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Concentrated Animal Feeding Operations: Hazards, Environmental and Health Risks as the Latent Products of Late Modernity

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Concentrated Animal Feeding Operations:
Hazards, Environmental and Health Risks as the Latent Products of Late Modernity

A Thesis

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Master of Arts
in
Sociology

by

Bryan R. Clarey

B.B.A. Middle Tennessee State University, 2009

May 2012

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Dedication

I dedicate this thesis to my four year old nephew, Gage Larry Palmer, for it is your generation that could suffer the most serious consequences of modernized food production, or could find a more environmentally sustainable and safer way of feeding our citizens. I hope it is the latter. With this thesis, I want to teach you to respect the environment and the animals we share it with. I love you more than words can express.

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Abstract

CAFOs raise tens of thousands of animals in confined cages and feedlots, feed them high calorie diets, and ship them to slaughter in record time. These factory farms (as they are sometimes called) devastate neighboring environments with the releases of toxic methane gas and animal waste. Progress in modernized agricultural production has enabled us to feed the growing population but unintended consequences for human health and neighboring communities are happening. This study examines environmental and human health impacts of CAFOs on Central Mississippi residents. Through analyses of existing studies and data and telephone surveys, the objectives will be met. Risk society theory is used to explain the increase of diseases and environmental risks associated with CAFOs in late modernity. The results do not indicate that neighboring residents of CAFOs in Central Mississippi are more likely to have ill health, a negative quality of life, or environmental degradation, overall.

Keywords: CAFO, Risk Society, Environmental Degradation, Food Production, Modernity, human health, community, disease, environmental injustice.

Chapter 1

Introduction

“The admission by ministers of a possible link between mad cow disease and human death confirms the emergence of a new type of political society: I call it the ‘risk society’.”

- Ulrich Beck (1996)

Ulrich Beck’s risk society theory provides a theoretical framework for understanding the increase of diseases and environmental contamination attributed to Concentrated Animal Feeding Operations (CAFOs) or factory farms. With the explosion of population, the need for more food is inevitable and the need for cheap food is expected. CAFOs raise tens of thousands of animals in confined cages or warehouses, fatten them with high calorie, protein rich diets, growth supplements, and antibiotics then ship them off to slaughter in record time. Owners of CAFOs want to make money and provide animal meat to be sold, but animals are treated inhumanely and food safety is of the least concern. In addition, these factory farms devastate their neighboring environments with methane gas and animal waste containing toxins and antibiotics. Society has progressed by the industrialization or modernization of food production which feeds citizens cheaply and quickly. However, these technological breakthroughs in agriculture are causing unintended consequences for human health and the planet.

Throughout this study, there are examples of how CAFOs or factory farms present our society with two major risks: the risk of environmental pollution from current food production and the risk of eating unsafe food. Not only may people become sick and die from the food they are eating, but the environment is polluted as well. About 76 million Americans acquire food poisoning every year and 5,000 Americans die due to food-borne illnesses (Greger 2006). This study will define what the term risk society means and through the literature review, it will give examples of how the mass production of food creates some of the risks addressed by the theory.

The World Health Organization (WHO) states that large, centralized and mechanized animal slaughter plants are causing hazards for the human food chain (Greger 2006). In the name of progress and profit, farmers and food companies make it a priority to increase food production to keep up with the demand of consumers. However, they disregard the quality and health aspects of the product, thus causing both adverse environmental and health consequences.

Society is entering a post-industrial epoch that is full of unintended consequences from the progresses and speeds of production set forth by modernity (Beck 2010). Scientific advancement leads to ramifications that can only be considered unintended and unforeseen. The theory of risk society posited by Ulrich Beck explains how modern society creates unprecedented technological advances, but must now deal with the unintended threats and consequences caused by the very advances modernization is responsible for (Beck 2010).

Reviewing past empirical studies, case studies, and secondary data, the issues of environmental degradation, environmental injustice, and unprecedented health problems associated with CAFOs are addressed. The implications for the risk society theory, the consequences of modernity, and theoretical perspectives on the environment and health are also discussed. Central Mississippi counties are home to a large number of chicken CAFOs. This is the setting where both qualitative and quantitative data were collected to meet the objectives of this thesis.

Contemporary sociologists focusing on environmental issues including John Barry (1999) and Dorceta Taylor (2000), as well as theorists of late modernity such as Scott Lash (1996), Ulrich Beck (2010), and Anthony Giddens (1990) provide the theoretical framework for this study. While there is much quantitative, secondary data on the pollution generated by CAFOs,

more qualitative data is needed describing the experiences of the people living close to CAFOs and the environmental degradation caused by such businesses. Moreover, public perception of CAFOs, including their link to diseases in human health, as well as to environmental degradation and injustice, needs to be further developed. In order to describe how devastating the environmental impact of these organizations is, in-depth interviews must be added in future research endeavors so that the people in affected communities can share their experiences. These experiences can only advance the understanding of Beck's risk society theory (2010) and his assertion that citizens in late modernity are forced to bear the harmful consequences of modernity (Beck 2010). This includes the structures used in the industrial production of animals for food.

The specific audiences this study targets include policy makers and legislators who specialize in the food industry and its production. Environmental sociologists, ecologists, public health specialists, and epidemiologists will find this research to be informative and will want to extend the research presented. The fact that food production using animals is progressing because of innovation, technology, and mechanization, while the consequences and externalities of this are creating human health and environmental hazards, is a central theme of the risk society theory. Because the mass production of animals for food in CAFOs is a risk to our bodies and the environment, this form of modernized food production undermines what it was intended to do: to nourish our bodies.

Statement of Problem

Modernization and industrialization of the current production of animals for food consumption, such as using concentrated animal feeding operations or factory farms, is causing ill health of residents and a decrease in their quality of life, as well as environmental injustice and degradation in the communities surrounding these animal production facilities.

The purpose of this study is to investigate the health and quality of life of people living in close proximity to concentrated animal feeding operations. In addition, the environmental injustice and degradation imposed upon the natural surroundings of these organizations will be addressed in the study.

Objectives

The primary objectives of this study include: first, reviewing the existing literature on the problems caused by CAFOs; second, presenting a theoretical framework in order to explain this problem; and third, analyzing the data and using appropriate methodologies to determine the effects that CAFOs have on their neighboring populations in central Mississippi.

The secondary objectives include: to extend the existing body of knowledge and to make the research available for scientists and governmental agencies. These entities may find this study helpful so they may plan future animal farming in an environmentally sustainable manner. Another objective is to make a contribution to the discourse of environmental sociology.

Chapter 2

Background Information

Concentrated Animal Feeding Operations

Across the globe, four domesticated animals are raised for every person, annually, and ten billion animals are raised and slaughtered in the United States per year (Imhoff 2010). Additionally, the United Nations Food and Agriculture Organization (FAO) expects global meat and dairy consumption to double by the year 2050 (Imhoff 2010). The need to feed this growing meat and dairy consumer demand is attracting the growth and proliferation for concentrated animal feeding operations (CAFOs) or factory farms¹. For example, in 1950, U.S. citizens consumed twenty one pounds of chicken meat per person, per year; by the year 2000, they consumed seventy seven pounds of chicken per year, per person (Imhoff 2010).

“Wherever we look closely at the most egregious assaults on the Earth’s beauty and integrity, we find that the abusive behavior flows from a root cause: a technological and industrial approach to production, land management, recreation, or other economic activity” (Tompkins 2010:viii). Industrial production of animals in CAFOs is designed specifically to achieve economies of scale with speed and efficiency, animal density, and weight gain being primary goals (Imhoff 2010). Animals are confined in inhumane living quarters (often thousands of animals are housed in one warehouse) and overfed with grains, animal waste, and animal parts, and given antibiotics and growth promoting hormones in order to reduce costs, speed up their growth and control any diseases that could wipe out herds or flocks in factory farms. Indeed, animals are fed just about anything to add weight quickly no matter how unsanitary it

¹ “Factory farms” is another term for “CAFOs” and the two will be used interchangeably throughout this thesis.

may be (Imhoff 2010). The animals are also altered genetically to “meet the conditions of their confinement” (Imhoff 2010:xii). For example, chickens are raised for meat (broilers) and are genetically modified to grow larger breast meat at a much quicker pace than regular chickens of non-CAFOs. It takes just 45 days for a broiler to reach “slaughter weight”, whereas before, broilers would live for several months before being slaughtered (Imhoff 2010). At the turn of the 21st century in the United States, CAFOs were killing 7,000 calves, 130,000 cattle, 360,000 pigs, and 24 million chickens per day to meet the demands for meat and meat products (Imhoff 2010).

CAFOs no longer require the use of fertile land and are “independent of geographical conditions” (Graham and Nachman 2010:647). What this means is that industrial food producers do not need land for feeding animals or space for animals to live outside any longer. This is what is considered “the separation of land from livestock” (Graham and Nachman 2010:647). CAFOs have allowed industrial animal producers to move from the traditional seasonal cycle of raising animals, to more continuous production. CAFOs provide 74 percent of poultry, 50 percent of pork, and 43 percent of beef to American consumers (Graham and Nachman 2010).

Proliferation of Animal Waste

With the increase in the number of animals comes an increase in solid, liquid, and hazardous waste. Although some animal waste can be recycled and fed back to the animals, a majority of it is stored in “lagoons” (Imhoff 2010). Different types of CAFOs present different waste problems. Generally, there are two types of CAFOs where animals are housed: the open feed lot facilities and the enclosed facilities. What facilities are used depend on the type of animal being produced (PEW 2008). Beef cattle are usually confined in open lot facilities with concrete or dirt floors and corrals to keep the animals grouped together (PEW 2008). Swine,

poultry, and dairy cattle are typically kept in partially or completely enclosed facilities (PEW 2008). In both open lot and closed facilities, animal waste is collected and transported to a lagoon or waste pit. These lagoons are temporary holding areas for both solid and liquid untreated animal waste (PEW 2008). Waste management is specific to the type of animal housed and the way in which the waste is collected. According to the PEW Commission report, 83% of farm operators apply the manure from open lots onto the land owned or managed by that specific operation (PEW 2008). The same can be said for dairy cattle waste; however, swine waste is collected as a liquid waste (PEW 2008). Over 62 percent of swine CAFOs collect the animals' manure after it falls through the slotted floor underneath the animal, store it in a shallow unit, and then the waste is flushed with water into an outdoor lagoon (called "flushing out") (PEW 2008). When these lagoons become nearly full, the liquid and untreated animal waste is sprayed or irrigated onto nearby farm land (PEW 2008). Poultry, which includes "layer hens" and "broilers", produces "poultry litter" which is a combination of "excreta, feathers, spilled feed, bedding material, soil, and dead birds" and more than 90 percent of this litter is applied to land (PEW 2008:15). In some states it is used as a protein supplement for beef cattle (PEW 2008). Layer hens are housed in battery cages with wire flooring and the manure is collected beneath them. In the Southeastern region of the United States, 42 percent of CAFOs reported "flushing out" as their method of removing waste from the layer chickens (PEW 2008). Broilers are not housed in cages and are allowed to roam on the dirt floor in the confined area. Their manure and litter combination is removed from the housing unit and either applied to the surface of the ground or incorporated into the soil of farms (PEW 2008).

Air emissions, drainage, and runoff of animal waste are some of the environmental impacts associated with CAFOs and it may be impossible to predict or reduce these problems

(PEW 2008). The Clean Water Act and the Coastal Zone Act Reauthorization Amendments (CZARA) prohibit certain types of runoff and prohibit specific discharge management practices (PEW 2008). Both surface and groundwater can be affected by CAFO waste disposal. The waste of cattle and swine equals or exceeds waste produced by humans and this waste must be effectively managed in order to “minimize environmental and public health risks” (PEW 2008:22). For example, a CAFO that is on 100 acres of land generates the same amount of sewerage as a city with 100,000 citizens (Imhoff 2010). Unfortunately, animal waste is not required to be chemically treated in sewerage plants like in metropolitan cities. This untreated, noxious animal sewerage is left in lagoons or waste pits until sprayed on nearby “sprayfields” or buried underground enabling it to seep into the waterways and surrounding metropolitan water sources (Imhoff 2010). According to the PEW Commission Report, bacteria, viruses, parasites, and fungi can all be attributed to CAFOs and the disposal of their waste (PEW 2008). The U.S. Department of Agriculture states that CAFOs produce an average of 355 million tons of waste per year as opposed to the 7.6 million tons of waste generated by residential and commercial facilities and this waste includes salmonella, campylobacter, listeria, and E. coli 0157:H7 (Graham and Nachman 2010).

