3) LMPPs releasing toxic substances are located in census tracts and counties containing a disproportionately large number of Hispanic residents. .

4.2 Delimitations and Definitions

“New Census file tracks the nation’s occupations: where workers work and live...data covers gender, race, ethnicity, education, age, industry and earnings...summary geographic levels include [national to local]” (Census Bureau, 12/29/03)

No occupational meatpacking data were available in this report.

While acknowledging the recent growth of other immigrant groups in Iowa and Nebraska meatpacking communities (none of whom are expanding as rapidly as the Hispanic/Latino cohort), this study did not extend beyond the Hispanic population, or examine any other industry besides slaughtering and meat processing.

The geographic scope was limited to Iowa and Nebraska with relevant linkages to origin states and/or countries in the case of internal and international migration. While these two states contain relatively few packinghouses (115 out of 1,391 U.S. establishments, or 8 percent of the national total), Nebraska and Iowa generate about 26 percent of all meat product value in the U.S. (1997 Economic Census). In addition, 93 slaughtering and meatpacking facilities are located in the 22 LMPP counties - out of a total of 192 counties in the study area - and represent more than 80 percent of Iowa and Nebraska’s meat processing plants. Thus, this setting offered a unique and important snapshot for an analysis of the cultural, industrial, socio-spatial and environmental impacts of the industry in a relatively encapsulated geographic area of the global food arena.

LMPP counties are defined as those with meatpacking plants employing more than 1000 people and/or in the top 50 meat-processing facilities nationwide, as identified by cross-referencing sources of the U.S. Government Accounting Office (GAO), the

Toxic Release Inventory (TRI) of the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture, and American Business Directories (2003). In counties where high in-migration of Mexicans has occurred simultaneously with the location of meatpacking plant(s), it was assumed that these establishments were the primary beneficiaries of the Mexican workforce. This assumption was based on the fact that Hispanics/Latinos comprised the highest percentage of all groups employed by the animal slaughtering and processing industry (43.4 percent) in 2002, while this industry led the nation in percentage of Hispanics employed (Bureau of Labor Statistics, 2003). Data from the 2000 U.S. Census indicates that the Hispanic population in Iowa and Nebraska was approximately 77 percent of Mexican descent, with Latin Americans and 'other' comprising the bulk of the remainder.

The primary data source for the socioeconomic aspect of this study was the U.S. Census Bureau. Variables widely acknowledged and applied in immigration and vulnerability research were used to investigate the research objectives of the study. Information on race, ethnicity, educational attainment, annual income level, poverty status, employment, disability and other relevant characteristics were obtained from the U.S. Census of Population and Housing 1990 and 2000 (U.S. Census Summary File 3, 1990, 2000). Occupational illness and injury numbers for Hispanics in the meatpacking industry originated from the Bureau of Labor Statistics (BLS) household and industry files (2002). Data on toxic emissions from LMPPs that were used for the environmental quality evaluation and ranking of LMPP counties were extracted from the 2002 Toxic Release Inventory (TRI) database of the Environmental Protection Agency (EPA) and the

Environmental Defense Fund's Scorecard website (www.scorecard.org) that provides data on animal waste and watershed pollutants generated by LMPPs. [Appendix E]

4.3 Data Organization

“What is needed is more solid research on what the problem is”, including culture, language and poverty factors that may influence approaches to the conspicuous preponderance of Hispanic exposure and deaths due to in hazardous employment...” (Christopher in *Occupational Safety and Health Reporter*, 2001).

Because of the highly dynamic nature of the combination of immigration, occupational hazards, and industrial risk, an expanded research effort supplementing quantitative research with historical and descriptive case studies was implemented. This extended hybrid was not only necessitated by certain data gaps, but also by virtue of the subject matter, which has typically elicited reticence wrapped within a cloak of non-disclosure/confidentiality privilege by the meat industry. Therefore, certain facets of Hispanic vulnerability in the meatpacking industry are unsurprisingly unavailable through normal data channels and required retrieval and analysis through a more qualitative endeavor. Components of immigration policy/legislation affecting the industry, working conditions contributing to increased health hazards, and historical influences on the reception of Mexicans immigrants to the U.S. (e.g. bracero programs) are examples of the type of analyses that entailed a more qualitative approach.

Analyses determining the changes in, and magnitude of, Mexican vulnerability associated with employment in high-risk Midwestern meatpacking plants utilized information obtained from the U.S. Census Bureau, Occupational Safety and Health Administration (OSHA), the U.S. Government Accounting Office (GAO), the U.S.

Environmental Protection Agency (USEPA), and the U.S. Bureau of Labor Statistics (BLS). Various relevant primary and secondary literary sources (manuscripts, journal articles, institutional research findings, policy recommendations/speeches, etc.) were also employed to fill in statistical opportunities for further analysis and clarification.

The U.S. Census Bureau delineates business and employment information according to its North American Industry Classification System (NAICS) and occupation (SOC): these are 31161 (animal slaughtering and processing), and 51-3023 (slaughterers and meatpackers), respectively. SIC 2011 is also referred to as an alternate to NAICS 311611. Although Economic Census statistics are gathered according to the geographic location of each establishment with detailed data for each industry and area, racial/ethnic or socioeconomic information regarding employees is only available at the county level. However, ethnicity data at the county level is not broken down by industry or occupation into categories more specific than ‘manufacturing’ and ‘production worker’, which encompasses a huge and varied segment of private industry. In light of this distinct lack of information integration (or information disintegration), a three-pronged approach was used to examine Hispanic immigration to the Midwest, their geographic location with respect to the primary industry at the destination site, socioeconomic and health-related characteristics, and potential exposure to industrial chemicals:

Longitudinal evaluation: Hispanic population changes in Iowa and Nebraska counties between 1990 and 2000 were measured and analyzed with respect to differences in LMPP versus non-LMPP counties. Additionally, 1990 to 2000 differences in socioeconomic indicators of vulnerability were assessed for Hispanics to determine the

existence and/or magnitude of change associated with Hispanic population growth between the two sets of counties.

Socio-occupational vulnerability ranking: Separate county rankings for social change (five socioeconomic factors) and environmental quality (three industrial risk factors) were computed to illustrate these vulnerability influences in each LMPP county relative to the others. The rankings (social and environmental) were then combined to portray the compound socio-industrial vulnerability from the accumulation of factors leading to social isolation, occupational illness and injury, and environmental exposure in LMPP counties.

Environmental justice analysis: A multiple-resolution analysis of demographic, socioeconomic and work-related health characteristics was used to examine spatial inequities in the distributions of LMPPs at the county and state scales. Specific attention was paid to disproportionate representations of minority (Blacks and Hispanics), disabled, and low-income populations that reside in LMPP host communities.

The following chapters (Chapters Five, Six and Seven) focus on the particular methodologies and findings for the three primary thesis objectives stated previously. Chapter Five examines LMPPs in Iowa and Nebraska, their location by county, and Hispanic migration to these areas. It also assesses the socioeconomic changes in these areas that have occurred over the period 1990 to 2000, with a distinct focus on Hispanic attributes connected with income, education, language, immigration, and disability. Chapter Six contains the approach and analysis for ranking vulnerability in LMPP

counties on the basis of social change and environmental quality, while Chapter Seven highlights the analysis of environmental justice and related findings.

Chapter Five

Industrial-Immigrant Linkages and Socioeconomic Change

“According to the plant records, the workforce was two-thirds Hispanic, one-fifth White, [and] one-tenth Asian”, “76 percent of the plant’s officials and managers were White males”, and “most personnel classified as professionals, technicians, and sales workers were also White males” (Stull and Broadway, 2004: 85).

This quotation from Stull and Broadway refers to ‘Running Iron Beef’, one of the world’s largest beef plants that employed over two thousand workers. As a condition of their study, they could not divulge the name of the company, its employees, or location. However, it is most likely owned by one of the ‘top four’ meat processing firms in the country -namely, ConAgra, IBP (Tyson), Cargill, or National Beef (Schlosser, 2001: 137), is located in the Midwest, and avidly recruits immigrants for its nastiest, most dangerous operations. This chapter focuses on uncovering similar information concerning location and employment at a wider geographic scale, encompassing two states and 192 counties where approximately 26 percent of all the nation’s slaughtering and meat processing takes place (U.S. Census Bureau, 1997 Economic Census). Once identified, a comparative socioeconomic assessment of Hispanic characteristics in LMPP and non-LMPP counties was done to highlight changes from 1990 to 2000 for each LMPP county.

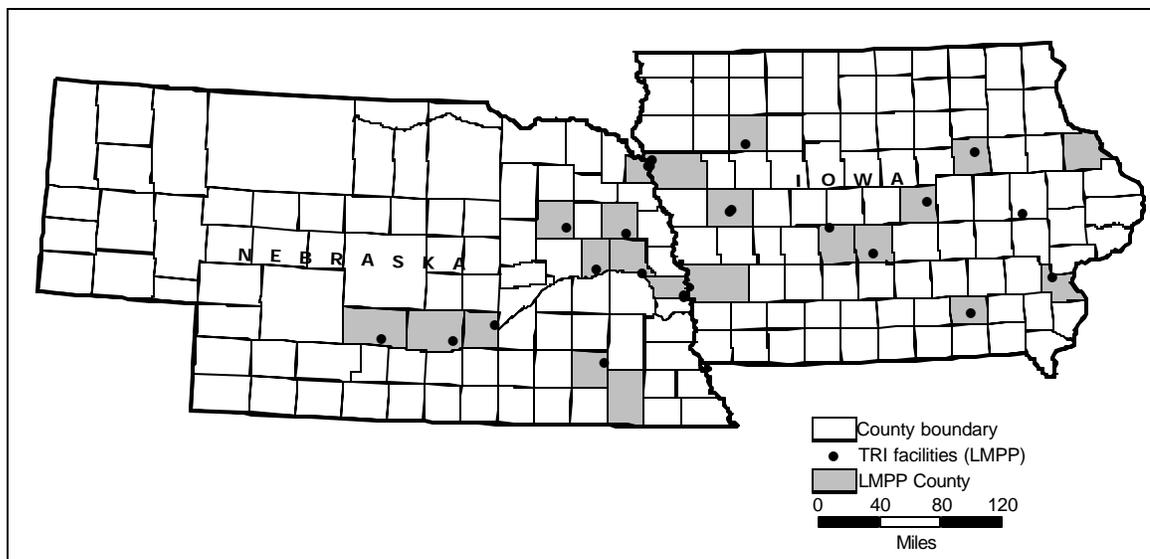
Within the past decade, Iowa and Nebraska have witnessed an unprecedented 167 percent increase in the aggregate number of new Hispanic/Latino immigrants to their combined states (U.S. Census 1990, 2000). Rural Midwestern towns that contain

slaughterhouses have not only experienced rapid cultural transformation more than others, but have also been sorely challenged by the meatpacking industry's unwillingness to address (beforehand) important issues like language, schools, and housing for the perpetual flow of foreign workers that arrive to toil in their factories. And while these facts are widely acknowledged by large meatpacking plant (LMPP) town residents as well as in industrial, governmental and academic circles, specific employment information is exceedingly difficult to unearth. Seemingly simple queries (e.g., How many employees work at each plant? What is the racial breakdown of the LMPP labor force? Do minorities and/or foreign-born have a higher illness and injury rate than other LMPP workers?) were met with obscure or incomplete data through public channels and personal contact (U.S. Census, Bureau of Labor Statistics, OSHA).

Even the identification of LMPPs in Iowa and Nebraska is complicated by the changing nature of this oligarchic segment of industry, partially due to mergers and acquisitions by the four companies who control about 85 percent of the market (Schlosser in Stull and Broadway, 2004:xiii), and partly because of the sort of underworld quality that surrounds the meatpacking milieu evidenced by P.O. box addresses and codes in public databases that are used either to withhold or shroud specifics in order to avoid disclosure (BLS; *info*, USA). Nevertheless, through cross-referencing four independent sources – US Government Accounting Office (GAO), American Business Directory, 2003, Economic Census (1997), and Toxic Release Inventory (TRI) report of the Environmental Protection Agency (EPA) – a fairly comprehensive and credible list of the large meatpacking plants in Iowa and Nebraska was assembled.

Table 2 lists the LMPPs by firm name, parent company, and location, and includes 25 Iowa and Nebraska factories that employ more than 1,000 people at their site and/or are in the top 50 meat processors in the U.S (American Business Directories (ABD), 2003; BLS, 1997; GAO, 1998; TRI, 2004). The factories are situated within 22 counties, which also host 68 small and medium-sized meatpacking plants for a total of 93 establishments in the two states (BLS, 1997). A map depicting the locations of LMPP counties in Iowa and Nebraska, along with those LMPP facilities reporting to TRI is shown in Figure 1.

Figure 1. Location of Iowa and Nebraska LMPP Counties



Twenty of the 22 LMPP counties being studied have huge meatpacking establishments that employ between 1,000 and 4,999 people to run their operations, with an average of around 2,000 workers and a high of 3,679 at the Dakota City IBP factory (ABD, 2003; BLS, 1997; GAO, 1998; personal communications with plant and union

personnel, 2005). Prior studies on individual plants in the Midwest have revealed that, on average, a large-scale packinghouse uses around 2,500 workers on a day-to-day basis (Stull and Broadway, 2004).

Table 5.1 Iowa and Nebraska Large Meatpacking Plants (LMPPs)

County	City	Facility (Parent)
IOWA:		
Black Hawk	Waterloo	IBP (Tyson)
Buena Vista	Storm Lake	IBP (Tyson)
Crawford	Denison	Farmland (National Beef)
Crawford	Denison	IBP (Tyson)
Dallas	Perry	IBP (Tyson)***
Dubuque	Dubuque	Farmland (National Beef)*
Louisa	Columbus Junction	IBP (Tyson)
Marshall	Marshalltown	Monfort/Swift (ConAgra)
Polk	Des Moines	PineRidge Farms
Pottawattamie	Council Bluffs	IBP (Tyson)*
Wapello	Ottumwa	Excel (Cargill)
Woodbury	Sioux City	John Morrell (Smithfield)**
NEBRASKA:		
Buffalo	Gibbon	Gibbon Packing
Colfax	Schuyler	Excel (Cargill)
Cuming	West Point	IBP (Tyson)
Dakota	DakotaCity/SoSioux	IBP (Tyson)
Dawson	Lexington	IBP (Tyson)
Dodge	Fremont	Hormel
Douglas	Omaha	Monfort/Swift (ConAgra)
Douglas	Omaha	Nebr.Beef Ltd.
Gage	Hastings	ConAgra
Hall	Grand Island	Monfort/Swift (ConAgra)
Madison	Madison	IBP (Tyson)
Madison	Norfolk	Beef America*
Saline	Crete	Farmland (National Beef)

*Not reporting to TRI

**Researched by Eisnitz, 1997

***Researched by Fink, 1998

Despite the fictional name of ‘Running Iron Beef’, the Stull and Broadway study revealed very real racial disparities in the plant, and by extension, in the meatpacking

industry as a whole (2004). Unfortunately, such information is apparently unavailable for the majority of slaughterhouses that have not been the specific subject of discourse.

Thus, linking the recent influx of immigrants to Iowa and Nebraska with their employment in LMPPs was another engaging exercise that resulted in numerous obstacles. Predictably, when general employment numbers are obscure to nonexistent, so too, will be the attending descriptions of said workers. To wit: racial or ethnic breakdown of meatpacking employees in the U.S. public databases is only available at the national level (Census, 2000; BLS; EEOC).

5.1 Approach to the Hispanic-LMPP Linkage

One way to assess the influence (or pull-factor) that the meatpacking business has on immigrant in-migration to different regions is to examine the relationship between the spatial and temporal aspects of the issue. This was done by comparing the proximity of the industry (LMPP in county) with the decadal population movement associated with the Hispanic growth in these counties. In order to link immigration and industry, the average percent increase (1990-2000) of Hispanics relative to non-Hispanics in LMPP counties of Iowa and Nebraska was compared to the corresponding increase in non-LMPP counties.

Following the first hypothesis concerning the immigration of Hispanics to Midwestern LMPP counties is the assertion that, contrary to popular belief, these laborers are not wresting away jobs from local natives. Through Census data, the number of unemployed in Iowa and Nebraska counties for 1990 and 2000 was calculated by subtracting employed civilians over the age of sixteen from total workers. Additionally, the Bureau of Labor Statistics provided unemployment rates on a county basis for the

intervening years, 1995-2000. Both data sets were examined to determine the significance of decadal mean unemployment rates associated with LMPP and non-LMPP counties. Finally, comparison of means tests and the correlation analyses were performed on the 2000 unemployment level of Hispanics and Whites and between LMPP and non-LMPP counties to ascertain employment displacement in relation to increasing Hispanic in-migration to the study area.

Descriptions of the Hispanic change variable, as well as the unemployment change variable are as follows:

- *Hispanic/non-Hispanic population change, 1990-2000*: This variable represents the relative increase/decrease in the number of Hispanic persons in a given county during the last decade, with respect to the rest of the population (non-Hispanics). For each county in Iowa and Nebraska, it was computed as a difference in two ratios: $(\text{Hispanics in 2000} / \text{Non-Hispanics in 2000}) - (\text{Hispanics in 1990} / \text{Non-Hispanics in 1990})$. Because this variable compares ratios instead of raw numbers, it does not overestimate Hispanic growth in counties that have experienced an overall increase in the population between 1990 and 2000.
- *Unemployment change, 1990-2000*: This variable represents the increase/decrease in the proportion of all unemployed individuals aged 16 or higher in the civilian workforce, in any given county between 1990 and 2000. For each county in Iowa and Nebraska, it was computed by subtracting two ratios: $(\text{Unemployed workers in 2000} / \text{Total workforce in 2000}) - (\text{Unemployed in 1990} / \text{Total workforce in 1990})$.

5.2 Hispanic Migration for LMPP Jobs: Findings

“Packing plants need people whose personal situation hovers on malnutrition, misery, hopelessness, and lack of alternative opportunities: precisely that of millions of Mexican men and women” (CIEPAC, 2003:6).

Iowa and Nebraska experienced very little population growth in the ten years from 1990 to 2000, but net figures obscure the underlying activity involving an influx of Hispanics that roughly corresponded with the outflow of native Whites. Although Hispanic migration to non-traditional states has recently been addressed (Fix *et al*, 2003), the unanswered question regarding motives for relocating to these Midwestern states not known for inordinate employment opportunities, multicultural populations, or geographically genial climates remains. To examine the question regarding Hispanic migration to large meatpacking plant (LMPP) counties, the mean of the changes in Hispanic/non-Hispanic ratios between 1990 and 2000 in both LMPP and non-LMPP counties were estimated and compared. A two-sample t-test of means was used to analyze the statistical significance of the differences.

Table 5.2 Comparing Counties With Large Meatpacking Plants (LMPPs) to Those Without LMPPs Using 1990 and 2000 Census Data: Demographic and Unemployment Changes

Variable	LMPP mean (n=22)	non-LMPP mean (n=170)	Difference	t-value
County population change (1990-2000)	0.089	-.004	.093	6.02
Population density (2000)	168	30	138	5.19**
Hispanic/non-Hispanic population change, 1990-2000	8.73	0.93	7.80	10.46**
Unemployment change, 1990-2000 (Census)	-0.001	-0.002	0.001	0.159
Unemployment change 1995-2000 (BLS)	-0.164	-0.276	0.112	0.485

*p <.05; **p<.01

The results, summarized in Table 5.2, show that the average changes (1990-2000) are 8.73 and 0.93 respectively, in LMPP and non-LMPP counties. The significantly larger increase in the Hispanic/non-Hispanic ratio in the first group suggests a strong ‘pull’ factor in LMPP counties. This connection is further bolstered by raw numbers of decadal foreign-born in-migrants: an average of 2,518 new immigrants moved to LMPP counties during this time, as opposed to 235 foreign-born individuals in non-LMPP counties. Additionally, the averages of both county population change (1990 to 2000) and population density (2000) are appreciably higher in the LMPP group (22 counties) compared to the non-LMPP group (170 counties). Although this can be partially explained by the location of LMPP counties in the largest metropolitan areas (i.e. Omaha, Des Moines, Sioux City, Dubuque), it is also due to the surge in Hispanic in-migration to these areas (See Table 3.1 in Chapter Three for Hispanic migration flows to Iowa and Nebraska, 1995-2000).

The contentious terrain of immigration in the U.S. today is often colored by equally arguable assertions that jobs are being usurped by new, foreign arrivals of the receiving communities. Specifically, African Americans are thought to be bearing a disproportionate share of deteriorating employment opportunities manifested by the mounting numbers of immigrants who “impede or delay the working of natural labor market forces” that would otherwise serve to “improve bargaining power, and better wages, conditions and employment prospects” (Beck, 1996). Therefore, another aspect of Hispanic immigration to LMPP counties is the issue of native worker displacement. Two-sample t-tests were performed to compare means on unemployment data from the Census

(total number of unemployed individuals, 1990-2000 change) and the BLS (unemployment rate differentials, 1995-2000). As Table 5.2 shows, neither test revealed a significant difference in the sample means of unemployment rates between counties hosting a large slaughterhouse employing many immigrants and those counties without an LMPP. On the basis of these tests, it could be inferred that native employment displacement by LMPPs should not be a concern. Instead of undermining employment opportunities, economies of LMPP counties appear to be enhanced by sustained high employment levels. However, this study did not examine the African-American situation, which may indeed illuminate reciprocal job disassociations attached to positive immigration trends.

Despite this relatively positive employment scenario, further analysis of 2000 Hispanic unemployment in relation to White unemployment revealed an 8 percent average unemployment rate for Hispanics versus 3 percent for Whites, indicating racial inequalities in the Iowa and Nebraska job markets. While overall Hispanic population growth during the 1990-2000 time frame averaged approximately 9 percent throughout the LMPP study area, unemployment remained relatively static over the decade.

5.3 Socioeconomic Profile: LMPP versus non-LMPP Counties

“Slaughterhouses are now located in rural areas that rarely get much attention from the national media. The vast majority of meatpacking workers are impoverished Latino immigrants who don’t get much attention, either. Nor do they wield much influence in Congress. Most Americans live in cities or suburbs and have little idea where their food comes from...The profound changes in meatpacking over the past three decades have not been widely advertised. On the contrary, they have been carefully hidden” (Schlosser in Stull and Broadway, 2004: xiv).

Temporal changes in the demographic and socioeconomic profile of Hispanics in counties of Iowa and Nebraska in the time-period 1990 to 2000 formed the underlying template for the majority of this research. The primary ‘adjusted change’ variables examined were: Hispanic growth, unemployment, income, education, language, immigration and disability. The definitions of these variables, in the context of this thesis, are provided in Table 5.3, followed by a brief rationale for their inclusion in this study.