Another consequence of CAFOs is the spread of E. coli 0157:H7 and salmonella due to the presence of feces in raw meat (Imhoff 2010). In the slaughtering factories, the speed of slaughter is so quick and careless, feces makes its way onto the carcasses and then onto the meat as it is being packaged to be shipped out for consumption (Imhoff 2010). The Centers for Disease Control (CDC) reports that 73,000 Americans per year are sickened by this particular strand of E. coli and the reasons these pathogens spread is due to manure or stomach contents being splattered on the meat in packaging plants (Imhoff 2010).

The John Hopkins University Bloomberg School of Public Health stated that the current industrial methods of farming present risk to public health and the environment, as well as harm to the animals raised for food (Imhoff 2010). The examples and empirical analyses presented in this thesis clearly support this statement and it is the responsibility of governments and CAFO owners to make the necessary changes in order to avoid such risks.

Pandemic

If not properly managed, the intensification of livestock and food production is a recipe for disaster of pandemic proportions. Greger² (2006) explores the emergence of the H5N1 (Avian Influenza) which first appeared in Hong Kong in 1997. This was not the first time avian influenza appeared in society. The 1918 Flu, humanity's greatest killer, came from avian influenza, according to a report in October 2005 and had a global mortality rate of five percent (Greger 2006). H5N1 is a more lethal strain of the same pathogen that kills fifty percent of its victims. Indeed, the current H5N1 Avian Influenza is so virulent that it is counteracting the human body's antiviral defenses (Greger 2006). The first death in Hong Kong due to H5N1 showed scientists that the virus could spread across species – from birds to humans (Greger 2006). The second person to die in Hong Kong due to H5N1 was a 13 year old girl which only confirmed the fear that a virus “strictly for the birds” was now definitely sickening people (Greger 2006).

The Centers for Disease Control and Prevention (CDC) and its journal *Emerging Infectious Diseases* (EID) published a study on H5N1 in Hong Kong chicken farms during the beginning of 2002 (Kung et al. 2007). Although retail marketing of live poultry, a cultural norm

² Michael Greger, MD is the Director of Public Health and Animal Agriculture with the Humane Society of the United States. Dr. Greger is a graduate of Cornell University School of Agriculture and Tufts University School of Medicine. His book *Bird Flu a Virus of Our Own Hatching* was published in 2006 and is referenced in this thesis.

in Asia, was discovered to be the cause of the H5N1 outbreak, the virus was discovered in both retail markets and chicken farms (Kung et al. 2007). The first outbreak in 1997 in Hong Kong evidenced the first transmission of the H5N1 to humans, resulting in 18 cases and 6 deaths, and was controlled “by slaughtering all poultry in all markets and local farms, and stopping the trading of live poultry for seven weeks” (Kung et al. 2007:2). H5N1 was not seen again until 2001 with only retail live markets being affected (Kung et al. 2007).

In January 2002, again the virus was found in both retail live markets and densely populated chicken farms (Kung et al. 2007). In March, seventeen farms located within 2 kilometers and four farms located within 2 to 5 kilometers of the “index farm” (the first farm to be tested positive for the virus) were treated with depopulation, enhanced biosecurity, and vaccinations used to control the outbreak (Kung et al. 2007). Interestingly, the 22 affected farms were “clustered” in three different geographical areas with 17 in Kam Tin, 1 in Hung Shui Kiu, and 4 in Pak Sha (See Figure 1: Map of Hong Kong below) (Kung et al. 2007).

The spread of the virus in Hong Kong is interesting due to the affected farms being in such concentrated areas. The chicken CAFO industry in the United States is set up similarly to Hong Kong’s. The poultry industry in Mississippi is concentrated in the middle of the state with billions of pounds of chicken meat being produced in a rather small geographic area (Mississippi.org Agricultural Maps 2011). One conclusion of the Hong Kong EID journal study is that the location of the affected farms being so geographically close to one another presented the opportunity for the virus to spread rapidly amongst farms or the farms were infected by one source of infection (Kung et al. 2007).

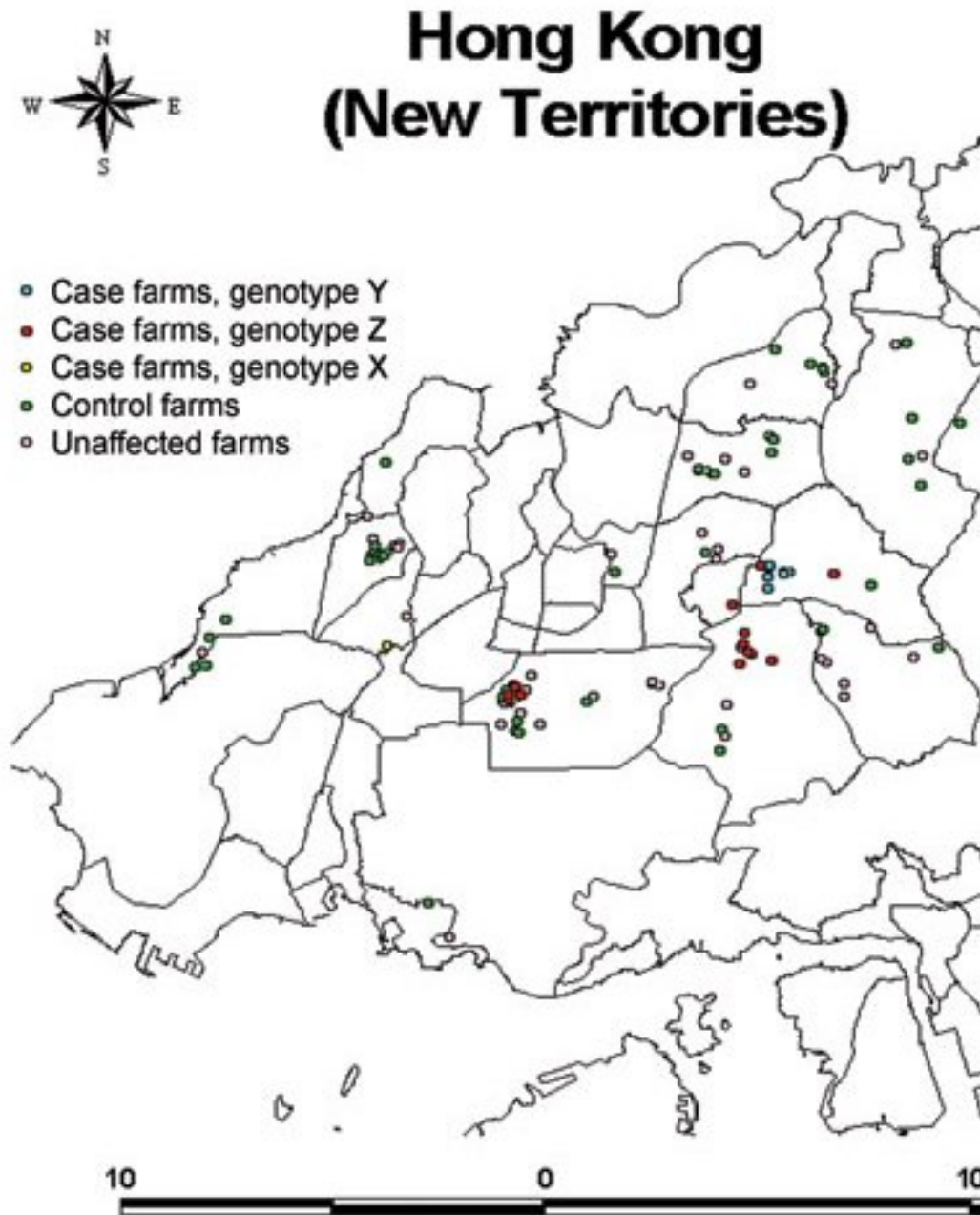


Figure 1. Map of Hong Kong
Source: (Kung et al. 2007)

H5N1 starts in the lungs and spreads throughout the human body via the bloodstream, damaging and destroying the organs. In 2005 the *New England Journal of Medicine* published

the first case of deadly “human-to-human transmission” of H5N1 (Greger 2006). The International Food Policy Research states that high concentrations of animals can become breeding grounds for disease (Greger 2006). CAFOs are examples of “high concentrations of animals”. The increasing number of zoonotic diseases (diseases that are able to jump from animal to human) is expected to continue (Greger 2006). The director for Harvard’s Center for Health and the Global Environment stated that the domestication of animals is the reason for the influx of diseases to humans (Greger 2006). The Smithsonian posits there have been three major epidemiological changes in human history: The first was due to the domestication of animals in agriculture, the second was the “diseases of civilization” such as cancer, heart disease, and stroke. The third epidemiological change is now occurring and it is the re-emergence of zoonotic diseases (Greger 2006). Again, the increase of consumer demand for cheaper food and agribusiness firms’ quest for capitalist expansion has led to the growth of CAFOs, which may have played a role in the third epidemiological change (Greger 2006).

If a pandemic were to occur, 90% of the country’s 4,000 emergency departments would be (and are) understaffed and overcrowded (Greger 2006). Adding to the chaos “nearly half of the local health department workers are likely not to report to duty during a pandemic” according to a John Hopkins survey of public health (Greger 2006:68). This is exactly what occurred during the SARS crisis in Toronto. Dr. Greger’s tone in *Bird Flu: A Virus of Our Own Hatching* is not “if” the pandemic occurs but “when” it occurs the speed of infection around the globe would be quite frightening. During the 1918 Influenza the entire planet was overwhelmed within weeks and that was before airline travel (Greger 2006). In April 2005 then President George W. Bush authorized the use of quarantines inside the United States if a pandemic were to affect society (Greger 2006). It is hard to imagine what would happen to society if an H5N1 pandemic

was to occur. Many institutions in society such as the travel industry, the retail industry, universities and colleges, schools, office buildings and grocery stores would come to a grinding halt, surely devastating society.

Environmental and Health Consequences

David Kirby's book, *Animal Factory* (2010) exposes how several areas of the United States are dealing with pollution and health problems associated with factory farms. He discusses several specific instances of factory farms negatively affecting American society in different regions, including Iowa, Illinois, and the Delmarva Peninsula³. The Eastern shore of the Chesapeake Bay, being the western border of the Delmarva Peninsula, is home to many CAFOs that produce one million tons of manure per year. However, there is one particular state that has experienced unusually high numbers of pollution rates due to the proliferation of factory farms in their area. North Carolina has the second highest number of factory farms, second only to Iowa, and Kirby follows a man named Rick Dove through his experiences as the Riverkeeper of the Neuse River in North Carolina. He documents the multitude of negative environmental and health consequences that people living and working on the Neuse River's banks have endured since the beginning of the 1990's. The river's banks and tributaries are home to a number of factory farms that have continually polluted the waterways and have negatively affected the health of people who come in contact with the river (Kirby 2010). The fishing and tourism industry in the state, as well as the socio-economic stability of the area are in jeopardy.

It is important to understand why CAFOs or factory farms present such negative environmental consequences and cause so many problems. Kirby (2010) outlines several

³ The Delmarva Peninsula is the geographic location where the states Delaware, Maryland, and Virginia intersect and the Chesapeake Bay borders the peninsula on the western side.

reasons in the introduction section of his book. According to the U.S. Environmental Protection Agency (EPA), “manure can contain pathogens, antibiotics, drug-resistant bacteria, hormones, heavy metals, and other compounds that can seriously impact human health, aquatic life, and wildlife when introduced into the environment” (Kirby 2010:xv). Unlike human waste, animal waste is not treated to kill pathogens and some animal waste, such as hog manure, has 10 to 100 times more concentrated pathogens than human waste (Kirby 2010). Also, open cattle feedlot odors contain 170 separate chemicals that cause a variety of human health concerns, and rearing cattle in open lots produces more greenhouse gases than cars (Kirby 2010).

Rick Dove was the licensed Riverkeeper of the Neuse River in North Carolina. His home was on the Neuse River and he had grown up swimming in the same river, but around 1990 fish were dying in unprecedented numbers (Kirby 2010). It wasn't until 1993, after years of investigation by Dove, that he would find out what was killing the fish in the Neuse River. Several CAFOs had opened upriver from his home over the years and animal waste was entering the river and its tributaries. A toxic organism called *Pfiesteria* was found to be the culprit of the fish kills but the fish were not the only living creatures it was affecting (Kirby 2010). Fishermen started to complain of memory loss, passing out in their boats, and developing red sores on their skin. Rick Dove was experiencing the same symptoms (Kirby 2010). The reason for the *Pfiesteria* increase was the over-pollution of nitrates in the river that was coming from the animal waste from hog factory farms (Kirby 2010). Furthermore, the pollution was not just coming from the animal waste emptying into the waterways; air emissions from the waste lagoons and the CAFOs themselves were carried in the air and then settled onto the nearby land and waterways (Kirby 2010). In short, it was not only a matter of hog manure seeping into the river and its tributaries, but also of air pollution from the CAFOs negatively affecting the waterways.

Kirby (2010) discusses the idea of environmental racism and injustice in his book and highlights the advocacy work done by Gary Grant⁴ living in Tillery, North Carolina. Grant called Rick Dove in 1996 to discuss CAFO placement of multiple swine facilities in Tillery. Interestingly, Grant had been working with a “young researcher at the University of North Carolina at Chapel Hill, Steve Wing” (Kirby 2010:154-155). Grant and Wing had been documenting the sudden increase of hog CAFOs happening mainly in poor African-American communities in North Carolina where “twelve of the top fifteen hog producing counties had black populations over 30 percent” (Kirby 2010:155). Their work together contributed to a published paper in *Environment and Urbanization* in 1996 (Kirby 2010).

In 1994, then President Bill Clinton ordered agencies to begin addressing these issues (Kirby 2010). However, when policy action is decentralized (more than one body of government is making the policies at a given time and policy decisions are not made by a central figure), little policy action takes place (PEW 2008). It is well-known that competitive federalism (governments with more than one form of government like the United States) causes policy makers to choose between creating new jobs and protecting the environment. Unfortunately, environmental protection routinely takes a back seat to what the government deems most necessary to improve our nation. The creation of jobs and wealth take precedence over environmental issues time and time again. The explosion of swine CAFOs in North Carolina, as in many other states, fiscally improved state and federal tax dollars, but the unforeseen costs and externalities greatly outweigh these improvements. Choosing to place these environmentally detrimental facilities in poorer communities is an example of big agribusiness choosing “the path of least resistance” (Bullard 1994:xv) precisely because in these poor communities citizens are

⁴ Gary Grant was the Director of Concerned Citizens of Tillery (CCT), a civil rights and social justice group located in Halifax County.

less likely to protest, either because they lack a uniform voice of resistance or lack the financial resources to do so (Wilson et al. 2002). Wilson et al. (2002:199) expands on Bullard's quote by stating "The majority of the Mississippi's industrial hog operations are located in areas with high percentages of African Americans and persons in poverty...supporting the idea that industrial pollution sources are disproportionately located in proximity to non-White and low income communities."

Previous Studies

There are several studies addressing specific aspects of CAFOs. Among these, Wilson et al. (2002) used environmental and census data to scrutinize the environmental justice problems associated with swine CAFOs in Northeast Mississippi (2002). The Mississippi Department of Economic and Community Development issued financial bonds in order to increase agricultural production under the emerging crops fund, which include CAFOs (Wilson et al. 2002). The study found the majority of swine CAFOs to be located in predominately non-White, poverty stricken areas, supporting the idea that CAFOs are consistent with the patterns of environmental injustice and racism (Wilson et al. 2002).

Other empirical studies have shown that CAFOs pollute the surrounding air with irritating substances (Wing and Wolf 2000; Chapin et al. 2005; Walker et al. 2005). These substances "include ammonia, hydrogen sulfide, methane," veterinary toxic wastes, bacteria, fungi, and endotoxins (Mirabelli et al. 2006:591). All of these emissions have been shown to negatively impact the health and quality of life of not only the workers in the CAFOs and their families, but also the neighboring populations (Mirabelli et al. 2006). People in close proximity to swine CAFOs reported "increased occurrences of headaches, runny nose, sore throats,

excessive coughing, diarrhea and burning eyes” (Mirabelli et al. 2006:591). Similar to Wilson et al. (2002), Mirabelli et al. (2006) also found CAFOs to be located mostly in minority and poverty stricken areas; another study supporting the idea of environmental injustice and racism. Moreover, children of CAFO workers in Iowa have higher rates of asthma than children not living in CAFO areas (Walker et al. 2005). The University of Iowa study found that people living near swine CAFOs reported higher incidents of “headaches, respiratory problems, eye irritation, nausea, weakness of the body, and chest tightness” (Walker et al. 2005:353).

Mirabelli et al. (2006) conducted their study to assess the effects of CAFO odors and airborne discharges on neighboring seventh and eighth grade students and staff members at elementary schools in North Carolina. The schools were used as test populations because a child’s respiratory tract is still in development as opposed to an adult’s tract. Thus, there is a greater risk for children to be exposed to the airborne toxins present in surrounding CAFOs and factory farms (Mirabelli et al. 2006). The survey was conducted on the students during the 1999-2000 academic year at 499 public schools and a follow up survey was later conducted at the same schools’ employees during the 2003-2004 academic year (Mirabelli et al. 2006). An elevated presence of asthma in children attending schools within three miles of CAFOs had been previously reported; therefore a radius of three miles was used in the study (Mirabelli et al. 2006). Schools within three miles of CAFOs were surveyed. Socio-economic data were collected for all participating schools, with determining participation in the National School Lunch Program for existing students (Mirabelli et al. 2006). The students’ participation in the lunch program indicated whether he or she was in a low or high SES category (Mirabelli et al. 2006). Race was categorized as “white” or “non-white” (Mirabelli et al. 2006). This demographic data determined whether CAFOs or factory farms were more prevalent in low SES

regions or more affluent SES regions, as well as which pre-determined category of race these CAFOs were most prevalent in (Mirabelli et al. 2006).

The results of this study indicated that high SES (more affluent) and high white geographic areas had the lowest number of schools located within a three mile radius of a CAFO (Mirabelli et al. 2006). Having a CAFO within the three mile radius was more “prevalent in schools with low-white/low-SES enrollment compared with schools in the highest category of white enrollment and SES” (Mirabelli et al. 2006:593). Furthermore, CAFO radii adjusted to include two miles geographically indicated a higher number of schools with “low-white/low-SES enrollment” than “schools with high-white/high-SES enrollment” (Mirabelli et al. 2006:593).

The study also measured the schools’ employees’ perception of livestock odor and whether or not it was noticeable both inside and outside the school buildings (Mirabelli et al. 2006). The surveys sent in the 2003-2004 academic year were used to attain this data which reported that “overall, the average livestock odor rating was...between ‘faint’ and ‘moderate’” and the reported perceptions of livestock odors and the strength of the odors decreased with the “increasing distance to the nearest swine CAFO” (Mirabelli et al. 2006:593). In addition, low socio-economic status categorized schools reported the highest occurrences of odors from livestock and low occurrences of odors was reported in “high-white/high-SES enrollment” (Mirabelli et al. 2006:593).

Mirabelli et al. (2006) was unable to conclude whether these odors contain irritating substances likely to cause respiratory illnesses because of lacking scientific analyses of the air, but the study does report that odors from CAFOs are more prevalent in schools that have students enrolled belonging to a lower socio-economic status demographic (Mirabelli et al.

2006). The study was also able to state there are higher numbers of swine CAFOs in regions with schools that participate in the National School Lunch Program, indicating these schools and their students belong to a lower SES demographic as well (Mirabelli et al. 2006). Themes of environmental injustice and racism may be suggested from this study and further research is warranted to support these suggestions.

The Community Health Effects of Industrial Hog Operations (CHEIHO) study of how malodor from CAFOs affects neighbors' mood and psychological well-being was a "collaborative community-based participatory research project...conducted in the low income African American communities of rural Eastern North Carolina where industrial hog operations are disproportionately located" (Horton et al. 2009:S610). One of the strengths of the CHEIHO study is the community-based support it received from citizens in the communities being studied, who were "essential to the recruitment and retention of study participants in predominately African American communities with historic distrust of researchers and research institutions" (Horton et al. 2009:S610). The research staff placed air monitoring trailers in sixteen neighborhoods with equipment to collect hydrogen sulfide⁵ and particulate matters which are known to be present in the air surrounding swine CAFOs. Each neighborhood trailer was, on average, 1.10 miles from the nearest swine CAFO, the range being between .56 miles and 1.50 miles (Horton et al. 2009). In addition, the average distance from these monitoring trailers was .20 miles, the range being .003 miles and .36 miles for 15 of the communities; one community had an average of .95 miles between the monitoring trailer and homes in the community (Horton et al. 2009).

⁵ Hydrogen sulfide (H₂S) is a "product of anaerobic decomposition of hog waste" (Horton et al. 2009:S611).

The study's participants lived within 1.5 miles of at least one swine CAFO and collected data from the monitoring trailers and by filling out questionnaires for two weeks, twice per day. Participants were asked to spend ten minutes outside before filling out the questionnaire. After the two year study, there were 101 participants and 2,666 numbers of records (Horton et al. 2009). The results showed that nineteen percent of the responses indicate the person filling out the survey felt "stressed or annoyed", thirteen percent felt "nervous or anxious", twelve percent felt "gloomy, blue or unhappy", seven percent felt "angry, grouchy, or bad-tempered", and five percent felt "confused or unable to concentrate" (Horton et al. 2009:S612). However, when the researchers adjusted for the time of day, such as 7a.m. vs. 7p.m., the results differed. Increasing levels of hydrogen sulfide were associated with feelings of stress, annoyance, nervousness, and anxiety; feelings of anger, grouchiness, confusion and the inability to concentrate were associated with the increases in malodor (Horton et al. 2009).

The CHEIHO study conducted in depth interviews some participants before and after the collection phases (Wing et al. 2008). The in depth interviews conducted before the collection phase offered many advantages to the study including: identifying relevant questions to be asked on the self-administered questionnaires handed out with the daily diaries to be filled out by participants (Wing et al. 2008). The interviews conducted after the collection phases helped to provide a context to interpret the quantitative data gathered and gave evidence regarding how the study participants were impacted by the whole experience (Wing et al. 2008). Horton et al. (2009:S614) make an interesting statement at the very end of that article: "Recognizing that health is a state of well-being, and not merely the absence of disease, public health and environmental professionals should consider the impacts of environmental malodor and its potential role in magnifying health disparities"

A study by Wing and Wolf (2000) obtained data on industrial hog and cattle production in North Carolina and its effects on neighboring citizens. The study begins by describing the health problems that persons living near CAFOs have reported. People “who lived in the vicinity of the intensive hog operation reported higher frequencies of 14 to 18 physical health symptoms, especially respiratory symptoms” (Wing and Wolf 2000:233). Respiratory symptoms include: runny nose, sore throat, excessive coughing, and burning eyes while other symptoms reported include headaches and diarrhea (Wing and Wolf 2000). The methods of their study included a structured questionnaire given to respondents by an interviewer. After the structured questions were administered, the interviewer asked about environmental issues that may have affected their health and the health of others in their households (Wing and Wolf 2000). Respondents were eligible to participate in the study if they had lived in the household for the previous six months or longer and were 18 years of age or older (Wing and Wolf 2000).

Interviewers were trained to administer the survey instrument and to explain the importance of the survey to the respondents (Wing and Wolf 2000). In the interview, the respondents were asked if the environment around their house affected their life and health and if other members of their household were affected (Wing and Wolf 2000). The problem of livestock odor was presented and then interviewees were asked if the livestock odor affected any of the following: limited recreation; respiratory symptoms; the ability to open windows; well contamination; breathing abilities; nausea; increase in flies and insects; dust or noise; children’s recreation; skin symptoms; decreased property values (Wing and Wolf 2000). Wing and Wolf (2000) state that limitations of this study were the “lack of environmental exposure monitoring data” and that future research could include “individual exposure assessment” and a “follow-up of exposed communities” (238).

Harris Ali's (2004) Walkerton, Ontario case study is qualitative in that the methods used included a "social autopsy analysis" (Ali's own description of an otherwise case study method) of the events that took place in Walkerton. This "Social Autopsy" encompasses the review of academic articles, the Inquiry Commission, and the attending of several Inquiry hearings in Walkerton (Ali 2004:2602). Local media reports were also part of the methodology and the collection of data was directed to the "identification of underlying socio-political and ecological processes" (Ali 2004:2602). Half of the citizens of Walkerton were infected with E. coli 0157:H7, seven of them dying, due to the presence of the bacteria in their water supply. It was determined that high numbers of CAFOs in the area were responsible for the pollution. This study will ask about water sources and water quality in Mississippi to measure whether there could be something wrong with the water in the respondents' homes due to possible contamination by CAFOs' operations. An expanded synopsis of Ali's study is highlighted in an upcoming section in this thesis.

In a study published in the Boston College of Environmental Affairs Law Review, Lessing (2009) states that (due to Congress and the Food and Drug Administration (FDA) promoting agribusiness to use sub-therapeutic levels of antibiotics in CAFOs), "doctors, scientists, and journalists have watched and protested as drug-resistant strains of bacteria known sensationally as superbugs, have become increasingly prominent in hospitals and areas surrounding livestock operations" (463). People, who contracted these superbugs, suffer prolonged illnesses and death (Lessing 2009). These instances are not isolated to consuming meat products produced at these CAFOs. Workers in these animal facilities contract diseases and pass them on to family members and friends (Gilchrist 2007). The following study lists some of the diseases linked to factory farming.