Table 5.3 Terms and Definitions

	Description
LMPP:	Large meatpacking plant with 1000+ employees and/or in the top 50 meat processors in the U.S.
Income:	Per capita annual income
Education:	Completed college, for those aged 25 and over
Language:	Spanish-speaking, linguistically isolated (no English)
Immigrant:	Foreign-born person who arrived in IA or NE during 1990-2000
Disability:	Civilian aged 16 years and over with employment disability

Clearly, “lack of wealth is a primary contributor to social vulnerability as fewer [personal] and community resources are available” (Cutter, 2003:251) to forestall and/or overcome economic catastrophes from sudden unemployment, job injuries, and other financial emergencies. Personal wealth, or lack thereof, was used as a measurement of deprivation and income disparity, defined by the Census 2000 average per capita income of Whites versus Hispanics in all counties. Mean differences in this category would point to either an increase or decrease in average earnings among Hispanics compared to Whites over the course of the ten-year period.

Ethnicity, or persons of Hispanic origin, as the overarching theme of this research, was the pivotal point around which the thesis revolves. Hispanic population increase as

influenced by the presence of LMPPs was the defining process for correlating the immigrant-industry connection, whereas Hispanic foreign-born entry into the U.S. were used as explanatory variables in the assessment of social vulnerability associated with working and living in slaughterhouse environs. Social, economic, and political marginalization of U.S. minorities has been empirically linked with limited access to resources that exponentially compounds the plight of already vulnerable populations (Chakraborty and Bosman, 2002; Cutter, 2003; Morrow, 1999).

Knowledge and the ability to communicate and understand others are two indispensable assets required to survive in today's technological society. Vulnerability conceived as a "potential for loss" (Mitchell, 1989 in Cutter, 1996:531) likewise encompasses educational, literacy and language deficiencies, attributes that are not uncommon among recent immigrants to meatpacking communities (Fink, 1999; Stull and Broadway, 2004). Lack of a college degree (for those aged 25 and up) as a measure of educational attainment, linguistic isolation of Spanish-speaking individuals as an indicator of English proficiency, and newly-arrived, foreign-born persons to Iowa and Nebraska counties, were thus incorporated into the overall assessment of Hispanic socioeconomic characteristics contributing to vulnerability.

Finally, employment disabilities reported by Census 2000 were considered in the study because of the obvious physical harm to workers as well as the financial burden. In addition to sustaining one's livelihood, steady employment has a critical bearing on immigrants for whom income/remittance back to Mexico was of paramount importance in their transmigratory decision. Illness and injury sustained on the job, interrupting and

reversing the flow of income while bringing physical pain to those affected, places an inordinate onus of vulnerability that cannot easily be ameliorated.

The following descriptions represent the longitudinal change variables associated with socioeconomic vulnerability used in the analysis of Hispanic/non-Hispanic disparities in the comparison of LMPP counties to those without LMPPs in the study area; they were also applied in the subsequent county rankings in Chapter Six.

- *Income disparity: Hispanic/White, 1989-1999*: This variable represents the relative increase/decrease in the per capita income earned by Hispanic persons in a given county during the last decade, with respect to the income earned by the White population. For each county in Iowa and Nebraska, it was computed as a difference in two ratios: (Hispanic per capita income 1999/White per capita income in 1999) – (Hispanic per capita income in 1989/White per capita income in 1989). A negative value for any county would denote a decline in the relative income of Hispanic employed civilians from 1989 to 1999.
- *College-educated: Hispanic/White, 1990-2000*: As an indicator of educational parity, this variable represents the relative increase/decrease in the educational attainment (defined as aged 25+ and completing college) of Hispanic persons during the last decade, with respect to the educational attainment of the White population. For each county in Iowa and Nebraska, it was computed as a difference in two ratios: (Hispanics with a college degree in 2000/Whites with a college degree in 2000) – (Hispanics with a college degree in 1990/Whites with a college degree in 1990). A

negative value for any county would denote a decline in the relative educational attainment of Hispanic employed civilians from 1990 to 2000.

- *Linguistically isolated, 1990-2000*: This variable represents the change in numbers of linguistically isolated, Spanish-speaking people between 1990 and 2000 as a function of 1990 population. It was calculated by finding the difference between the number of Spanish speaking individuals in 2000 versus 1990 for each county in Iowa and Nebraska, divided (normalized) by the 1990 Spanish speaking population.
- *New immigrants, 1990-2000*: This variable represents the change in numbers of foreign-born individuals entering the U.S. between 1990 and 2000 and settling in Nebraska and Iowa. It was calculated by finding the difference between the number of immigrants in 2000 and 1990 for each county, divided (normalized) by the 1990 immigrant population.
- *Employment Disabled, 1990-2000*: This variable represents the 1990 to 2000 change in numbers of those people aged 16 and over with employment disabilities, which includes all work-related disabilities, in all industries, for all races/ethnicities. For each county in Iowa and Nebraska, it was computed as the ratio of the difference between 1990 and 2000 numbers of employment disabled, divided (normalized) by the number of employment disabled in the U.S. civilian workforce in 1990.

Aggregate LMPP and non-LMPP county means were calculated for the above variables and compared to examine if significant differences exist within the socioeconomic realm of these clustered spatial sectors. In addition, two-sample t-tests for

means were also performed to determine the statistical significance of the socioeconomic differences between Hispanics and non-Hispanics in the study area (192 counties), for a depiction of possible inequities that may exist between the two groups. These two comparative exercises were undertaken in order to better understand both the spatial confluence of temporal, socioeconomic attributes in LMPP counties versus non-LMPP counties, and racial disparities in income and education that may exist between Hispanics and non-Hispanics in Iowa and Nebraska as a whole.

Statistical tests of difference in means for individual socioeconomic variables showed the stark contrast that exists between Hispanics and non-Hispanics in Iowa and Nebraska (Table 5.4), as well as between LMPP counties and non-LMPP counties (Table 5.5).

Table 5.4 Racial Disparity in Iowa and Nebraska: Income, Education, and Unemployment, 2000.

Variable (n=192)	Hispanic mean	White mean	t-value
Per Capita Income (1999)	\$ 9,668	\$ 17,551	23.586**
Percent College Educated, 25+	0.07	11.60	53.050**
Percent Unemployed	8.3	3.2	6.089**

** p <.01

As the above table illustrates, while the county-level average of White college graduates in 2000 was 11.6 percent of the population aged 25 and over, Hispanics who had graduated from college only averaged only 0.07 percent in the two-state area. Both groups showed increases in these variables from 1990, when 9.28 and 0.03 percent of Whites and Hispanics were college graduates, respectively. But although an average of about 7 out of ten thousand adults in the study area are now college-educated Hispanics

(compared to 3 out of 10,000 in 1990), the Hispanic-White college education disparity has widened as an even greater gain was made by Whites. Paralleling educational variances between Hispanics and Whites is a statistically significant gap separating per capita income levels of the two groups, which averaged \$9,668 and \$17,551 respectively in 1999. Employment differentials highlight the condition of unequal job opportunities; while more than 8 percent of Hispanics were unemployed in 2000, a mere 3 percent of the White population were in this highly vulnerable position in Iowa and Nebraska.

Table 5.5 Comparing Census Counties With Large Meatpacking Plants (LMPPs) to Those Without LMPPs Using 1990 and 2000 Census Data: **Socioeconomic Attributes**

Variable	LMPP mean (n=22)	non-LMPP mean (n=170)	Difference	t-value
Per Capita Income disparity: Hispanic/White change, 1989-1999	-0.293	0.032	-0.325	-2.75**
Hispanic/White college educated change, 1990-2000	0.065	0.046	0.19	1.641
Increase in linguistically isolated Spanish-speaking people from 1990-2000	0.995	0.099	0.896	10.53**
Increase in new immigrants to IA and NE from 1990-2000	4.285	0.692	3.593	10.86**
Increase in employment disabilities, 1990-2000	2.373	1.896	0.477	1.00

*p <.05; **p<.01

Unlike the Hispanic versus White educational disparity shown to exist throughout the Nebraska-Iowa study area, the comparison of Hispanic/White educational achievement in LMPP and non-LMPP counties did not reveal a significant difference. This may be due to the disproportionate numbers of Hispanic migrants (including college-educated) to the LMPP counties, in combination with corresponding decreases in

educated White cohorts out-migrating to greener pastures. Nevertheless, the hypothesis that Hispanics are significantly more educationally disadvantaged compared to Whites is supported by the t-test of means that compares the ratio of (2000) college educated Hispanics to total Hispanics against the ratio of White graduates to total White population in the entire study area. Results from Table 5.4 indicate that inequities exist between more privileged Whites for whom college is overwhelmingly more prevalent and their Hispanic counterparts.

The huge discrepancy between the average per capital income levels of Hispanics and Whites in the study area was discussed earlier. A longitudinal examination of the Hispanic/White ratio of annual income in 1989 compared to the ratio in 1999 highlights further income divisions between earners in LMPP and non-LMPP counties, as shown in Table 5.5. While non-LMPP counties in Iowa and Nebraska averaged a three percent increase in this ratio, Hispanic income relative to White income *decreased* by 29.3 percent in LMPP counties.

This economic chasm points to a disturbing trend of widening income disparities commonly seen in highly segmented labor markets: the rich (Whites) get richer while the poor (minorities) become poorer. Large slaughterhouses, in particular, have been the target of extensive coverage on low wages, due primarily to the convergence of weakened union influence and the historical and structural propensity of large slaughterhouses to hire immigrants willing to work for lower wages with virtually non-existent benefits. Active recruiting by firms like IBP (Tyson) in Dallas County, Iowa, began in the late 1980s when Hispanics were transplanted from California and Texas. By

2004, this LMPP employed 1,145 people, of whom 75 percent were of Hispanic origin, 12 percent Caucasian, 8 percent Sudanese, and 5 percent Bosnian (IBP employee liaison, October, 2004).

Population growth in LMPP counties averaged approximately 9 percent, compared to a slight decline (0.4 percent) in non-LMPP counties, and both immigration and linguistic isolation are shown to be extremely prevalent in LMPP counties compared to those without LMPPs. Although these statistics were expected - especially after the ‘immigrant-industry’ link was made (Section 5.2) – the rather insignificant mean difference for employment disabilities was a surprise. On the other hand, the low mean disability rate for LMPP counties may indicate further problems in the realm of on-the-job injury reportage and employment disability qualifications mentioned in Chapter 3.

Table 5.6 Pearson Product Moment Coefficient of Correlation Between Hispanic/non-Hispanic Population Change, 1990-2000, and Explanatory Variables

	LMPP Counties (n=22)	Non-LMPP Counties (n=170)
County population change, 1990-2000	0.38	0.13*
Per Capita Income disparity: Hispanic/White change, 1989-1999	0.09	-0.04
Hispanic/White college educated change, 1990-2000	0.64**	0.27**
Increase in linguistically isolated Spanish-speaking people from 1990-2000	0.99**	0.66**
Increase in new immigrants to IA and NE, 1990-2000	0.97**	0.55**
Increase in employment disabilities, 1990-2000	-0.30	0.06

p<*.05; p<**.01

Both numbers of foreign-born individuals and their attending linguistic isolation have skyrocketed in LMPP communities within the past decade. The results of

correlation analyses, summarized in Table 5.6, confirm the presence of a significant and positive association between Hispanic population growth (Hispanics/Non-Hispanics in 2000 - Hispanics/Non-Hispanics in 1990) and increases in both newly arrived immigrants ($r=0.99$) and Spanish-speaking, linguistic isolated individuals ($r=0.97$). On average, there are eighteen times more immigrants and about ten times as many Spanish-speaking individuals in LMPP counties than in counties without large meatpacking plants, according to the Census 2000. These facts punctuate not only the inference that many of the Hispanics are newly-arrived foreign-born residents, but also that they have been launched into their new environment very much on unequal footing with others concerning English proficiency and the ability to communicate and understand things like forms, documents, written instructions, and safety precautions.