Sayre (2009) lists five of the major prevalent diseases linked to factory farming. *Campylobacter* is the most common cause of foodborne illness in the United States and is most prevalent in chicken and turkey. It usually does not require medical attention; however, there are increasing numbers of *campylobacter* infections that are resistant to antibiotics used to treat them, prompting the FDA to ban these types of antibiotics being used in poultry production (Sayre 2009). MRSA causes deadly infections in susceptible people and the bacteria used to be problem in hospitals only, but now it has become a “community acquired” bacteria with the rise in factory farms (Sayre 2009). The European Food Safety Authority Report (2009) discusses the existence of MRSA in animal agriculture and found over twenty percent of Dutch pig farmers were carriers of the bacteria (EFSA Report 2009).

Sayre (2009) further links three more bacteria associated with factory farms including *Salmonella*, *E. coli* 0157:H7, and *Enterococcus*. There are 1.4 million cases per year in the United States of *Salmonella* infection and one strain of the bacteria is resistant to five major antibiotics (Sayre 2009). *E. coli* 0157:H7 is the deadly strain of an otherwise harmless bacterium with ground beef being the food most commonly contaminated (Sayre 2009). Lastly, *Enterococcus* is a group of bacteria that target the intestines of humans and in Europe the vancomycin-resistant *Enterococcus* (VRE) strain is resistant to antibiotics because of the overuse of antibiotics (vancomycin for example) in factory farms (Sayre 2009).

Numerous empirical studies have investigated the human health effects that CAFOs present to society, but the study by Chapin et al. (2005) conclusively links the feeding of sub therapeutic antibiotics to factory animals destined for food production, to human illnesses such as salmonella and enterococcus. The researchers collected air samples in vicinities of CAFOs and tested the samples for antibiotic-resistant bacteria, of which they found enterococcus,

staphylococci, and streptococci and all were resistant to several antibiotics (Chapin et al. 2005). It also has been documented that pork products sold to consumers are filled with these antibiotic resistant pathogens through the food the animals are fed. However, it was the goal of this particular study to link the air in and surrounding the CAFOs as a potential “exposure pathway for the transfer of bacteria to the animals” (Chapin et al. 2005:137).

In addition, food that is fed to animals confined in CAFOs is not what they were naturally intended to eat. The most unsanitary feeding practices include a diet of rendered animals and animal waste (Sapkota et al. 2007). Not only does this have negative health implications for the animals eating it, but human consumption of these animals leads to disease and illness in society. In December of 2003, the first U.S. case of bovine spongiform encephalopathy (BSE or Mad Cow Disease) was found in a dairy cow in Washington State leading to increased regulation of food given to animals reared for human consumption (Sapkota et al. 2007). Sapkota states that so much attention is focused on one facet of animal feed (rendered animals causing BSE), “it is necessary to examine the full spectrum of feeding practices and assess their potential human health implications collectively.” (2007:663)

Public Perception of CAFOs

Bovine Spongiform Encephalopathy (BSE) or as it is commonly called “Mad Cow Disease” is a risk created by the modernization of feeding and rearing cattle. When meat that is tainted with BSE is consumed by humans, the consumer may develop a “fatal neurodegenerative disease” called Creutzfeldt-Jakob Disease (Vcjd) (Davidson and Bogdan 2010). Moreover,

CAFOs present contradictions in our advanced industrial society and Beck's risk society theory is a central theme throughout the study (Davidson and Bogdan 2010). For example, CAFOs are constructed and utilized to feed large numbers of citizens but the feeding practices in these facilities have contributed to the death and illness of many people.

The authors researched the role media played in response to the outbreak of BSE in Alberta in May of 2003 and they present a clear picture of how news organizations handled the outbreak and ultimately influenced consumers' perception of food and its production. For example, the authors stated that the media framed the BSE crisis by using strategic language and also analogies of BSE to AIDS (Davidson and Bogdan 2010). This sensational and twisted, not to mention untrue, analogy further contributed to the misunderstanding of and the separation of food production from the public. Their study did bring a crucial topic to the forefront of peoples' minds: Perceptions of CAFOs either by urban citizens or by the people living close to them which is an important factor in my thesis and the following study in Ohio discusses it further.

Sharp and Tucker (2005) discuss how operating permits were revoked for a firm responsible for 15 million birds in egg laying chicken farms across three counties in Ohio due to resistance from local citizens of the firm's presence in the communities and their failure to follow environmental regulations. The firm was forced to stop operations and shut down all facilities in 2003 (Sharp and Tucker 2005). Prominent concerns at the community level include the "stress large-scale production facilities place on the physical environment" (210), including manure management and the quality of water in the community (Sharp and Tucker 2005). Moreover, concerns about the environment and other problems affecting quality of life are also in the forefront of citizens' minds. Colorado and Florida voters are voicing their opinions at the

polls regarding “acceptable livestock production practices” (Sharp and Tucker 2005:209). Both states’ citizens have regularly voted against CAFOs in some way.

In order to understand public concerns regarding CAFOs, which they refer to in their study as “large livestock operations”, Sharp and Tucker (2005) mailed questionnaires to Ohioans and achieved a 55.6% response rate equaling 4,013 completed questions. In order to test the respondents’ familiarity with livestock operations, a question on the survey asked “Are you familiar with some of the issues related to large-scale livestock and poultry production facilities in Ohio?” (Sharp and Tucker 2005:215). Knowledge of nearby livestock farms, not necessarily the proximity of the CAFO to the respondent’s residence, is found to be “strongly related to the issues of livestock development” (Sharp and Tucker 2005:223). If a person knows what a CAFO is, they are more likely to know about the issues associated with them. However, the proximity of the respondent to the CAFO is only “modestly related to overall concern” (Sharp and Tucker 2005:223).

In addition, Holt (2008) describes Smithfield Food’s purchase of shares in a rival company in North Carolina, although Smithfield Foods had been building CAFOs in the state throughout the 1990’s. Smithfield Foods tried to expand even further but North Carolina passed a moratorium in 1997 on the production of new swine CAFOs. After Smithfield Foods met opposition to expansion from the state and concerned citizens (such as Rick Dove mentioned earlier), hurricanes Dennis and Floyd devastated North Carolina in September of 1999 (Holt 2008). The flooding caused by the two hurricanes led to the overflow of manure lagoons and thousands of dead animals that were trapped in the CAFOs (Holt 2008). Those scenes “had a lasting impact on the public perception of the risks associated with CAFOs” (Holt 2008:170).

The Case of Walkerton, Ontario, Canada

The negative consequences of modernization and industrialization have been prevalent in the realm of food production for some time and Harris Ali's (2004b) study "The End of Nature and the Emergence of Disease in the Risk Society"⁶ exemplifies how modern industrial agriculture is a major cause of pollution of waterways and increased diseases and illnesses among people living close to CAFOs. Ali (2004b) discusses the deadly outbreak of *E. coli* 0157:H7 in Walkerton, Ontario, Canada, a small farming community northwest of Toronto. During May of 2000, half of the town's population became sick and seven died because of an *E. coli* 0157:H7 contamination of the local water supply (Ali 2004b). There were two explanations for this contamination, the first being the water utilities manager was found guilty of not properly cleaning the water (through various techniques) and falsifying documents (Ali 2004b). The second explanation for the contamination has to do with the over-abundance of fecal matter in lagoons from cattle farms in the area (Ali 2004b). In Walkerton, as in all factory farm manure lagoons, the lagoon containing fecal matter is sprayed on farm fields that cannot handle the volume of manure, causing run off into water supplies used for human consumption (Ali 2004b). This problem, coupled with the malfeasance of the utility company caused half of the population to become sick and seven people die. This study is an example of how the manipulation of the farming industry in the name of profit leads to human suffering from its unintended and environmental consequences.

The United States Government Accountability Office (GAO) states there are more than thirty new lethal types of food-borne and waterborne pathogens and the number of these

⁶ Article entitled: *A Socio-Economic Autopsy of the E. coli 0157:H7 Outbreak in Walkerton, Ontario, Canada* discussed previously in this thesis.

outbreaks has risen from 533 cases in 1990 to 1,414 in 2000 (Ali 2004b). Societies around the globe have witnessed a larger trend in new and re-emerging infectious diseases and one cause could be human-induced environmental changes. The case in Walkerton was caused by human-induced environmental changes. Industry has manipulated food production in order to produce more food, faster, and cheaper to meet the needs of the consumers, as previously mentioned. As Beck's risk society theory argues, while this may be a sign of progress it also has paved the way for unintended adverse health consequences. In short, with a major increase in the number of animals used in food production come major increases in animal waste, which if not properly and adequately disposed of, can make people sick.

Interestingly, in the 19th century, Karl Marx's theory of a metabolic rift stated that natural soil nutrients were not being returned to the land "via the waste products of humans and animals" (Ali 2004b:12). Ali proposes that today we are again experiencing a metabolic rift but that the "rupture of the symbiotic relationship between humans and nature has occurred not because of a deficit in the return of soil nutrients to the land base, but because of an excess addition to it." (Ali 2004b:12). Simply put, factory farms are producing too much excess nutrients (and pathogens) and the land cannot absorb all of them. Naturally, land cannot handle the amount of waste that CAFOs produce; therefore people experience the unintended consequences of disease and environmental degradation. The carrying capacity of the land has been "overshot" with excess animal waste and the ecosystem is unable to repair itself (Ali 2004b).

Ali (2004b) argues there are three main reasons why the general public is oblivious to the risk of animal production. The first reason is the general separation of rural and urban areas. Only two percent of the American population is engaged in farming (Ali 2004b). Thus, the alterations of natural cycles taking place in factory farms are hidden from "urbanites" until an

environmental health disaster calls attention to them. The second reason is the separation of animal slaughter and butchery from the preparation of food and consumption. The butchering of animals is “moved behind the scenes of societal life and hidden somewhat from public view” and this “lack of public awareness of what is in our food and what actually takes place on factory farms” is producing negative environmental and health consequences (Ali 2004b:27). The third reason is that the emergence of these diseases is not easily recognized through the “lens of de-contextualized industrial time,” meaning farming is not supposed to be understood in the manner of industrial time (Ali 2004b:17). Natural time, which occurs in farming, is different from industrial time and inadequate recognition of this fact has implications for “facilitating the rapid development of antibiotic resistance and enhancing the virulence of pathogens” (Ali 2004b:17). The compression of time in factory farms and the vast increase in the number of livestock production generate vast amounts of manure and pathogens in a very short period of time.

Chicken Broiler Production in the Southern United States

The “Broiler Industry” is the first animal husbandry production organization to use the industrialized and modernization model, and the term “Broiler Chicken” refers to male or female chickens reared for meat, not eggs (Constance, 2008). Technology has allowed the animal agricultural industry to modify the habitat of its poultry from the typical farm to warehouse-like structures, housing tens of thousands of birds at one time (Constance, 2008). Vitamins, medicine including antibiotics, as well as artificial lighting, have allowed broiler chickens to be raised almost anywhere, in almost any climate. Constance (2008) states the use of synthetic Vitamin D to replace sunlight in poultry confinement buildings, the implementation of the USDA’s National Poultry Improvement Plan, and the government’s rationing of beef, not chicken, during World War II all facilitated in the increase of poultry production. Constance (2008) also states that

when the War Food Administration contracted the Delmarva Peninsula to produce chicken for all of their food programs, “this created a vacuum on the supply side” and the need to satisfy the increased demand by “emerging broiler growing areas in the U.S. South”(18). Through continued support from the government and technology, broiler production increased dramatically in the Delmarva region in the 1940’s and 1950’s (Constance 2008).

Pre World War II and throughout the war, the Delmarva Peninsula was the major producer of broiler chickens in America (Constance 2008). However, because the Southern United States was experiencing depressive farming conditions and the subsequent “underemployment” of farm workers, much of the broiler production industry moved to the Deep South as its economic savior (Constance 2008:19). The South was an attractive option for broiler producers to contract farmers to produce poultry because of the low wages and less unions, not to mention the better climate (Constance 2008). By the 1970’s the broiler industry accounted for ninety percent of production in the South and today the South still accounts for seventy-five percent of poultry production (Constance 2008).

However, the Delmarva Peninsula, as well as the Southeastern United States is experiencing increases in nitrogen and phosphorus that accompany increases in confined poultry operations (Copeland 2010). Chicken operations account for eighty-two percent of excess nitrogen and they, along with dairy cattle and swine operations, account for ninety percent of excess phosphorus (Copeland 2010). According to the USDA, these regions potentially have a higher rate of run-off and water quality problems for surrounding communities (Copeland 2010). With Mississippi being among the Southern states accounting for over seventy percent of chicken production, is it such a stretch of the imagination to assume that the citizens of Mississippi would be experiencing the same negative consequences as the citizens of North

Carolina and the Delmarva Peninsula? The way to address this question is by conducting the present study.

According to Paul Roberts, food-borne diseases are increasing not only because they are more detectable but also because of the emergence of a food industry relying on cheap, fast, and highly distributable products (Roberts 2008). The innovations that have allowed our society to eat what we want, when we want have also caused unprecedented illnesses and diseases. Until the 1970's E. coli, as stated earlier, was a harmless bacterium. However, as cattle were fed corn more frequently, E. coli became resistant to the acid in the stomach and new deadly strains such as 0157:H7 evolved. Cattle diets were changed from grass to corn in order to fatten them more quickly and put more weight on them for slaughter, therefore increasing profit for CAFOs (Roberts 2008). With that being said, the continuing emergence of E. coli 0157:H7 could be prevented by simply feeding cattle what they were physiologically and naturally designed to eat: grass (Roberts 2008).

What we feed our livestock is not the only problem. As stated earlier, antibiotics are used in order to keep livestock from getting sick in confinement and to make them grow faster and larger. Half of all antibiotics used worldwide are given to animals in CAFOs which has produced numerous illnesses that are immune to several classes of antibiotics in humans (Roberts 2008). This could lead to a "post-antibiotic era" where there would be no effective antibiotics to treat human infections (Roberts 2008).

Modernization has afforded society cheaper grain, better breeding of animals, and larger, more efficient livestock operations substantially decreasing the cost of producing food but has also come at a substantial non-financial cost (Roberts 2008). Modernization has allowed society

to enjoy fresh cut flowers and red delicious apples in the dead of winter. Globalization has allowed society's members to consume products they would not have been able to enjoy 100 years ago. Many believe that the answer to impede the consequences and risks associated with modern agriculture discussed in this paper is to return to a more local or regional way of growing food and animals for consumption. Unfortunately this idea is an exercise in futility because society members are used to the convenience and the choices that modernization has given them. The only way that society could accomplish such an endeavor is through force or catastrophes. Government interventions via taxes, a substantial increase in the cost of oil, or a massive outbreak of a highly contagious animal or human disease are three possibilities raised by Roberts in his book. Any one of these scenarios could force Americans to adapt to a more local or regional way of eating.

Concluding Remarks

After World War II the importance of making sure Americans did not go hungry furthered the rules of modernization to be placed upon agriculture. As time moved on, more and more companies consolidated, increased in size, and produced more food. Food production adhered to the principles of capitalism. Economies of scale and profits were (and still are) the most important thing in business (especially manufacturing and production) and a successful business achieves efficiency, mass production, and lower costs per unit, sold at a higher price. However, the progress of unnatural industrial animal agricultural production has had unintended consequences and deadly ramifications.

CAFOs are designed to produce food faster, more efficiently, and less costly. They are an aspect of late modernity that has improved the speed and quantity of food available for

consumers, but they are a breeding ground for disease. Environmentally, CAFOs are destructive and the communities surrounding them experience degradation that is unrivaled to any other kind of industry. In earlier sections of this thesis, examples of just how problematic these factory farms can be were presented in order to shine light on the role they play in risk society. Furthermore, it is only a matter of time before H5N1 or Avian Influenza, a direct result of animals confined in these CAFOs, unleashes sociological, environmental, and health consequences for which society is not prepared. Greger (2006) paints a grim picture of just how relentless and damaging the diseases can be. It is not a matter of “if” it happens but “when” it happens.

Solutions to these problems of modernity are not going to be easy. The positive aspect of modernity is the convenience and high levels of production it affords society. The ease of going to a grocery store and buying almost anything you want, whenever you want, is a luxury that many people in our society have grown accustomed to. But as the saying goes “there is no such thing as a free lunch” and it is only a matter of time before people have to face the consequences of living in a risk society.

There is definitely the need for more research in the area of food production and its risks to society including environmental and human health consequences. Quantitative data on disease are fairly easy to find but qualitative data are lacking. In order to study these topics further, more qualitative measures should be used to understand society’s perception of the effects CAFOs and factory farms have on their communities, not to mention their health.

These research questions to be addressed are:

(1) How has the feeding of our citizens turned into such a risky, alarming, and negative sociological issue? (2) What factors have led to the spread of environmental degradation and disease among society's members? (3) What are the unintended consequences of CAFOs? (4) What exactly needs to be done about these unintended consequences? (5) How is modern agriculture affecting our society? (6) What do we know about Risk Society theory and how does it apply to modern agriculture and its deleterious effects on society? (7) Who is most likely to live close to a CAFO? (8) What can we learn from the field and studying communities affected by CAFOs?

The following chapter will provide the theoretical framework with perspectives of the environment and social theory, the theory of risk society, and the consequences of modernity. This study consistently uses these lenses in the previous review of literature, the theory chapter itself, the data and methods chapter, and the concluding chapter.

Chapter 3

Theoretical Perspectives

Introduction

There are three major theories employed in this study including critical theoretical perspectives on the environment, Ulrich Beck's risk society theory, and Anthony Giddens' analyses of the consequences of modernity. Theoretical perspectives on the environment are relatively recent endeavors. Even though some pre-Enlightenment and Enlightenment thinkers mention some aspect of an environment, it is not until contemporary era when social theory on environment begins to be discussed thoroughly. For example, Giddens (1990) discusses Marx, Durkheim, and Weber's ability to see how industrial work was degrading to human beings, but the ecological problems caused by that same industrial system were not incorporated into their traditional sociological writings.

Taylor (2000) identifies the stages and aspects of the New Ecological Paradigm (NEP), introduced by Dunlap and Catton (1980) and the Environmental Justice Paradigm (EJP). Comparing the Human Exemptionalism Paradigm (HEP) with other paradigms is essential to comprehend environmental sociology in theory and practice. Allowing the HEP to continue as the idea of CAFO production is allowing more environmental degradation and injustice these organizations are responsible for.

Contemporary theorists such as Beck and Giddens delve into the impacts unexpected consequences of modernity have on the environment in more detail than earlier sociologists. Both theorists challenge the idea of society being in a post-modern epoch and posit that society is still in modernity, just a later version of it. Risks and unintended consequences of the

modernization of animal husbandry for food production are central to the theoretical framework of this study.

The environmental movement has been successful in influencing government and business to adopt a more environmentally friendly attitude because the movement has emphasized the numerous environmental threats prevalent in society today (Lash et al. 1996). For example, when the connection between BSE or Mad Cow Disease was linked to feeding cattle the unusable parts of a cow, Europe banned this feeding process used by food production businesses or concentrated animal feeding operations (CAFOs), in order to stop the spread of the disease (Barry 1999).

This study has linked contemporary animal food production with the theory of risk and unintended consequences of modernity. There are theoretical perspectives concerning the environment in sociology that need to be addressed as well. Unfortunately, until recently, the theoretical perspectives on the environment have not been taken seriously because the environment is viewed as nonhuman and “beyond human society and culture” (Barry 1999:15).

One of the earliest major social theorists of the relationship between food production, environmental social constraints, and population was Thomas Malthus who hypothesized that population increase would greatly surpass food production (Barry 1999). However, Malthus did not take into account how technological advances would enhance the productivity concerning land and labor and, thus, increase food production. Malthus went so far as to say he “proved” how population would surpass food production with his idea of population increasing at geometric rates while food production only increasing at an arithmetic progression (Barry 1999).

This hinted at the end of civilization because there would not be enough food to feed all of the citizens. The opposite has happened in major developed countries.

Another earlier theorist whose work addressed environmental and ecological issues is John Stuart Mill (Barry 1999). Mill discussed mass consumerism in his work and how the desire for more and more material things would work to the detriment of nature by the intensive use of technology and science. He also viewed mass consumerism as a very narrow view of social progress (Barry 1999). Indeed, Jeremy Bentham and Mill were both against cruelty to animals in their Utilitarian approach, the first philosophical movement to limit animal cruelty and to recognize animals felt pain as well as pleasure (Barry 1999).

Max Horkheimer and Theodore Adorno of the Frankfurt School examined the dark side of modernity (Barry 1999). The Frankfurt School greatly develops the Marxist notion that the “link between society and nature lies both within social relations internal to organization of society and at the same time with how society views, uses, and abuses its natural environment(s)” (Barry 1999:89). Also, both theorists expanded on Marxism by analyzing the “interconnections between and among the spheres of nature” and “rather than seeing the progressive aspects of modernity...they emphasized its destruction of the environment...and its inability to control technology” (Merchant 1999:2). Indeed, Karl Marx separated humanity from nature, using both as resources to fulfill society’s basic needs (Merchant 1999). Specifically, Marx and Engels supported the Enlightenment and the myth that progress would be achieved through the domination of nature, which is the myth that Horkheimer and Adorno “sought to expose” (Merchant 1999:2).

In the 1940's, Horkheimer, Adorno, and Herbert Marcuse turned their attention to the domination and the objectification of nature with Adorno theorizing the domination of nature leads to the domination of man (Merchant 1999). Furthermore, one of the main contributions to the environmental social movement, by the Frankfurt School, was the introduction of the intrinsic value of nature and humanity, as well as, a quest for the "human reconciliation with nature" (Eckersly 1999:66), as opposed to Marx's view that nature and humanity were only important for productive forces of industrialization (Merchant 1999). The Frankfurt School deconstructed Marxism and debated the ideas of Marx through the views of culture, scientism, and reasoning, rather than through political and economic views (Merchant 1999). The Frankfurt school emphasized the exploitation of nature in ways that were different than Marxist philosophy (Merchant 1999). However, their ideas were not met without criticism.

Jurgen Habermas criticized the ideas of Horkheimer, Adorno, and Marcuse as unrealistic and more of a capitalist than a socialist problem, and disagreed with this "green movement" espoused by the Frankfurt School (Merchant 1999). To further explain, Merchant (1999) describes three types of Ecology as a discourse: Deep, Social, and Socialist. Deep ecologists believe the domination of nature is caused by humans' engrained sense of anthropocentrism and the only way to stop it is a transformation in consciousness; Social Ecology espouses domination of humans is caused by the domination of nature; Socialist Ecology is grounded in political economy and capitalism can account for the degrading of nature (Merchant 1999:9). Habermas also considered the green movement and new social movements as "grass roots" resistances that are basically incapable of stopping the political decision making from being taken away from "the life-world" and absconded by the capitalists and "technocratic elites" (Merchant 1999:6). In short, Habermas disagreed with Horkheimer, Adorno, and

Marcuse that political decision making could be given to “the life world” and not be taken away by capitalists. “The life-world” is Habermas’ term for the daily social activity that is universally taken advantage of, such as the working class and poor (Merchant 1999; Giddens 1985 (endnote in Merchant’s book)). This is what Habermas means when stating this ecological unsustainability is more of a capitalist problem than a socialist problem.

Ulrich Beck wrestles with the term nature and states it is not nature but a “concept, a norm, a recollection, a utopia, an alternative plan” (Beck 2010:83). However, he quickly defines the feature of this multi-faceted concept of nature to be studied in the crises of the environment, caused by industrialization, as the “science of nature...levels of toxins in the air, water and food” (Beck 2010:83). Moreover, Beck’s theory of risk societies in regards to ecology “has served to advance the development of environmental sociology” (Kivisto 2008:428).

The Environmental Justice Paradigm

The awareness of environmental issues, raised by Rachel Carson’s book, *Silent Spring* published in 1962 and the social movements in the 1960’s and 1970’s, contributed to Dunlap and Catton’s (1980) New Ecological Paradigm (NEP). This paradigm emphasizes that humans are one of many species on Earth and are interdependently involved in the global ecosystem (Catton and Dunlap 1980). Their paradigm further supports the notion that human actions have many unintended consequences (Catton and Dunlap 1980). Other assumptions posit that humans live in an environment with finite resources and even though humans seem to have the powers to extend any carrying capacity limits to ecosystems, “ecological laws cannot be repealed” (Catton and Dunlap 1980:34). Taylor refers to this as the New Environmental Paradigm (NEP) (Taylor 2000). This paradigm diverged from Catton and Dunlap (1980) but also the earlier Exploitative

Capitalist Paradigm in that there was a greater influence on humans being a part of nature and not dominant of it (Taylor 2000). The NEP also influenced people to be generally compassionate about other species and other people, and to plan risk avoidance in regards to the environment (Taylor 2000). A focus on the limitations of growth, whether they are in the population, in resources, or in consumption is a major characteristic of the NEP as well (Taylor 2000).