Although statistically significant correlations could not be found between Hispanic growth and employment disabilities in LMPP counties ($r=-0.3$), Census 2000 figures indicate that employment disabilities are four times as commonplace in LMPP counties as opposed to non-LMPP counties, inexorably contributing to the pronounced socioeconomic cauldron of vulnerabilities thus far addressed. Iowa, in particular, has experienced an inordinate surge in job-related disabilities over the decade compared with Nebraska. Whether this has any bearing on the fact that Iowa LMPPs are primarily hog processors as opposed to the Nebraska's mainly beef processing has not been determined; at the same time, we must remember that the numbers represent all employment disabilities, including those sustained while working in other industries.

Another variable showing a weak correlation with 1990-2000 Hispanic/non-Hispanic population change was the per capita income disparity, or the relative increase (or decrease) of the Hispanic to White income ratio over the ten year period. While t-tests showed an increase in income disparity in LMPP counties compared to non-LMPP counties during the decade (see Table 5.5), this inequality does not appear to directly relate to population changes between 1990 and 2000.

In summary, the social and industrial factors influencing immigrant vulnerability in Iowa and Nebraska LMPP counties are indicative of the complex and disheartening conditions that in all likelihood prevail throughout the U.S. segmented labor market. These factors also contribute to an on-going assimilation stratification of disadvantaged populations in our society. Ethnic inequities in job opportunities, earnings ability, educational attainment, and linguistic isolation have all been shown to exist in the study area. The next chapter on accumulated vulnerability in LMPP counties addresses these issues in tandem with environmental quality indicators for a more comprehensive analysis of the multiple factors influencing not just new Hispanics to LMPP areas, but also those Hispanic immigrants that work in slaughtering and meat processing jobs.

Chapter Six

Accumulated Vulnerability in Meatpacking Counties

“In August 1990, IBP [Perry, Iowa] brought in the first group of Latinos, recruited in East Los Angeles. By the time I worked at the plant in January 1992, it had imported Asian-Americans as well as a number of black workers either hired in Des Moines or recruited from rural Arkansas or Louisiana. This was not turning out to be as the town fathers had planned, but IBP was able to call up and use a history of 150 years of racial polarization to its advantage. Racial discrimination occurred among both managers and workers in the plant” (Fink, 1998: 137).

Expanding the study to look at socioeconomic indicators of change relating to Hispanic/non-Hispanic populations in tandem with occupational and industrial exposure to risk in counties with LMPPs, this chapter describes how these factors were ranked to illustrate the cumulative ‘place vulnerability’ of Hispanic immigrants within these counties. The initial phase of the analyses included all 192 counties in Iowa and Nebraska to ascertain relevance of the Hispanic-LMPP link and related social dimensions (see Chapter 5). For this phase of the analyses, only the 22 LMPP counties were included, exclusive of the other 170 counties in Iowa and Nebraska. Within these LMPP counties, the changes in ethnic characteristics contributing to vulnerability vis-à-vis Hispanic education, income, nativity, linguistic isolation, and disability were of prime concern in both the individual and cumulative rankings.

Various social attributes have been widely recognized as contributing to vulnerability, as discussed in Chapter 3. The concept of vulnerability has been previously

defined as a reduced capacity to cope due to such factors as low income, and lack of education, English proficiency, literacy, and racial factors that could serve to weaken one's control over decision-making. Increased susceptibility is also multiplied under conditions of high-risk employment and residential proximity to toxic facilities. The following three sections accent both the social and the industrial influences on Hispanics in large Iowa and Nebraska meatpacking plant counties, with the aim of ranking the 22 counties according to their vulnerability of place.

To briefly recap from Chapter Five (Section 5.3), the variables of education and income were based on 1990-2000 change ratios of Hispanic to White populations, and the immigrant element included all foreign-born arrivals to Iowa and Nebraska between 1990 and 2000, at least half of whom were Hispanic/Latino (approximately 77 percent of these individuals were of Mexican origin). Linguistic isolation pertains to all new (1990-2000) Spanish-speaking residents who do not speak English, and the disability variable encompasses the ten-year increase of all employment disabilities in LMPP counties. Decadal immigrant, language, and disability changes were transformed into ratios, using 1990 population figures for the denominator, to better reflect demographic proportions and reduce skewness due to unequal population distributions.

6.1 Socioeconomic Status: County Sequencing

Utilizing the above described longitudinal change ratios, a comparative assessment was made among all LMPP counties for each variable. This was done by ordering each factor according to its relative weight, so that the county indicating the

highest level of vulnerability for a given variable (e.g., smallest per capita income) among all 22 LMPP counties would be ranked first, and the county with the lowest proportion of the same variable (e.g., highest per capita income) would receive the lowest rank of 22. The resulting individual variable rankings within each LMPP county (from 1 to 22) would depict highest to lowest vulnerability for the five variables of social vulnerability under consideration - income, education, language, immigrant, and disability – as compared to the other LMPP counties. An average of the five social vulnerability ranks was used to calculate a mean rank for each LMPP county as shown in below. (No attempt was made to weight variables based on their relative importance for either this ranking or for the upcoming ranking of environmental indicators.)

Table 6.1 depicts an LMPP county ranking (from 1 to 22) based on the magnitude of the various socioeconomic change components of each county relative to the others. Crawford County, host to two LMPPs, is shown as the most ‘place vulnerable’ with the highest mean rank. The mean, incorporating the five rankings given to each LMPP county, constitutes the cumulative average standing of the LMPP county. This explains why, for instance, Crawford County ranks first among the LMPP counties with regard to the aggregate means, but does not rank first in any of the individual variable rankings. Conversely, a county could rank high in one of two variables (e.g., Colfax) but received a mediocre mean rank due to offsetting low rankings in other areas. In general, though, the top three socioeconomically vulnerable LMPP counties are in Iowa (Crawford, Woodbury, Buena Vista), two out of three hosting IBP facilities, and interestingly,

exclude Douglas or Polk County which have the highest population densities in the study area.

Table 6.1 Census 1990-2000 Change Components: Socioeconomic Indicators of Vulnerability for LMPP County Ranking

County	Income Disparity	College Education	Linguistic Isolation	New Immigrant	Employment Disability	Mean Ranking
Crawford	3	7	8	6	9	6.6
Woodbury	12	9	10	7	3	8.2
Buena Vista	16	12	4	4	8	8.8
Madison	6	4	7	10	17	8.8
Polk	7	11	16	8	4	9.2
Hall	5	18	5	5	15	9.6
Marshall	14	6	9	12	7	9.6
Dawson	11	21	2	2	13	9.8
Cuming	2	2	12	16	19	10.2
Dakota	8	22	3	3	16	10.4
Louisa	9	19	6	13	5	10.4
Colfax	19	20	1	1	12	10.6
Dallas	1	17	13	14	11	11.2
Douglas	10	14	14	9	14	12.2
Black Hawk	17	8	20	15	6	13.2
Pottawattamie	15	10	18	21	2	13.2
Saline	21	2	11	11	21	13.2
Buffalo	4	13	17	18	22	14.8
Dubuque	20	5	21	19	10	15.0
Dodge	13	15	15	17	18	15.6
Wapello	22	16	19	20	1	15.6
Gage	18	1	22	22	20	16.6

The cumulative effect of the aforementioned five vulnerability factors to inequitable and unhealthy environments is admittedly not all-inclusive of the myriad of political, social, and economic forces that combine to seriously inhibit an ongoing cultivation of sustainable livelihood by LMPP workers, but it is, rather, a snapshot of regional population change propelled by industrial implication in segmented labor practices. Instead of empowering and enriching their new employees, the strategy appears

to be the opposite. Egregious personal harm via daily contact with knives, roaring machinery and toxic chemicals may be considered merely an inherent part of the larger picture of the American slaughterhouse to some, but the dual exposure of on-the-job injuries and environmental hazards emanating throughout the plant environment serves to multiply the already exponential socioeconomic vulnerabilities of Hispanic meatpacking workers in Iowa and Nebraska LMPPs. Thus, the LMPP county ranking was extended to unsafe environments in and around meatpacking plants, as described in the following section.

6.2 Environmental Quality: County Ranking

Hispanic workers, many of whom are recent immigrants laboring in dangerous construction, food processing, and agriculture jobs, “face about a 20 percent greater risk of being killed on the job than black and White workers combined” (Rafael Moure-Eraso in *Occupational Safety and Health Reporter*, 2001).

Examination of occupational and environmental risks in the meatpacking industry was included to incorporate this important aspect of living in LMPP counties with the socioeconomic attributes analyzed and ranked above for a more comprehensive picture of immigrant vulnerability. Factors depicting the proportion of physical debilities and environmental degradations in each LMPP county in relation to the others, thus included injury/illness rates, factory emissions and animal waste at each location. Illness and injury rates obtained from the Bureau of Labor Statistics, toxic chemical releases reported to the Environmental Protection Agency’s TRI and the Environmental Defense Fund’s Scorecard data on animal waste and comparative pollution ratings from all LMPP

counties were analyzed. As with the socioeconomic factors used in the study, these environmental elements are described below, with a brief rationale for their usage preceding the computation.

Elevated numbers of workers experiencing bodily harm from work-related activities within the meatpacking industry, while not explicitly shown in the Census statistics on employment disabilities in LMPP counties, are well-documented in the Bureau of Labor Statistics database. Widely acknowledged as the most dangerous industry of all U.S. manufacturing concerns, slaughterhouses have an illness and injury rate of 15.6 percent compared to the national average of 3.0, while also ranking number one in 1996 for incidences of repeated trauma injuries like carpal tunnel syndrome, noise-induced hearing loss, and bursitis (OSHA, 2003; *Monthly Labor Review*, BLS, 8-5-99). Comparatively exorbitant numbers of hurt and disabled employees, the majority of whom are probably Hispanic immigrants since they occupy an overwhelming presence in meatpacking plants today, add fuel to the fires of change that threaten staid Midwestern communities. Extra pressures on social services, public assistance programs, and the physical and financial upheaval for work-disabled populations ultimately stem from the very bowels of the slaughterhouse that still remains mired in 19th century standards and practices (Fink, 1998; Stull and Broadway, 2003).

Incredibly, as if the 15.6 percent on-the-job, national impairment rate in slaughterhouses weren't high enough, BLS data indicates greater average rates for Nebraska and Iowa, at 16.0 and 24.3 percent, respectively. Because of certain data limitations at the plant, tract and county level, occupational illness and injury rates within

slaughterhouse counties were based on this BLS state-level data for the industry. County-level ratios of illness/injury rates for LMPP workers were obtained by applying the respective state-level rates to the population of workers in each LMPP county in Iowa and Nebraska. Garnering employment figures for LMPPs, as previously discussed, was difficult if not impossible to do with accuracy. While some plant personnel were forthcoming in general terms, others were downright uncooperative. Nevertheless, LMPP employee numbers were calculated using 1997 Economic Census data (ranges) when actual numbers were unattainable. One possible implication of high illness and injury rates for a particular LMPP is that a majority of the affected could very well be of Hispanic origin. In fact, according to company sources, 75 to 80 percent of the meatpacking workforce in Iowa and Nebraska is of Hispanic ethnicity (IBP; Gibbon Packing, 2005), whereas nationally, Hispanics represent 43 percent of the total slaughtering and meat processing employees (BLS, 2002)

Like the foregoing occupational injury factor, animal waste has rarely been incorporated in studies concerning social vulnerability, physical hazards, and environmental quality, but is included in this thesis because of its obvious affiliation with slaughtering and meatpacking operations, as well as its contribution to overall environmental degradation. As observed in a WorldWatch (1991) paper, “Traditionally, farm animals have played an indispensable role in keeping agriculture on a sound ecological footing by returning nutrients to soil as manure”, but today’s factory-style livestock industries have “environmental side-effects that stretch along the production

line – from growing vast quantities of feed grain to disposing of mountains of manure” (Durning and Brough, 1991:5).

Approximately 11.5 million tons (or about 3 trillion gallons) of animal waste were generated annually in Iowa and Nebraska by LMPP counties alone in 1997 (Department of Agriculture in Scorecard 2002). Such excessive volumes of dung are by-products associated with gigantic feedlots often adjacent to large slaughterhouses, contributing to air pollution through nitrogen lost to the atmosphere, as well as land and water contamination caused by the leeching/run-off of nitrous toxins. As noted earlier, Scorecard 2002 data on tons of animal waste reported by the 22 LMPP counties were retrieved and added together for a total amount; this sum was then used as the basis for determining percentages of animal waste contributed by each LMPP county relative to others.

The third environmental quality issue involved emissions of toxic chemicals like ammonia, chlorine, phosphoric acid, and sulfuric acid – mainly from production and sanitation activities - that are eventually transferred off-site for disposal (EPA, 2002), along with similar toxic chemicals released into the air and water. These plant wastes and environmental emissions were summed to depict total factory pollution in each LMPP county. These occupational and industrial factors were computed as follows:

Illness and Injury: This factor represents the relative number of illness and injuries per year sustained by meatpacking workers in each LMPP county in Iowa and Nebraska. It was calculated by: (a) multiplying 2002 BLS state rates (Iowa=24.3 percent;

Nebraska=16 percent) for illness/injury incidents in the meatpacking industry by the estimated number of workers at the 22 LMPPs; and (b) determining the percentage of each resulting injury/illness number relative to the total number of injury/illness incidents for all LMPPs in the 22 county area.

Animal Waste: This factor signifies the relative amount of animal waste produced by animal factories and related feedlots (per 1997 Census of Agriculture data) for each LMPP county. It was computed as a percentage of total annual animal waste for the 22 LMPP counties.

Factory Pollution: This factor represents the relative combined production waste and air/water emissions reported to the Toxic Release Inventory (TRI) in 2002 for each LMPP county in Iowa and Nebraska. It was computed as a percentage of total annual pounds of releases to air, water, and land for the 22 LMPP counties.

Together with illness and injury rates, the combined animal and industrial waste formed the basis for an overall environmental quality ranking scheme, which provided a representative measure for comparative analysis, as well as an additive function of physical vulnerability to the foregoing social vulnerability scenario. The three environmental quality variables were likewise ranked independently within their respective areas, ranging from 1 to 22, with the most industrially hazardous/contaminated county receiving the highest rank of one and the least, 22. Again, mean rankings were computed for an aggregated environmental quality score, representing the average

standing of each LMPP county based on the cumulative effect of occupational illness/injuries, animal waste, and factory pollution.

Table 6.2 Census 2000 Components: Environmental Quality Indicators of Vulnerability for LMPP County Ranking

County	Animal Waste	Factory Emissions	Illness/ Injury	Mean Ranking
Dubuque	1	1	8	3.3
Dawson	3	4	9	5.3
Woodbury	8	2	12	7.3
Crawford	5	17	1	7.7
Madison	11	3	10	8.0
Colfax	7	5	15	9.0
Douglas	21	6	2	9.7
Black Hawk	12	16	3	10.3
Wapello	18	8	5	10.3
Pottawattamie	10	9	13	10.7
Buena Vista	4	22	7	11.0
Dakota	20	10	4	11.3
Gage	9	7	19	11.7
Cuming	2	13	22	12.3
Marshall	15	19	6	13.3
Hall	12	18	11	13.7
Louisa	16	12	14	14.0
Dodge	14	15	15	14.7
Buffalo	5	21	20	15.3
Saline	17	14	15	15.3
Polk	22	11	21	18.0
Dallas	18	20	18	18.7

Table 6.2 reflects the LMPP county ranking of environmental quality factors.

The highest-ranking LMPP county for animal waste was Dubuque County, home of Farmland's (National Beef) hog operation (in 1997), followed by Cuming, Dawson, and Buena Vista Counties, all hosting IBP facilities that slaughter cattle and hogs. At the forefront of LMPP counties with the most plant-generated pollutant was Dubuque again, followed by Woodbury, Madison, and Dawson Counties. Crawford County (Farmland,

IBP), already cited as the highest-ranked county for cumulative socioeconomic disparities in the study area (see Table 6.1), also ranked first among the 22 counties for LMPP-related illness/injury events. The environmental quality ranking of work-related injury rates and factory pollution thus reveals locational concentrations of multiple exposures to hazards that could aid in determining community resources for disabled workers as well as pinpointing areas for pollution abatement programs.

6.3 Integrated Socio-Industrial LMPP County Ranking

Results from the preceding vulnerability sequencing were integrated to form a composite ranking for LMPP counties in Nebraska and Iowa that numerically illustrates the cumulative impact of socioeconomic and industrial-environmental constraints that almost universally beset Hispanic immigrants upon their arrival in the American slaughterhouse environment. The final composite score for each LMPP county delineates the magnitude of social and environmental vulnerability of a particular county in relation to all of the others. Ultimately, this summary ranking of socio-occupational vulnerability, illustrated in the following section, reminds us that not only people suffer unequally, but also, place vulnerability differs in its propensity to generate spatial disturbances that can greatly influence personal health and well being.

Table 6.3 summarizes the combined effect of ranking LMPP counties by decadal socioeconomic change and current environmental quality indicators. The top four counties – Crawford, Dawson, Woodbury, and Madison – all rank within the upper half

of the most vulnerable LMPP counties in terms of socioeconomic and environmental constraints that were measured in the study. [Appendix F]

Table 6.3 Mean Ranks of LMPP Counties by Socioeconomic Change, Current Environmental Quality, and Cumulative Vulnerability Indicators

County	Socioeconomic Change (Rank 6-17)	Environmental Indicators (Rank 5-19)	Cumulative Average (Rank 14-31)
Crawford	6.6	7.7	14.2
Dawson	9.8	5.3	15.1
Woodbury	8.2	7.3	15.5
Madison	8.8	8.0	16.8
Dubuque	15	3.3	18.3
Colfax	10.6	9.0	19.6
Buena Vista	8.8	11.0	19.8
Dakota	10.4	11.3	21.7
Douglas	12.2	9.7	21.8
Cuming	10.2	12.3	22.5
Marshall	9.6	13.3	22.9
Hall	9.6	13.7	23.2
Black Hawk	13.2	10.3	23.5
Pottawattamie	13.2	10.7	23.8
Louisa	10.4	14.0	24.4
Wapello	15.6	10.3	25.9
Polk	9.2	18.0	27.2
Gage	16.6	11.7	28.2
Saline	13.2	15.3	28.5
Dallas	11.2	18.7	29.8
Buffalo	14.8	15.3	30.1
Dodge	15.6	14.7	30.2

The average rankings associated with negative socioeconomic change and environmental quality show that the highest four counties were fairly consistent in faring badly in both areas: Crawford was first in social, fourth in environmental; Dawson was eighth in social, second in environmental; Woodbury was second in social, third in environmental; and Madison was third in social, fourth in environmental. Cumulatively,

and on a scale of 14 to 31 from worst to best in both areas, Crawford scored 14.2 and Dawson scored 15.1. The fact that these large meatpacking counties with high social vulnerabilities tended to also rank high in industrial risk only serves to heighten immigrant susceptibility in LMPP counties.

Although not a factor in the ranking process, Crawford and Dawson Counties also had very high Hispanic growth rates, at 9 percent and 30 percent, respectively, for the 1990-2000 period. As an illustration of the compound vulnerabilities associated with living and working in LMPP counties, these individual and collective rankings serve to punctuate the fact that high incidences of social disparity and industrial inequity combine to create highly vulnerable people and places. In fact, the intersection of the industrial hazard ramifications on disproportionately arrayed populations of disadvantaged people with an increasing number of vulnerable individuals in LMPP counties points directly to the issue of environmental justice. Consequently, the following Chapter 7 presents an LMPP environmental justice analysis that completes the thesis in its appraisal of disproportionate population attributes in LMPP host areas, including the host tracts of these facilities where adjacent communities are direct recipients of this industry's deleterious chemical emissions.

Chapter Seven

Environmental Justice Analysis

“Although potential health problems depend on the specific nature of the accident, the evidence suggests that even moderate exposure to chemicals such as ammonia and chlorine could result in eye and skin irritations, fatigue, respiratory illnesses, and even death from suffocation” (Chakraborty, 2001:893).

This citation by Chakraborty (2001) refers to exposure regarding accidental spills of toxic chemicals, a very real risk in meatpacking plants today. As highlighted in Chapter Two (Section 2.2.2), ammonia fumes are a concern to meatpacking employees; accidental releases of ammonia (used in refrigeration systems) have also occurred, causing airborne concentrations of the chemical and hospitalization of employees (OSHA, 2004). Chlorine is another highly toxic chemical that is used primarily in the sanitation of our nation’s slaughtering and meatpacking plants. So, along with the foregoing depiction of animal waste and factory pollution, there are these additional industrial toxins to consider in the evaluation of environmental justice.

The analysis of environmental justice (EJ), addressing the spatial coincidence of uneven distributions of underprivileged, disabled and/or minority populations in areas with polluting LMPP facilities, was conducted using a multiple-scale, multi-resolution approach. Although the EJ movement also calls for the overall reduction in toxic burdens assumed by all (Bullard, 1990; Lavelle, in Cutter, 1995), this study focused on the measurement of *equity* in the spatial distribution of the burden of risk. To that end, 18 LMPPs (four were excluded because of data unavailability) reporting emissions of toxic

chemicals to the EPA's annual Toxic Release Inventory were identified by address and census tract. Information on population characteristics relevant to EJ assessment - minorities, disabled and impoverished - were retrieved from U.S. Census 2000. Population percentages were calculated for White, African-American, Hispanic, employment disabled, and individuals living below poverty level at the tract, county and state levels to assess whether disproportionately large numbers of disadvantaged individuals reside within LMPP tracts and counties compared to their respective county and state levels.

A methodology similar to that used by Knezevic and Chakraborty (2004) in their multi-scalar comparison of communities hosting nuclear power plants was employed to delineate environmental inequity concerns in LMPP locales. Their method entailed a calculation of ratios (e.g., percentage of minorities in host tract/ percentage of minorities host county) to illustrate uneven population distributions at multiple resolutions, with a value of 1.0 representing even distribution and anything greater than 1.0 showing an over-representation of the population group under consideration (e.g., minorities) in the host area. In this way, EJ indicators for LMPP host sites were calculated for selected socioeconomic variables, as a representation of tract/county and county/state ratios in concentrations of disadvantaged populations.