Taylor (2000) states the NEP is still the dominant ideology but there is a new one emerging: the Environmental Justice Paradigm (EJP) which includes the research of environmental issues in regards to race, class, and gender. Experiences of the environment differ between people of color and whites and the environmental activism undertaken by the two racial groups differ as well (Taylor 2000). The EJP has a list of Principles and their inclusion in this study of CAFOs is vital. The Principles of Environmental Justice include, but are not limited to: “To mandate ethical use of land and renewable resources, mandate balanced and responsible uses of land and renewable resources, reducing consumption, personal responsibilities, sustainable development for humans and other living things, reprioritize our lifestyles to ensure the health of the natural world for present and future generations, recognize the need for rural ecological policies, right to be free from ecological destruction, and the fundamental right to clean air, land, water, and food” (Taylor 2000:539).

Beck and Giddens Revisited

Sociological theorists have used various terms to characterize previous epochs of social change, such as: pre-modernity, modernity, post modernity, late modernity, and Beck and Giddens’ reflexive and radicalized modernization (Beck 2010; Giddens 1990). Whereas

modernity encompassed belief in rational and scientific methods to understanding the world (as opposed to religious doctrine in pre-modernity), post-modernity emphasizes instead, subjective hyperrealism, images, simulations, and modern consumption by society (Kivisto 2008). Beck (2010:223) contends the idea of post-modernity is “misleading, even false” because the consequences and crises in the 21st century are “products of the triumphs of modernization”. Beck and Giddens theorize that society did not enter into a new and different post-modern epoch but are simply in a later version of modernity (Beck 2010).

The transformation from an industrial or modern society to a risk society introduces the idea of reflexive modernization where society confronts itself with the negative ramifications that are inherent in an industrial or modern society and eschews the controllability of nature that modernity represented (Lash, Szerszynski, & Wynne, 1996). Both Beck and Giddens think that society is in reflexive modernization (Beck 2010; Giddens 1990). Consequences of modernity, such as threats to the environment, nuclear technology, and the immense production of commodities come to dominate. The immense production of animal commodities by factory farming and the effects on the communities surrounding these organizations are the main ideas that guide this study on CAFOs. In addition, the link between risk societies with current mass production of animals for food is made by Beck in his 1996 commentary. CAFOs have been responsible for the proliferation of diseases and Beck (1996) states how the link between mad cow disease and human death has paved the way for a new type of political society, he calls the risk society.

Beck, a reflexive modernization and contemporary theorist, argues a society of risk is defined as having three elements including: “undesirable outcomes, possibility of occurrence, and state of reality” (Krimsky & Golding 1992:58). The modern food production system has

satisfied these three elements and made society more risky because of CAFOs polluting waterways and communities. As stated above, CAFOs cause food-borne illness outbreaks and major environmental degradation. Beck's work influences our understanding of what these environmental harms have done to our natural surroundings and also the subject of ecology in general (Beck, Giddens & Lash 1994).

Ulrich Beck's Risk Society

Beck (2010) develops his theory of risk through globalization, comparative, and contradiction perspectives in his book *World at Risk*. Society as a whole shares the threats and challenges posed by environmental crises with the greatest threats being climate change, environment destruction, and loss of non-renewable energy resources (Beck 2010). In addition, while modernity has afforded society improvement of the human condition through scientific and technological advancements, and capitalism but these advances have introduced contradictions regarding humanity's participation in society (Merchant 1999).

Beck (2010:22) outlines several contradictions of modernity inherent in his risk society thesis, stating: "modern society is ailing not from its defeats but from its triumphs." For example, mass unemployment can be viewed as sign of success rather than a failure because an objective of modernization (in business) is to use less labor inputs, therefore decreasing costs (Beck 2010). However, less labor inputs equals loss of jobs and unemployment. Moreover, the success of medicine has made life expectancy increase but the retirement system is disintegrating (Beck 2010). More people are living longer, only to have insufficient retirement resources to support them when they need them. Scientific and technological "triumphs" have created greenhouse gasses that have eaten a deep hole in the ozone layer (Beck 2010). The same can be

said about the “triumph” of modernization of animal husbandry, in that we have figured out how to feed the masses cheaply and quickly through mass production but at the expense of the environment and human health.

Beck argues there are two major comparative worldviews of risk including: modernity is an “opportunity” but is also “problematic” (Beck 2010:160). Above all, though, “the decisions and practices that go hand in hand with scientific-technical industrialization and its globalization jeopardize not only the organic foundations of all life forms but also the majority of human beings” (Beck 2010:160). CAFOs have already been shown as an example of the industrialization of animal husbandry using science and technology. Therefore, it appears that CAFOs jeopardize not only all life forms but especially human health and well being. Beck (2010) further states that business, science, and state inspectors present an illusion of safety. The businesses engaged in CAFOs give society the illusion that they are producing wholesome and safe food but research has shown the opposite.

Globalization has allowed what Beck considers the collision of risk cultures (Beck 2010). Not every culture or country agrees with what is a risk and what is not in regards to food production and animal husbandry. An important characteristic of a second or late modernity is the collision of risk cultures (Beck 2010) by opposing cultures or countries. For example, England, France, Greece, Italy, Hungary, Austria, and Poland have banned or placed restrictions on the creation and the imports of genetically modified foodstuffs or Genetically Modified Organisms (GMOs)⁷ (Beck 2010). However, American culture has embraced this technological

⁷ *GMOs include scientifically altered plants such as wheat or corn that is altered to withstand the pesticides sprayed on it in order to remove pests from the crop before harvesting. GMOs also include the genetic modification of animals.

advancement further supporting Beck's thesis of the collision of risks and what risks certain countries will tolerate. Beck expands on this point by defining global definitions of environmental problems, emphasizing the differences in world cultures and what is and is not considered a risk.

The first definition is the confusion between lay and expert knowledge. The idea of expertise and the clash between expert and lay knowledge is a prominent debate in the theoretical perspectives on the environment and risk. Policy regarding environmental risk can no longer be considered an "expert matter alone" and policy must engage all parts of lay society (Lash et al. 1996). It has been the practice of expert institutions to blame risks and environmental problems as "Acts of God" that could not have been controlled (Lash et al. 1996). Beck has stated, similarly, that modern science denies their responsibility for creating modern risks (Lash et al. 1996). In addition, the fact that these expert institutions fail to control the risks they have created only adds to an illegitimacy of the institutions themselves. It is not the intention to claim that lay knowledge is superior to expert or scientific knowledge, however combining the two can only lead to less alienating forms of public knowledge and "new constitutional norms of valid knowledge may be articulated" (Lash et al. 1996).

The second global definition is the Western "ecological neo-imperialism" in which Beck claims the Western states lead knowledge and development over poorer countries, all the while covering up their culpability for global environmental threats (Beck 2010). The elites carry the knowledge and a perversion of nature occurs (Beck 2010). In the context of this particular study, the elites of knowledge belong to the top food production companies so they may exploit nature and cover up their perversions and their acts against nature. Their acts transform and distort nature with CAFO pollution and disregard for the communities they inhabit.

Beck's theory of world risk society also states that "incalculable risks and manufactured uncertainties resulting from the triumphs of modernity mark the condition of humanity at the beginning of the 21st century" (Beck 2010:191). He also identifies that the people who cause the environmental and societal risks are not the ones to suffer from the outcomes (Beck 2010). This antagonism of risk is prevalent in current mass production of animals for food. There are only a few major companies that control the mass production of animal agriculture. Top executives of these companies live in expensive cities and not in the rural towns in which their companies operate. The top executives are not the ones who must deal with the foul odors, animal waste, ill health, or polluted waterways that CAFOs are known to cause.

The thought of a future catastrophe is an element of the risk society theory (Beck 2010). This exemplifies the current mindset of society's actors in regards to disease, war, natural disasters, etc. Also, when we as a society view these disasters and catastrophes on our 24 hour news cycle television, we see them, but we don't necessarily have to get involved. We do not have to physically go through what we are watching on television or listening to on the radio (Beck 2010). The viewer or listener is not physically feeling the rain from a hurricane or the bullets from a gun. Only a select few who work or live in proximity to CAFOs personally and physically witness these experiences. These are the people that are experiencing the consequences of modernity in the area of food production.

Anthony Giddens on The Consequences of Modernity

Copious problems are attributed to the animal food production industry and are presented in this thesis. Giddens (1990) theoretically and intensely discusses the issues of modernity and its consequences on society. “Inherent in the idea of modernity is a contrast with tradition” (Giddens 1990:36). Aspects of trust, expert systems, confidence, reflexivity of modernity, and the uncontrollability of progress are discussed. Each subject that Giddens discusses in his book can be compared to the problems current society is experiencing due to CAFOs.

Anthony Giddens uses the term “juggernaut” to introduce the idea of radicalized modernity as a juggernaut or “a runaway engine of enormous power...we can drive (this engine) to some extent but (it) threatens to run out of control and render itself asunder” (Giddens 1990:139). What Giddens means by this is that modernity is out of control and unintended consequences are inevitable. For example, the modern food system is too large and uncontrollable, like the juggernaut, and we must figure out a way to modify it in order to be a sustainable society. Giddens (1990) asks the question “how far can we – where ‘we’ means humanity as a whole – harness the juggernaut, or at least direct it in such a way as to minimize the dangers and maximize the opportunities which modernity offers to us?” (151) Giddens’ theory of the juggernaut signifies many aspects of the current food industry and its deleterious effects on society. The problems of mass production of animals for food is two-fold Consumers are accustomed to eating relatively cheap meat and it is the consumers that are the driving force behind the proliferation of CAFOs, which in turn are causing the unintended consequences. If it were not for the consumers buying cheap meat, the technological advancement of CAFOs would not be needed. Peoples’ demand for cheap food has grown into something like a juggernaut,

similar to the CAFO industry's growth that is almost out of our hands and is no longer under our control.

Analyses of risk societies and the consequences of modernity, as well as theoretical perspectives on the environment are presented in this study to provide a theoretical framework for which hypotheses can be tested. Specifically, food production operations will be tested to be a risk to the people living in the same communities as CAFOs, as well as the environment, in central Mississippi. As previously mentioned, CAFOs are used in food production in order to feed growing populations, as well as, to keep up with what global consumers are expecting: fast and cheap food. Modernity is an achievement of society with the introduction of science and technology to make lives better for its citizens (Giddens 1990). This research is formed to examine whether the empirical data collected and the previous literature support the assumption that living near, or in the same community as, a CAFO contributes to ill health, a negative quality of life, and environmental injustice and degradation. If the assumption is supported, it undermines the benefits of modern food system production, which is to nourish people and not make them victims of the CAFOs' pollution of land and waterways. A dark side of modernity that happens when society industrializes animal food production is exemplified throughout this study.

Theoretical perspectives of the environment are presented in this study for three major reasons. First, hypotheses are made regarding society and its interaction with its ecological surroundings such as air, water, animals, and land. Secondly, environmental social theory is a relatively new theoretical and research endeavor but it is essential in this study because the hypotheses testing involves environmental factors influencing animal husbandry, land usage, and the detriment to communities that surround polluting food production organizations. Third, the

importance of clean air, clean water, favorable land usage by CAFO owners, and the well-being of citizens cannot be underestimated or forgotten.

H1: The closer a citizen lives to a CAFO the more likely he/she is to suffer from respiratory illnesses, holding all other factors constant.

H2: The closer a citizen lives to a CAFO the more likely he/she is to suffer from gastrointestinal problems, holding all other factors constant.

H3: The closer a citizen lives to a CAFO the more likely he/she is to suffer from psychological issues, holding all other factors constant.

H4: Malodor will be the most prominent complaint among the citizens living near CAFOs in Central Mississippi.

H5: The majority of the respondents will be African American.

The following chapter will detail the data collected, testing of the hypotheses and the results, along with the qualitative measures undertaken for this study.

Chapter 4

Data & Methods

Research Design

This study used a mixed methods research design including: secondary data analyses, a survey, and a field study. The study setting is counties and cities in Mississippi hosting CAFOs. Mississippi was chosen because of its high concentration of chicken broiler CAFOs in the middle of the state. Both the quantitative and qualitative data were collected concurrently and analyzed. In methodological triangulation, the researcher uses multiple data “to determine if there is convergence, differences, or some combination” (Creswell 2009:213).

Furthermore, this research design is explanatory because it explains a trend or pattern that has been documented regarding CAFOs and their effects on the surrounding environments and community members’ health and quality of life (Mirabelli et al. 2006). The questionnaire used for surveying includes several “open ended” items throughout, allowing the respondent to write about any problems or concerns they have.