Following the approach used by Knezevic and Chakraborty (2004), host tract/county and county/state ratios were computed for six variables of interest: population density (people per square mile), and percentage of White, percentage of African-American, percent Hispanic, percent employment disabled, and percentage of

people living in poverty. The results, summarized in Tables 7.1 and 7.2 respectively, indicate which enumeration units hosting LMPPs have disproportionate representations of various disadvantaged populations. [Appendix G]

Table 7.1 Host Tract/County Ratios by LMPP

Facility	County	Population Density	Percent White	Percent Black	Percent Hispanic	Percent Disabled	Percent in Poverty
IBP	BlackHawk	2.6	0.70	4.31	1.33	2.15	1.21
IBP	BuenaVista	8.4	0.85	1.39	1.88	1.34	1.16
Gibbon	Buffalo	0.5	0.95	0.56	2.93	1.14	0.88
Excel	Colfax	7.8	0.86	1.52	1.64	1.16	1.08
Farmland	Crawford	14.8	0.94	1.96	1.99	1.07	1.07
IBP	Cumming	2.6	0.97	1.34	1.90	1.10	0.91
IBP	Dakota	2.8	0.93	0.87	1.38	1.29	1.21
IBP	Dallas	19.7	0.84	1.80	5.98	1.36	2.24
IBP	Dawson	16.3	0.74	1.63	2.18	1.34	1.17
Hormel	Dodge	3.3	0.94	1.81	2.67	1.16	1.04
Nebr.Beef	Douglas	1.4	1.05	0.28	2.55	1.28	1.73
Swift	Hall	9.0	0.95	1.61	1.38	1.01	1.57
IBP	Louisa	0.8	0.95	1.45	1.84	1.01	0.84
IBP	Madison	0.3	0.94	0.32	2.15	1.01	1.04
Swift	Marshall	24.8	0.76	2.33	3.78	1.30	1.94
PineRidge	Polk	2.7	0.77	2.70	4.55	2.32	3.81
Excel	Wapello	12.1	0.95	3.95	2.70	1.46	2.19
J.Morrell	Woodbury	0.5	0.74	3.89	1.51	3.93	5.66

As seen in Table 7.1, on average, LMPPs have located in census tracts that contain a higher proportion of Blacks, Hispanics, disabled, and impoverished individuals compared to their corresponding county proportions. It also indicates that White residents are under-represented (host tract/county ratio < 1.0) in all tracts with LMPPs, except for Swift & Co. in Douglas County. Conversely, both African-American and poverty are over-represented (ratios > 1.0) in a majority of LMPP tracts, while Hispanic and disabled populations are disproportionately located in *all* LMPP host tracts compared to their

respective counties. The largest ratios and consequently the greatest over-representations can be observed for African-Americans in Black Hawk County (Waterloo, IA), Hispanics in Dallas County (Perry, IA), and disabled and poor individuals in Woodbury (Sioux City, IA).

As previously noted in the county level analysis and rankings (Chapter Six), but now tied specifically to large meatpacking plant locations, relatively high proportions of workers with job-related disabilities reside in Iowa LMPP tracts (Woodbury, Polk, and Blackhawk) where hog slaughtering and processing operations far outnumber beef facilities (mostly in Nebraska). LMPP host tract/county disability ratios range from 1.01 to 3.93, signifying a probable association with hazardous working conditions in and around these slaughtering and meat processing facilities.

Another disturbing association heretofore only addressed on fairly vague county terms, is the direct connection of Hispanic populations residing within the meatpacking environs. The fact that every single LMPP host tract has an appreciably higher proportion of Hispanics than its respective county, reinforces the assertion that Hispanics are not only more vulnerable within the treacherous LMPP factory, but are also disproportionately exposed to deadly toxins from animal waste outside the plants and chemical emissions from plant operations that flow into the air and water. In addition, in all but three tracts, poverty rates were higher in the LMPP host tract than in the county, and several of the highest tracts also ranked high in relative numbers of Hispanics and disabled, signaling the possible accumulation of vulnerable attributes for host LMPP area populations that are already disadvantaged by their proximity to polluting LMPPs.

Table 7.2 Host County/State Ratios by LMPP County

Facility	County	Population Density	Percent White	Percent Black	Percent Hispanic	Percent Disabled	Percent In Poverty
IBP	BlackHawk, IA	4.30	0.94	3.98	0.61	1.13	1.46
IBP	BuenaVista, IA	0.67	0.94	0.18	4.18	0.97	1.17
Gibbon	Buffalo, NE	1.93	1.06	0.14	0.78	0.90	1.12
Excel	Colfax, NE	1.11	0.91	0.02	4.36	1.06	1.08
Farmland	Crawford, IA	0.46	0.99	0.38	2.92	1.19	1.23
IBP	Cumming, NE	0.79	1.07	0.03	0.91	0.69	0.90
IBP	Dakota, NE	3.37	0.88	0.16	3.77	1.08	1.14
IBP	Dallas, IA	1.32	1.01	0.37	1.80	0.82	0.62
IBP	Dawson, NE	1.06	0.91	0.08	4.23	1.17	1.08
Hormel	Dodge, NE	2.95	1.07	0.11	0.65	1.17	0.86
Nebr.Beef	Douglas, NE	60.76	0.90	2.88	1.11	1.13	0.98
Swift	Hall, NE	4.31	0.99	0.09	2.33	1.31	1.20
IBP	Louisa, IA	0.56	1.00	0.13	4.21	1.15	1.04
IBP	Madison, NE	2.73	1.02	0.23	1.44	0.99	1.12
Swift	Marshall, IA	1.32	0.96	0.46	2.99	1.07	1.14
PineRidge	Polk, IA	12.17	0.94	2.42	1.47	1.16	0.88
Excel	Wapello, IA	1.59	1.02	0.47	0.74	1.53	1.47
J.Morrell	Woodbury, IA	2.27	0.93	1.01	3.04	1.19	1.14

Table 7.2 summarizes the comparison of counties hosting LMPPs to their respective states, in terms of the same set of variables. The most obvious trend in Table 7.2 is, again, the higher proportion of Hispanics in the smaller unit of enumeration (county, in this case) compared to the larger (state). Although not as consistent as the tract/county comparison with higher across-the-board ratios of Hispanics, the magnitude of the county/state Hispanic differentials occurs in many (albeit different) host areas. Proportions of African-Americans in three relatively high-density LMPP host counties (Black Hawk, Douglas, and Polk) are higher than state levels, but in all other counties, African-Americans comprise a smaller percentage of the population than at the state-

level. Employment disabled and individuals living in poverty are generally disproportionately arrayed in LMPP host counties versus state, although the ratios indicate less spatial inequity at this resolution than on the tract/county level.

Table 7.3 Comparison of Host Tracts, Counties and States, 2000: Mean Ratios

	Host Tract/County Ratio (n=18)		Host County/State Ratio (n=18)	
	Cases > 1.0	Mean	Cases > 1.0	Mean
Population Density	14	3.59	14	4.86
Percent White	1	0.88	6	0.97
Percent Black	14	1.87	3	0.07
Percent Hispanic	18	2.46	13	2.31
Percent Employment Disabled	18	1.47	14	1.10
Percent Individuals Below Poverty	15	1.71	13	1.09

A summary of host tract/county and county/state mean ratios, shown in Table 7.3, gives a succinct account of the EJ status based on two related measures. The column for ‘Cases >1’ indicates the total number of LMPP host areas (out of 18) where the ratio exceeds one; that is, where the proportion of the variable in the host tract or county is higher than its proportion in the corresponding county or state, respectively.

Summarizing the collective extent of each population variable for the host LMPP areas, the ‘Mean’ column provides the average ratio based on all 18 sites in the study area.

All of the EJ variables (except for percent White) show elevated mean ratios greater than one in the tract/county column, suggesting that within each county, LMPPs are currently located in densely populated tracts characterized by low percentages of Whites and high proportions of Black, Hispanic, disabled, and individuals in poverty.

Host county/state averages show a similar, albeit less pronounced trend in exhibiting

higher concentrations of minority and disadvantaged populations. When comparing the attributes of counties hosting LMPPs to their respective states, the majority of host counties have ratios greater than one and the combined mean values are also over one for density (4.86), Hispanics (2.31), disabled (1.10), and poor (1.09). Differential distribution of African Americans can be found in the contrasting figures from the two geographic scales: while they are not over-represented on the host county/state level (.073), there is a clear indication of their disproportionate standing on the tract/county level (1.87). It appears that while LMPPs are located in predominantly African-American tracts within each host county, they can be found in counties that are predominantly White in Iowa or Nebraska.

As emphasized by other researchers (Cutter *et al.*, 1996; Knezevic and Chakraborty, 2004), this type of cross-sectional analysis highlights the importance of spatial enumeration for EJ assessments in its multiple-scale and multi-resolution approach to explicating population inequities associated with locations of toxic facilities. Overall, from this evaluation of disadvantaged populations in LMPP host areas at multiple levels, there is strong evidence of environmental inequity based not only on individual attributes, but also on the alarming confluence of Hispanics, African Americans, disabled, and low-income denizens in meatpacking plant locations. This disproportionate assemblage of minority and disadvantaged populations near LMPP sites serves to further implicate an already ethically questionable industry that employs more than 205,000 Hispanics nationwide.

Chapter Eight

Conclusions and Recommendations

This thesis focused on three important issues that have received limited attention in the research literature: (1) Hispanic immigration to meatpacking counties in the Midwest; (2) the cumulative socioeconomic and occupational/industrial attributes of Hispanics living and working in these areas; and (3) the environmental justice implications of meatpacking plants that release industrial pollutants. These issues were addressed by:

- measuring the nature and magnitude of the socioeconomic disparity between new Hispanics and other racial/ethnic groups in counties of Iowa and Nebraska that contain large meatpacking plants (LMPPs);
- integrating the social and occupational vulnerabilities of Hispanics in the 22 LMPP counties and ranking them according to ‘place vulnerability’;
- conducting a multi-scalar analysis to determine if LMPPs are disproportionately located in minority and low-income communities; and
- examining the theoretical, historical, and institutional forces that compel the perpetuation of conspicuous inequality in the meatpacking industry.

The results and findings from this multi-layered analysis lead to several key observations. First, LMPP counties in Iowa and Nebraska have witnessed an unprecedented growth in their Hispanic populations from 1990 to 2000. Although LMPP

counties averaged a nine percent increase in this cohort relative to non-Hispanic growth, some of these counties experienced up to three times this rate. Compared to the nine percent LMPP average, the 170 non-LMPP counties experienced a Hispanic growth of below one percent for the decade. High Hispanic in-migration to Iowa and Nebraska LMPP counties has not precipitated elevated unemployment rates, contrary to the popular argument that new Hispanics are depressing job opportunities for native workers. Statistical tests using data from both the U.S. Bureau of Labor and the U.S. Census Bureau revealed no significant difference over the decade between LMPP and non-LMPP counties. In fact, the Census 2000 average unemployment rate for all Hispanic workers in Iowa and Nebraska was 8 percent, compared to only 3 percent for Whites. An increase in socioeconomic disparities from 1990 to 2000 was also evident in LMPP counties compared to non-LMPP counties, a phenomenon that appears directly related to new Hispanic immigrants moving to the former areas. In particular, greater numbers of Hispanic migrants from 1990-2000 coincided with increased foreign-born individuals, higher linguistic isolation, and lower per capita income levels in LMPP areas, indicating a more serious consideration of programs supporting cultural diversity through bi-lingual accommodations and community support.

Second, the LMPP county rankings – socioeconomic, environmental quality, and combined– were constructive in determining which LMPP counties represent/indicate the greatest cumulative vulnerabilities in the study area. The addition of occupational and industrial factors associated with slaughtering and meat processing counties (injury rates, animal and factory waste) to social vulnerability factors captured the thesis objective of

integrating social and industrial immigrant vulnerability. Through the ordering of LMPP counties relative to their overall place vulnerability, it became readily apparent that the four highest-ranking counties also held elevated positions in both the socioeconomic and the environmental quality (industrial) rankings. This consolidation of negative influences on the general wellbeing and coping abilities of populations in specific LMPP counties (Crawford, Dawson, Woodbury, and Madison) should be recognized as an intolerable situation that requires rectification. In addition to the aforementioned recommendations regarding social modifications, increased safety measures (knowledge, equipment, line speed) within LMPPs that reduce hazards and more rigorous pollution abatement strategies need to be developed and implemented.

Finally, the multi-scalar analysis of environmental justice (EJ) not only reinforced other thesis findings, but also spatially highlighted the residential population distributions in specific LMPP locations. Tract/county ratios of selected demographic attributes supported the environmental inequity hypothesis, based on the disproportionately large numbers of African-Americans, Hispanics, employment disabled, and individuals in poverty that reside in the same census tract as an LMPP facility. Although less pronounced than tract/county ratios, Hispanics, disabled, and impoverished individuals are also disproportionately located in counties with LMPPs, in both Iowa and Nebraska. The results also suggest that the choice of geographic scale and resolution influence the results of EJ analysis, as indicated by previous studies (e.g., Knezevic and Chakraborty, 2004; Cutter *et al.*, 1996). While LMPPs are located in census tracts containing a disproportionately larger number of African-Americans at the county scale, they can be

found in predominantly White counties at the state scale. These findings add to previous revelations of socioeconomic disparity and compound socio-industrial vulnerability through their particular focus on LMPP areas.

Through these analyses, it has been shown that LMPP counties have experienced an acceleration of Hispanic immigration over the past decade; that those living and working in counties where large meatpacking plants are sited are not only more socioeconomically vulnerable by virtue of their limited education, language, and earning capacity, but are also more vulnerable to the effects of occupational and environmental hazards. The EJ analysis, while illustrating the inequitable distribution of disadvantaged and minority populations in LMPP host tracts, underscores the alarming conditions that prevail for a growing number of Hispanic immigrants moving to these communities for employment in slaughtering and meat packing factories. A good starting point for reversing this trend of continuing marginalization would involve a comprehensive agenda underwriting proactive community involvement in the working conditions, environmental justice, and corporate transparency/accountability of their meatpacking businesses.

Although this study primarily focused on 22 (of 192) counties in Iowa and Nebraska with LMPPs, these counties host about 80 percent of all meatpacking firms in the two states. As an extension of this research, further investigations need to be conducted into the socioeconomic, health, environmental and cultural manifestations of changing demographics in other slaughtering and meatpacking communities, counties, states, and regions. The vulnerability analysis methodology developed and used in this research can be applied to other states with multiple LMPP establishments (e.g. Illinois,

Kansas, and Texas) to rank counties and communities on the basis of similar socioeconomic and industrial indicators. Through this study, it has also become evident that environmental justice studies are especially relevant to the inequitable distributions of populations and toxic emissions that have been linked with LMPP facilities.

A unique feature of the thesis was the inclusion of work attributes in the analyses, from the illness/injury rates of meatpacking employees to factory-related pollution and employment disabilities. It is believed that this occupational-industrial aspect of life is a critical factor in more fully understanding the vulnerabilities that beset many working people in our society today. Despite data gaps in Bureau of Labor Statistics (BLS) information on occupational illness/injury incidents (county, plant level; racial breakdowns), and widespread under-reportage of accidents by meatpacking firms, exacerbated by an inevitable underestimation of the immigrant meatpacking cohort (undocumented workers), this factor was used in the environmental quality portion of the LMPP county ranking. Because of the importance of considering job safety and work environment issues, hopefully more studies will incorporate this critical element.

Three areas of concern repeated surfaced in the course of this research: (1) the lack of robust data and transparency, not just within the meatpacking industry, but also from our own government agencies; (2) outdated management philosophies in the meatpacking business regarding the treatment of its employees; and (3) a less than positive feeling about Hispanics (particularly Mexicans) by many Americans. In light of these problems, recommendations center on a call for more robust data, especially from our public and governmental databases; strengthened corporate responsibility, either

through revitalization of unions or mobilization of all agricultural workers in the U.S.; and the widespread promotion of multiculturalism and acceptance in our country.

Animosity toward those who are different, less fortunate, and usually most vulnerable (i.e. immigrant) is a notion that has been expressed by the public at large. John Isbister's discussion of the concept of immigrant 'theft', or stealing off the host country (which in turn, assumes that the U.S. belongs exclusively to Americans) may go to the heart of the matter. He questions the validity of this underlying assumption of ownership, however, and concludes that it is faulty given that we are also relative newcomers to our geographic station (Isbister in Bookman, 2002).

Hispanics, particularly Mexicans, continue to be intricately involved in American history and culture. From the railroad and agricultural *bracero* programs of yore to the current market structure held together by millions of foreign-born individuals in the service, agricultural and manufacturing sectors, their contribution to our strong economy is priceless. Unfortunately, reciprocal benefits do not appear to proliferate; indeed, the fact that we have become more of a multicultural, bilingual, and labor-segmented society (rather than one with homogenous hegemony) has fomented contentious debate and explicit displeasure in many American households and factories.

The fact remains, though, that regardless of one's stance on the migration issue, tens of millions of our Southern neighbors are here, and most are here to stay. Once removed, once committed to a source of belonging – even temporarily (migrant) or under unpleasant circumstances (meatpacking plant)– people are naturally beholden to their space; while at the same time, their spatial territory (host community) is reinforced by

their presence. Given this very intimate and critical relationship, fundamental human rights should stand paramount to all else in the final analysis. Therefore, instead of bemoaning the erosion of the ‘White majority’ and the less than preponderant English proficiency among new Hispanic immigrants, perhaps it would behoove the naysayers to embrace their differences, and move on toward a better society by advocating higher education, employment and wage equality, corporate responsibility and community planning for our newest members.

Some researchers have recommended community programs designed to address the proliferation of problems associated with the new siting of a meat plant (Fink, 1998; Stull and Broadway, 2004). Others have pointed to worker democracy and increased mobilization as an avenue of change for the American meatpacker (Horowitz, 1997; UFCW, 2005). Based on the 1906 *Jungle* experience that led to the Federal Meat Inspection Act and increased public scrutiny of working conditions, it would also seem that an overhaul of our current food safety system would likewise result in a more positive working environment in the slaughterhouse. Processing meat for export to the EU slows down the line because of higher meat standards there; in the Netherlands, health officials instead of agricultural appointees oversee meat quality and production speed is determined by safety considerations (Schlosser, 2001). Because meatpacking “cannot be easily dislodged from the political geography of the United States” – due to water supply, transportation networks, and feedgrain/livestock economies-of-scale that cannot currently be matched elsewhere – this remains a relatively immobile industry (Fink, 1998:199). The American slaughterhouse is also here to stay, at least for the

foreseeable future. Advocating policy changes that would hold the meat industry more accountable for food quality, workplace safety, and environmental justice would therefore be in everyone's best interest.

There are seemingly serious, insurmountable issues at every step of the meat ladder, from the chemical cocktails and feed grain campaigns launched to speed up and enhance animal growth, to the decline of peasant farming, oligarchic price fixing, feedlot overcrowding/abuse, toxic waste, E coli, worker injuries and injustices, inadequate housing, schooling, and health care for new immigrant meatpackers, rural ghettos and socially stratified communities, environmental degradation and global warming, but most serious is the perpetuation of the expanding ranks of marginalized people. Rung by rung, however, it is possible to dismantle the ladder. This thesis represents a step toward achieving this goal in fostering a more spatially inviting, inclusive world of universal human rights and social justice.

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Appendices

Appendix A

Global Production, Consumption, Imports, and Exports of Beef and Veal

(1000 Metric Tons, Carcass Weight Equivalent)

Production 2003		Consumption 2003		Imports 2003		Exports 2003	
European Union	8,045	European Union	8,324	Japan	810	Australia	1,264
Brazil	7,385	China	6,274	Russian Federation	650	Brazil	1,175
China	6,305	Brazil	6,273	European Union	517	New Zealand	578
Argentina	2,800	Argentina	2,426	South Korea	445	India	439
Australia	2,073	Russian Federation	2,315	Mexico	370	European Union	437
India	1,960	Mexico	2,308	Canada	273	Argentina	386
Mexico	1,950	India	1,521	Philippines	120	Canada	384
Russian Federation	1,670	Japan	1,324	Taiwan	98	Uruguay	320
Canada	1,190	Canada	1,065	Egypt	93	Ukraine	168
New Zealand	693	Australia	786	Hong Kong	81	China	43
Others	3,968	Others	4,043	Others	226	Others	24
Total Foreign	38,039	Total Foreign	36,659	Total Foreign	3,683	Total Foreign	5,218
United States	12,039	United States	12,339	United States	1,363	United States	1,143
World Total	50,078	World Total	48,998	World Total	5,046	World Total	6,361

Source: United States Department of Agriculture, 2003

Appendix B

Meat Industry Benchmarks

Highlights of Meat Industry During the 20th Century

1906	Federal Meat Inspection Act -Established a national meat inspection system under the umbrella of the United States Department of Agriculture
1920s	Development of cellulose casings and skinless hot dogs replaced natural hot dog casings, reduced costs and increased sales.
1930-1950s	Refrigerated transportation (rail cars, trucks) and interstate system developments drastically boosted long-distance distribution of perishables and meat plants relocated closer to livestock, farther from consumer.
1950s	Vacuum packaging, combined with oxygen-permeable film, extended shelf life of processed meats, opened up export markets
1950s	Fast food chains emerged and hamburgers became an American staple
1958	Humane Slaughter Act regulated animal handling and slaughter practices at meatpacking plants, improving working conditions and meat quality
1960s	Meat packing plants began butchering beef carcasses into smaller sections that were boxed for retailers; this expanded and speeded up distribution
1993 on	E. coli 0157:H7 outbreaks from contaminated hamburger and other foods frighten and anger the public, causing widespread changes in industry standards, government regulations, and consumer specifications

Source: Food Engineering Magazine (2000)

Appendix C

Labor Market Segregation

Worker proclivities, or what people choose to do or not do for a living – which in large part is influenced by wages, working conditions and job mobility - contribute to the bifurcation of the labor market in industrial countries. The ensuing high market economy demand in unpleasant, low-paying jobs with little job security or upward mobility is at the heart of the dual labor market theory (Piore 1979) that argues that international migration is caused by ‘pull’ factors of developed countries instead of ‘push’ factors (high unemployment, low wages) of less developed countries. The pull factors manifest themselves in a permanent, built-in demand for foreign labor and are a product of four major characteristics of modern industrial societies: structural inflation, motivational problems, economic dualism, and labor supply demographics.

Dual labor market theory is demand, not supply-based; is dependent on recruitment versus wage differentials; involves sociological and institutional mechanisms that keep wages low (rather than supply and demand) and is not overly affected by government influence since labor demand is seen as being built into the structural needs of the economy. Wage differential, then, is not a necessary condition for migration. This is why, in many developing countries, families are able to hedge an unstable labor market by having members in both local and foreign labor economies, despite perceived socioeconomic handicaps (Massey, 1993). Even foreign workers recruited for the worst domestic jobs remit significant amounts to homeland families, a phenomena that has become integral to household and developing countries’ sustainability in countries like Mexico where approximately \$9 billion annually is received from US immigrants (representing the third largest source of foreign capital after oil exports and foreign industry), making migration “a policy priority” to Mexican President Vincente Fox (Ostergaard-Nielsen, 2003).