Data

According to Factory Farm Map Organization, Mississippi is home to numerous chicken broiler CAFOs (2011). The website maps out counties and color codes them to reflect whether they are “severe” or “extreme” areas of animal production in the year 2007.⁸ Regarding chicken broiler CAFOs, the following counties, according to the website, are considered severe (1 million to 2.75 million birds sold): Copiah, Lincoln, Marion, Pike, and Winston. The following counties are considered “extreme” geographical regions of chicken broiler production (2.75 million or more birds sold): Amite, Covington, Jasper, Jones, Lawrence, Leake, Neshoba, Newton, Rankin, Scott, Simpson, Smith, Walthall, and Wayne. Moreover, the Mississippi Development Authority (Mississippi.org 2011) reports these amounts of broiler chickens produced:

⁸ The Factory Farm Map Organization is an interactive, online tool that gives information on the number of factory farms (or CAFOs) in the United States. The user may filter to search different types of farms (i.e. swine, cattle, chicken, etc.), different states and their counties, and other information that is useful and user friendly for anyone inquiring about the number of factory farms located in America. The latest research data was posted as of 2007 (data is posted about every five years) but the website is regularly updated with valuable information for researchers, or anyone interested in this topic. The website is the property of the Food and Water Watch Organization (www.foodandwaterwatch.org). The Factory Farm Map was accessed in August 2011 from: <http://www.factoryfarmmap.org>

Table 1 Broiler Production in counties considered “Severe” to “Extreme”

County	Broiler Production in Millions of Pounds
Copiah	57.8
Lincoln	57.7
Marion	85.8
Pike	75.6
Winston	11.4
Amite	75.4
Covington	127.3
Jasper	127.5
Jones	330.1
Lawrence	92.7
Leake	348.7
Neshoba	389.8
Newton	224.5
Rankin	175.1
Scott	546.1
Simpson	363.7
Smith	505.9
Walthall	117.7
Wayne	289.1

Source: Mississippi.org Agricultural Websites, 2012

Table 2: Populations and Housing Units in these counties

County	Population	Housing Units
Amite	13,131	6,635
Copiah	29,449	12,184
Covington	19,568	8,496
Jasper	17,062	8,212
Jones	67,761	28,424
Lawrence	12,929	6,019
Leake	23,805	9,415
Lincoln	34,869	15,255
Marion	27,088	11,838
Neshoba	29,676	12,357
Newton	21,720	9,373
Pike	40,404	17,861
Rankin	141,617	56,487
Scott	28,264	11,470
Simpson	27,503	11,934
Smith	16,491	7,237
Walthall	15,443	7,132
Wayne	20,747	9,213
Winston	19,198	8,745

Source: United States Census 2010

Table 3: Mississippi’s Top Five Chicken Producing Counties, Population and Housing Units

County	Broiler Production (millions of pounds)	Population	Housing Units
Scott	546.1	28,264	6,635
Smith	505.9	16,491	7,237
Neshoba	389.8	29,676	12,357
Simpson	363.7	27,503	11,934
Leake	348.7	23,805	9,415

Sources: Mississippi.org Agricultural Map, 2012; United States Census 2010

Population Count and Number of Households

Table 2 represents the county, population count, and the number of households in counties with chicken broiler CAFOs. This information is relevant to get an idea of which counties have the highest population counts and numbers of households. Table 3 represents the top five broiler (in pounds) counties in Mississippi. The counties and cities that were chosen for implementation of the telephone survey were based on the number of CAFOs present in four cities in two of these counties listed in Table 3 (discussed in the Sample portion of this thesis).

Broiler Production in Mississippi (in millions of pounds)

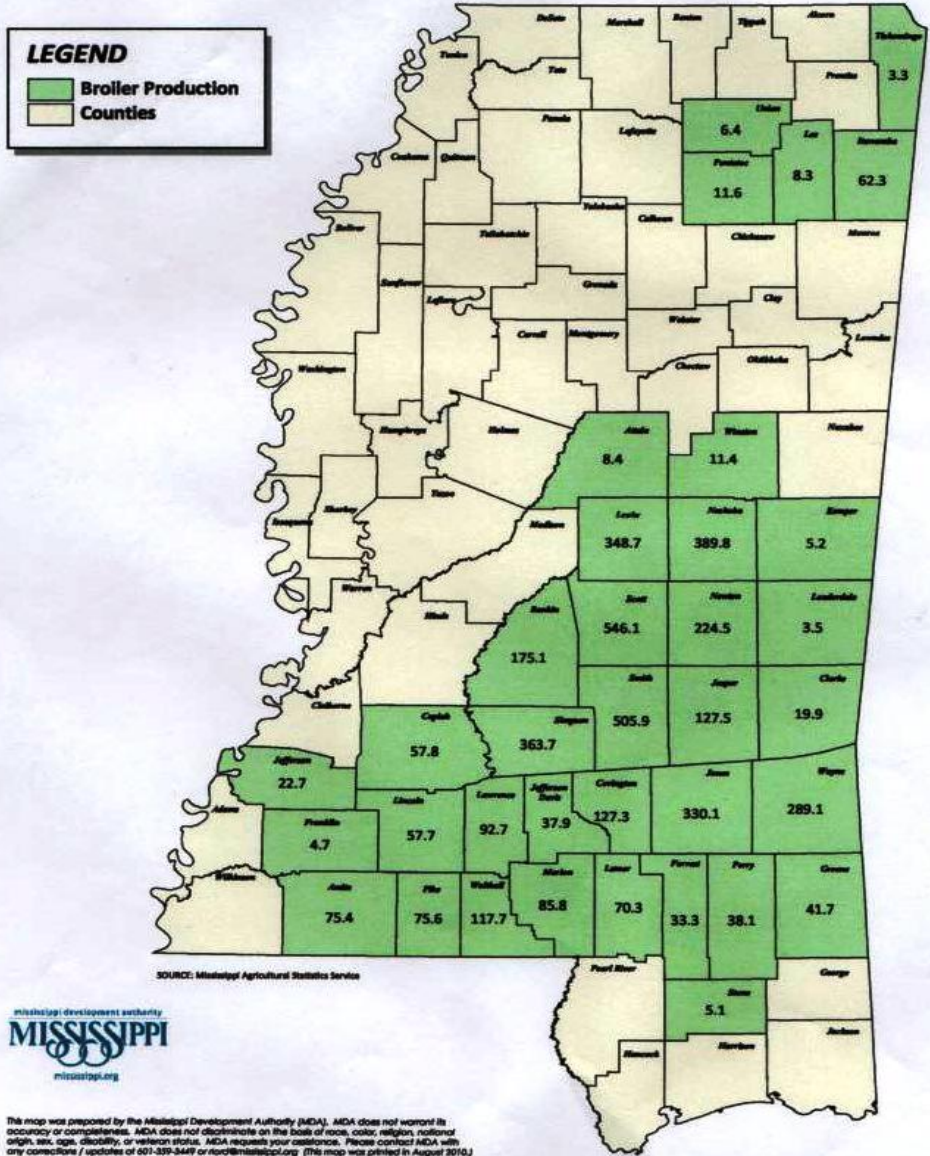


Figure 2: Broiler Production in Mississippi

Source: Mississippi.gov Agricultural Map 2012

The Sample

Telephone Surveys are suitable for this study to achieve rapid turnaround in the data collection. The purpose is to collect data from citizens living in close proximity to a CAFO. Area Probability Sampling and Random Digit Dialing (RDD) telephone numbers, supplied by Survey Sampler Inc. were used with a criterion of being within two to six miles of three data points. The data points were locations of CAFOs and their addresses were obtained on the Mississippi Department of Environmental Quality's (MDEQ) website. A telephone book of Central Mississippi was utilized to supplement the sample frame as well.

One thousand RDD phone numbers were acquired from Survey Sampler, Inc. Of that 1,000: 8 were ported and 535 were reported as disconnects by Survey Sampler Inc's screener server, leaving 457 numbers delivered. Of the 457 numbers, 306 numbers were attempted by the telephone survey administrators. The telephone administrators found 43 numbers were businesses, 25 were disconnects, 131 were non-answering, and 66 declined to respond. As of March 13, 2012 the number of completed surveys from this sample frame was 39 (two surveys were incomplete and not included in analyses).

A Central Mississippi telephone book was used to supplement more phone numbers. Another 596 phone numbers were generated from the book and 183 numbers were attempted. Two numbers were businesses, 31 were disconnects, 83 were non-answering, and 55 declined to participate. The telephone book garnered another 12 completed surveys making the total sample size 51. All telephone surveys were conducted between February 17, 2012 and March 20, 2012.

The questionnaire for the survey can be found in Appendix A. The goal was to obtain data regarding the health and quality of life of the respondents and their families, as well as

environmental factors surrounding their places of residence. The questionnaire was designed to take between 10 and 15 minutes. Most of the questions were answered using an ordinal scale, with some open-ended questions so the respondent could supplement the survey answers with their own thoughts, experiences, opinions, etc. There are a few demographic questions and specific questions about the respondent's knowledge of CAFOs, whether they live "near" one, and if so, have they had any problems associated with those organizations.

Telephone calls were made between the hours of 4 p.m. and 9 p.m., Monday through Friday, and between 2 p.m. and 9 p.m. on Saturdays and Sundays to minimize refusals or non answering households.

Counties and Cities Chosen

The counties chosen to be sampled are the "clusters" (Fowler 2009). In these clusters, five cities or "blocks" (Fowler 2009) in Mississippi including Philadelphia, Carthage, Walnut Grove, and Union (which encompasses the city of Edinburg) are the setting for the telephone surveys. These cities have been chosen because their corresponding counties and the cities themselves having high numbers of chicken CAFOs. The Mississippi Department of Environmental Quality lists CAFOs as AFOs (animal feeding operations) with 0251 being the SIC number.

Table 4: Cities in Mississippi Surveyed

City	Population	Housing Units	# of CAFOs	County
Philadelphia	7,477	3,389	95	Neshoba
Carthage	5,075	1,799	87	Leake
Walnut Grove	1,911	208	19	Leake & Scott
Union*	1,988	779	40	Neshoba & Newton

*Union encompasses the city of Edinburg

Sources: Mississippi Department of Environmental Quality; United States Census 2010

The questionnaire asked general demographic data such as age, race, gender, education, marital status, and type of work done. The beginning questions entailed general health, quality of life, and environmental related issues. “What kind of work do you do presently?” was asked to separate any respondents that worked in the neighboring CAFOs. It was intended to create a variable of CAFO workers that could have been tested separately in the future. However, none of the respondents answered they worked in agriculture, of any kind.

Dependent variables were the measurements of illnesses and ailments reported such as: runny noses or irritation of eyes. Moreover, The Food and Water Watch 2010 Report discusses the use of the arsenic-based drug roxarsone in 70% of poultry farms (Food and Water Watch 2010). Chronic exposure to arsenic can cause cancer in the bladder, kidney, lungs, liver, and prostate.

Exposure to arsenic also leads to cardiovascular disease, diabetes, and neurological problems in children (Food and Water Watch 2010). Questions regarding those diseases were included on the questionnaire. This is a dependent variable to be aware of because it involves a vulnerable population (children) and if the regions in Mississippi with chicken broiler CAFOs

report neurological problems in children or adults, there may be a correlation to be explored further. To clarify, children were not asked to take the survey but the respondent was asked if they or anyone in their household suffers from neurological problems. There is also an open ended question that asked if anyone under the age of 18 lives in their home and if so, had the minor(s) been diagnosed with any atypical diseases.

Independent variables include the cities where the questionnaires were administered via telephone. In addition, other independent variables include: the CAFO's proximity to the residence, the state of Mississippi, and the counties chosen. These aspects of the project will not change. As previously mentioned, dependent variables include the health ailments, as well as, quality of life, and environmental perceptions.

All questions regarding health, quality of life, and environmental surroundings were asked using an ordinal scale for the responses. For example, the first question asks if the respondent "suffers from (or have you suffered from) these ailments in the last 6 months?" Then fifteen ailments are listed and next to each one is a scale of 0 to 5 with 0 being "never", 1 being "once per month", 5 being "everyday", and 9 is "don't know".

The quality of life and environmental surroundings statements have a 5 point Likert Scale where 1 is "strongly disagree", 5 is "strongly agree", and 9 being "don't know". In order to analyze the data collected, coding indicating that the higher the means of the numbers circled, the more ill health effects present, was performed. The quality of life and environmental surroundings answers were displayed in a frequency chart.

Qualitative Approach: Existing Documents

A large portion of my qualitative data included the examination of existing documents. Online databases used in this study were factoryfarmmap.org (produced by Food and Water Watch), reports by the United States Environmental Protection Agency (USEPA), The United States Census Quick Facts Website, Mississippi.gov, Mississippi.org, and the Mississippi Department of Environmental Quality (MDEQ). The MDEQ website was examined to note the number of CAFOs present and any pollution or complaints against them in the clusters being studied. The PEW Commission's report, accessed online and previously discussed, was also incorporated.

During my field research, I had two telephone conversations with two utility personnel from the regions. One informed me that if a resident has a complaint about their water quality, a technician is sent out to flush the line. This representative informed me that about 99% of the time the problem is fixed. If they cannot fix the problem, further action is taken place, a form is filled out, and the form is filed in city hall. When I asked the utility worker if that information was available online, he laughed and said that no, it was not.