The exploitation of peripheral nations and their marginalized populations by industrialized countries has also been addressed through the world systems theory (Wallerstein, 1974), which is linked to the structure of the world market since the 16th century; that is, capitalism reinforced by colonialism, and later, industrialization. As neocolonial governments and multinational firms continue to capture more and more control of land, raw materials and labor in peripheral regions, migration flows are inevitably generated (Brettell and Hollifield, 2000). While rural-to-urban movements are a common response to this process of market penetration, a simultaneous exodus abroad transpires as “globalization creates material and ideological links to the places where capital originates” (Portes, 2001; see Augelli, 1980; Loescher and Scanlon, 1984; and Stepick and Portes, 1986 for related examples in Haiti and the Dominican Republic).

Ultimately, and perhaps regrettably, the compression of geographic space wrought by electronic communication, mass media networks, and affordable transportation has eased the process of recruiting low-paid immigrants in order to boost profit margins during economic downturns. This growing dependency on immigrant labor production is further intensified by the fact that undesirable, low-wage jobs have traditionally been dominated by teenagers and women, and these native sources are increasingly moving onward and upward, respectively (Massey, 1993). Thus, the need for a replacement labor supply sources has necessitated the hiring of immigrants, a situation that clearly refutes claims that immigrants take jobs from native workers. In fact, studies using aggregated Census data indicate that immigrants have had no significant impact on either native job displacement or wage rates (Castles and Miller, 2003; Passel and Fix, 1994; Bookman, 2002).

This labor market segmentation seems to be more obvious to the American population than its concomitant bifurcation of the immigrant work force within the U.S.. Stereotypically negative myths concerning immigrants’ work status have been met with empirical evidence to the contrary. For instance, such generalizations fall short of reality in the face of 1990 Census data that indicates ‘significantly’ higher average household incomes of legal immigrant households who arrived before 1980 than natives’ household income. Even for recent arrivals (post-1980), average household incomes are only about 7% below those of natives. However, the aggregate nature of these statistics masks the widening gap between the substantial numbers of highly educated, high-earning immigrants and the growing sector of disadvantaged immigrants, of whom Mexicans form an ever-growing majority presence (Passel and Fix, 1994).

Appendix D

U.S. Immigration Law: Timeline of Legislation

- **1924 National Origins Act:** Imposed national quotas.
- **1965 Amendment to Immigration and Nationality Act:** Amended Immigration and Nationality Act by repealing quotas.
- **1986 Immigration Reform and Control Act (IRCA):** An amnesty program that legalized approximately 3.3 million formerly undocumented migrants, imposed employer sanctions for hiring illegal immigrants, and increased enforcement at US borders.
- **1990 Immigrant Act of 1990:** Revised all grounds for exclusion and deportation, signaling a profound alteration of political and ideological premises. Included a ‘provision for diversity’ to ensure availability of visas for immigrants from countries with levels under 50,000 in the preceding five years.
- **1996 Personal Responsibility and Work Opportunity Reconciliation Act (Welfare Reform Act):** Established restrictions of eligibility of legal immigration and broadened restrictions for illegal and nonimmigrant participation in means-tested public assistance programs (welfare). The **Illegal Immigration Reform and Immigrant Responsibility Act**, also passed in 1996, further attempted to strengthen US border control, worksite enforcement, and restrictions on benefits for aliens.
- **2004 Temporary Worker Program:** (Currently being considered by US policy-makers) – Targets the estimated 8 million ‘undocumented aliens’ in the country, most of whom are employed in response to the market demand for their labor. The program would mandate registration and processing of all participants, with attending fees, for a renewable 3-year term with a mandatory return home unless permanent status is granted, ostensibly based on an offer of employment.

(Compiled from the following sources: Bookman, 2002; Magana, 2003; Massey, 1995; and Aguirre, E., 2004)

Appendix E

Data Details: Census, BLS and EPA

Census variables analyzed

From Census2000 Summary File 3:

POPULATION DATA: Geography = Iowa and Nebraska by county

TOTPOP90	Total population in 1990
TOTPOP00	Total population in 2000
HISPOP90	Number of Hispanics in 1990
HISPOP00	Number of Hispanics in 2000
TOTWKR90	Civilian workforce, 1990
TOTWKR00	Civilian workforce, 2000
UNEMPL90	Unemployed workers in 1990, all industries
UNEMPL00	Unemployed workers in 2000, all industries
EMPLYD90	Employed population over 16 in 1990
EMPLYD00	Employed population over 16 in 2000
HISINC89	Average per capita income of Hispanics in 1989
HISINC99	Average per capita income of Hispanics in 1999
WHTINC89	Average per capita income of whites in 1989
WHTINC99	Average per capita income of whites in 1999
HISCLG90	Hispanics who had completed college in 1990
HISCLG00	Hispanics who had completed college in 2000
WHTCLG90	Whites who had completed college in 1990
WHTCLG00	Whites who had completed college in 2000
LINISO90	Linguistically isolated Spanish-speakers in 1990
LINISO00	Linguistically isolated Spanish-speakers in 2000
FB_90_94	Foreign-born that immigrated between 1990 and 1994
FB_95_00	Foreign-born that immigrated between 1995 and 2000
EMPDSBL9	Disabled civilian workers in 1990
EMPDSBLO	Disabled civilian workers in 2000

Bureau of Labor Statistics variables

From BLS 2003 Survey of Occupational Injuries and Illnesses:

HOUSEHOLD DATA: Geography = National

Table 18 Employed persons by detailed industry, sex, race, and Hisp/Latino ethnicity

INDUSTRY DATA: Geography =State (Self-reported)

Table 1 Number of nonfatal occupational injuries and illnesses involving days away from

Appendix E (continued)

work by selected worker and case characteristics and industry, state, private industry, 2002

Table 7 Number of nonfatal occupational injuries and illnesses involving days away from work by industry and race or ethnic origin of worker, 2002

UNEMPLOYMENT DATA: Geography = County

BLS Dataview File Unemployment rates by county, not seasonally adjusted; net changes

Environmental Protection Agency variables

TOXIC INVENTORY DATA: Geography = County by industry

Total toxic chemical releases (fugitive air, ancillary uses, and off-site transfers)

Data sources of environmental quality components: Census 2000; BLS 2002, Scorecard 2004.

Appendix F

Data Detail for Socioeconomic Change Components and Environmental Quality Factors used in LMPP County Rankings

Socioeconomic Data used in LMPP County Ranking

County	Income Disparity	College Education	Linguistic Isolation	New Immigrant	Employment Disability
Black Hawk	0.04	0.00	0.10	2.67	4.53
Buena Vista	0.03	0.01	1.68	7.17	4.12
Buffalo	-0.22	0.01	0.32	1.39	-0.59
Colfax	0.09	0.02	4.18	14.26	0.42
Crawford	-0.39	0.00	0.95	4.59	4.01
Cuming	-0.48	0.00	0.71	2.51	0.04
Dakota	-0.10	0.08	2.37	9.27	0.08
Dallas	-5.64	0.01	0.60	2.85	3.74
Dawson	-0.03	0.04	3.01	12.06	0.31
Dodge	0.00	0.01	0.52	1.58	0.05
Douglas	-0.04	0.01	0.57	3.85	0.29
Dubuque	0.15	0.00	0.07	1.17	3.87
Gage	0.06	0.00	0.00	0.25	0.00
Hall	-0.16	0.01	1.34	5.12	0.16
Louisa	-0.04	0.02	1.19	3.68	5.19
Madison	-0.12	0.00	1.15	3.79	0.07
Marshall	0.01	0.00	0.95	3.72	4.26
Polk	-0.11	0.01	0.33	4.20	5.31
Pottawattamie	0.02	0.01	0.18	0.87	5.55
Saline	0.18	0.00	0.76	3.78	-0.44
Wapello	0.30	0.01	0.11	0.92	5.88
Woodbury	-0.01	0.00	0.80	4.57	5.37

Appendix F (continued)

Environmental Quality Data used in LMPP County Ranking

County	Animal Waste	Factory Emissions	Illness/ Injury
Black Hawk	0.04	0.01	0.07
Buena Vista	0.07	0.00	0.06
Buffalo	0.06	0.01	0.01
Colfax	0.05	0.09	0.04
Crawford	0.06	0.01	0.09
Cuming	0.11	0.02	0.01
Dakota	0.01	0.04	0.07
Dallas	0.02	0.01	0.03
Dawson	0.10	0.10	0.05
Dodge	0.03	0.02	0.04
Douglas	0.01	0.09	0.08
Dubuque	0.13	0.14	0.05
Gage	0.04	0.06	0.02
Hall	0.04	0.01	0.04
Louisa	0.02	0.02	0.04
Madison	0.04	0.10	0.05
Marshall	0.03	0.01	0.07
Polk	0.01	0.02	0.01
Pottawattamie	0.04	0.04	0.04
Saline	0.02	0.02	0.04
Wapello	0.02	0.05	0.07
Woodbury	0.05	0.12	0.04

Appendix G

Data Detail for Environmental Justice Analysis: Population Percentages

County	Tract%White	Co%White	Tract%Black	Co%Black	Tract%Hisp	Co%Hisp
BlackHawk	0.62	0.88	0.34	0.08	0.02	0.02
BuenaVista	0.75	0.88	0.00	0.00	0.24	0.13
Buffalo	0.90	0.95	0.00	0.01	0.14	0.05
Colfax	0.71	0.82	0.00	0.00	0.43	0.26
Crawford	0.87	0.93	0.01	0.01	0.17	0.09
Cumming	0.93	0.96	0.00	0.00	0.10	0.05
Dakota	0.74	0.79	0.01	0.01	0.31	0.23
Dallas	0.79	0.95	0.01	0.01	0.32	0.05
Dawson	0.61	0.82	0.01	0.00	0.55	0.25
Dodge	0.90	0.96	0.01	0.00	0.11	0.04
Douglas	0.85	0.81	0.03	0.12	0.17	0.07
Hall	0.84	0.89	0.01	0.00	0.19	0.14
Louisa	0.89	0.94	0.00	0.00	0.23	0.13
Madison	0.86	0.91	0.00	0.01	0.19	0.09
Marshall	0.69	0.90	0.02	0.01	0.34	0.09
Polk	0.68	0.88	0.13	0.05	0.20	0.04
Wapello	0.92	0.96	0.04	0.01	0.06	0.02
Woodbury	0.65	0.87	0.08	0.02	0.14	0.09

County	Tract%Dsbl	Co%Disbl	TrPerCapInc	CoPerCapInc	Tr%Poverty	Co%Poverty
BlackHawk	0.20	0.09	14613	18885	0.16	0.13
BuenaVista	0.10	0.08	14563	16042	0.12	0.10
Buffalo	0.08	0.07	16192	17510	0.10	0.11
Colfax	0.10	0.08	14719	15148	0.12	0.11
Crawford	0.10	0.10	15727	15851	0.12	0.11
Cumming	0.06	0.05	17641	16443	0.08	0.09
Dakota	0.11	0.09	14679	16125	0.14	0.11
Dallas	0.09	0.07	14654	22970	0.13	0.06
Dawson	0.13	0.09	13308	15973	0.13	0.11
Dodge	0.11	0.09	17178	17757	0.09	0.09
Douglas	0.12	0.09	16264	22879	0.17	0.10
Hall	0.11	0.11	17068	17386	0.19	0.12
Louisa	0.09	0.09	17994	17644	0.08	0.09
Madison	0.08	0.08	15087	16804	0.12	0.11
Marshall	0.11	0.09	11554	19176	0.20	0.10
Polk	0.21	0.09	10747	23654	0.30	0.08
Wapello	0.18	0.12	12376	16500	0.29	0.13
Woodbury	0.37	0.09	6413	18771	0.58	0.10