The other utility worker was hesitant to talk to me. It was only after I explained to this person that I was not a reporter but just doing research on rural communities in Mississippi for my thesis, he told me some procedural information. If a resident's complaint cannot be fixed by someone in the department, the problem is reported and made available online. I was unable to find such records. Testing at the plant is done three times per day and field testing is done at sample sites throughout the city, three times per day as well. If a person with a well water system has a problem, it is their responsibility to fix it, not the city's responsibility. The Government Accountability Office (GAO) testimony in 2008, discussed next, claims that

regional regulation of water quality and not federal regulation is an inefficient way of handling complaints and environmental issues.

Government Accountability Office Testimony

The United States Government Accountability Office (GAO) published its testimony before the Subcommittee on Environment and Hazardous Materials, Committee on Energy and Commerce, and the House of Representatives in 2008 entitled “Concentrated Animal Feeding Operations: EPA Needs More Information and a Clearly Defined Strategy to Protect Air and Water Quality.” Anu K. Mittal, Director of Natural Resources and Environment gave testimony stating that because there is not a specific federal agency that collects information on CAFOs, the USDA data on “large farms that raise animals” would be used in place (GAO 2008). The testimony also stated that when CAFOs are clustered in small geographic areas the animal waste produced cannot effectively be used as fertilizer and may increase pollutants. These pollutants are a direct threat to waterways and water quality close to CAFOs (GAO 2008). The testimony’s main objective was to discuss CAFOs and their effects on human health and the environment, and to “what extent the EPA has assessed the nature and severity of such impacts” (GAO 2008:2).

The GAO states that the EPA’s National Air Emissions Monitoring Study is not as effective as the EPA believes it to be, citing the National Academy of Sciences, which claims that the EPA has not “yet established a strategy or timetable for developing a more sophisticated process-based model” needed to account for all animal emissions at CAFOs (GAO 2008:4). In addition, under the Clean Water Act, CAFOs are designated as “point sources” of pollution and are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit. However, the GAO found that the EPA is not enforcing this permit rule as it should. Instead it is

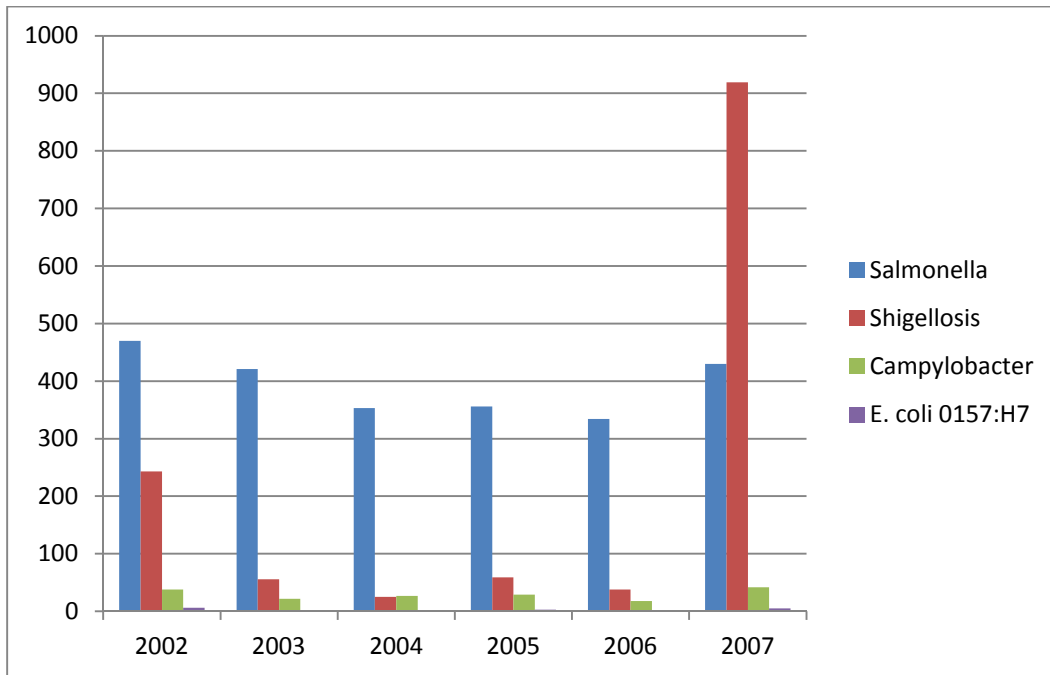
acquiring quarterly estimated numbers of CAFOs that have been issued the NPDES permits, which presents a non-systematic and uncoordinated process making it difficult for the EPA to monitor and regulate CAFOs (GAO 2008). For example, the New York Times established a “Toxic Waters Near You” database that compiles information on facilities that have permits to discharge pollutants. The information comes from the EPA, not states, and when Philadelphia, Carthage, and Walnut Grove, MS were searched in the database, all of the poultry farms listed had “No Information” under the heading “Last Inspected”, and under “Violations” all of them indicated zero (New York Times 2012). However, the records are out-dated because the last inspection to take place was at a fairground in September of 2008 (New York Times 2012).

Rates of Food Related Illnesses in Mississippi

Mississippi’s website contains health statistics for the different Public Health Regions in the state. The regions involved in this study are V and VI. The years 2002 through 2006 indicate small changes in the rates of disease and the years are almost mirror images of each other. Salmonella has the highest reported rates and the other reported rates of illnesses are dwarfed in comparison. The year 2002 indicates a higher reported rate of Shigellosis⁹ but nothing severe. However, in 2007 there were 919 reported cases of Shigellosis, which could be researched further. These diseases are foodborne illnesses but as we’ve seen in Walkerton, Ontario, E. coli 0157:H7 is capable of being waterborne. According to Mississippi.gov, the following diseases were reported in the years 2002 through 2007: Campylobacter, E. coli 0157:H7, Salmonella, and Shigellosis as illustrated in Figure 3.

⁹ Shigellosis is caused by the bacteria Shigella causing diarrhea, fever, and stomach cramps. It rarely requires hospitalization and may be acquired by eating contaminated food handled by people that forget to wash their hands after using the bathroom. The bacteria can be spread by other means as well. (CDC 2012)

Figure 3: Food Related Diseases 2002-2007 in Mississippi



Source: Mississippi.gov 2012

Observation

On the weekend of February 17-20, 2012 observations of the landscapes, cities, and CAFOs were made in the Philadelphia, Carthage, Union, Edinburg, and Walnut Grove areas¹⁰. Observing so many CAFOs along the county roads gave me a better idea of just how ubiquitous these organizations are in that part of Mississippi. Observing how close some of the CAFOs are to homes and a large church (in Edinburg) and the changes in the landscape from the expected green and tree filled rural sites, to the gray and white warehouses dotted along the roadside, are experiences that could not be gained from the telephone survey alone. The smell CAFOs emit is rancid, putrid, unbearable, and unbelievable. White and yellow signs were placed at the

¹⁰ Originally, the data collection through questionnaires was going to be supplemented by handing out the survey instrument for possible respondents to fill out. Unfortunately, the weather did not permit this to happen.

beginning of the entrance ways with the words “Danger”, “Biohazard Area”, and “Tyson Foods” (if the CAFO was contracted as a Tyson grower) imprinted on them. Pictures were taken and are included in the appendix.

Results of Telephone Surveys

Analyses of the responses were tabulated using IBM SPSS Version 19 and 20, as well as Microsoft Excel. The sample size of 51 respondents had an average age of 57 years old. Figures 4 and 5 illustrate the sample's demographics. Table 5 describes the sample's socio-demographic data: marital status, education level achieved, and household income amounts.

Figure 4: Sex Distribution

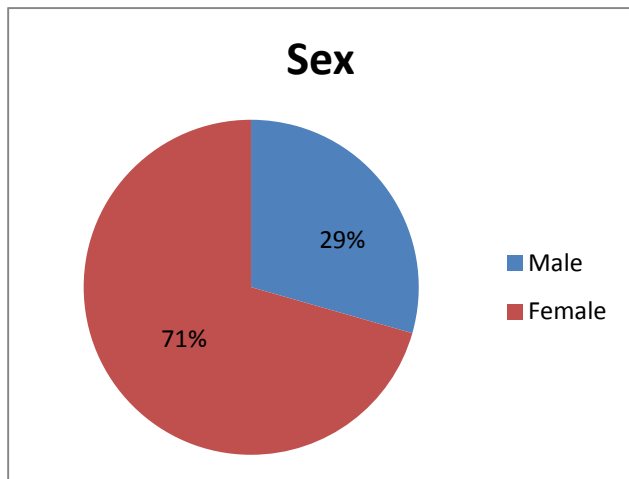


Figure 5: Race Distribution

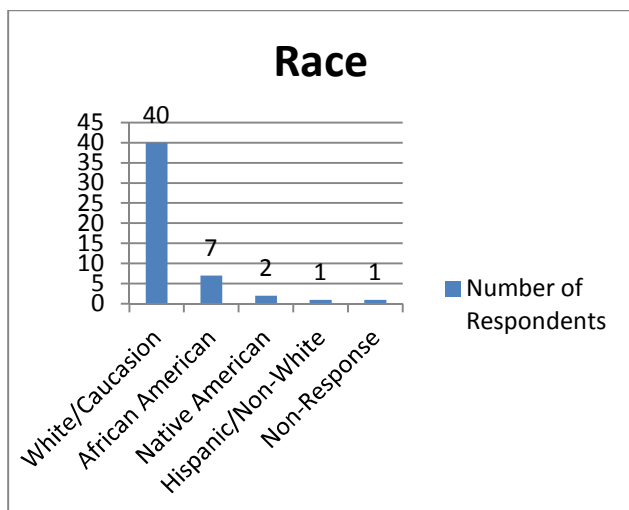


Table 5: Socio-Demographic Characteristics

Variables	Frequency	Percentage
Marital Status:		
Single/Never Married	6	11.8
Married	23	45.1
Divorced or Separated	14	27.5
Widow	7	13.7
Other	1	2.0
Education Level Achieved:		
Grade School	3	5.9
High School/GED	17	33.3
Associate or Vocational Degree	12	23.5
Bachelor's Degree	12	23.5
Master's Degree	5	9.8
Professional (doctor, lawyer, pharmacist, etc.)	2	3.9
Household Income:		
\$0 - \$19,999	13	25.5
\$20,000 - \$29,999	12	23.5
\$30,000 - \$39,999	7	13.7
\$40,000 - \$49,999	6	11.8
Above \$50,000	10	19.6
Refusal to Answer	2	3.9
Missing Data	1	2.0

Testing the Hypotheses

H1: : The closer a citizen lives to a CAFO the more likely he/she is to suffer from respiratory illnesses, holding all other factors constant.

This hypothesis, as well as, hypotheses 2 and 3, cannot be accepted based on the results of the telephone sample from Central Mississippi. For this study, health problems were defined by the physical and psychological ailments listed on the survey and the decision to use the ailments as variables was based on the previous studies mentioned in the literature; environmental degradation and reduction of quality of life were defined similarly and by the previously mentioned literature as well (Wing and Wolf 2000; Ali 2004; Chapin et al. 2005; Sharp and Tucker 2005; Walker et al. 2005; Mirabelli et al. 2006; Contance 2008; Holt 2008; and Horton et al. 2009). H2 stated that the closer a citizen lives to a CAFO the more likely he/she is to suffer from gastrointestinal problems. Similarly, H3 stated that the closer a citizen lives to a CAFO the more likely he/she is to suffer from psychological issues.

The two ailments that were determined related to distance in the Chi Square tests were diarrhea and depression. The following tables 6 and 7 indicate the p values, the degrees of freedom, and the critical values. The only conclusions that can be made from these tests are that diarrhea and depression are related to the distances reported but that is all that can be concluded. Due to the small sample size, any further conclusions made would be spurious.

Table 6: Distance of Residence to CAFO and Health Chi-Square Test

How far would you say your residence is from the nearest animal factory farm? * Diarrhea

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	94.856^a	65	.009
Likelihood Ratio	60.968	65	.619
Linear-by-Linear Association	6.713	1	.010
N of Valid Cases	49		

Table 7: Distance of Residence to CAFO and Health Chi-Square Test

How far would you say your residence is from the nearest animal factory farm? * Depression

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	87.277^a	65	.034
Likelihood Ratio	55.165	65	.803
Linear-by-Linear Association	.603	1	.438
N of Valid Cases	50		

The following Chi-Square Test Measurements, as well as the degrees of freedom, and the critical value indicate that the variables: the environment such as the air around me, allows me to be productive, with their subsequent answer to how far would you say your residence is from the nearest animal factory farm, are related but that is all that can be determined from this test because of the small sample size.

Table 8: Distance of Residence to CAFO and Quality of Life Chi-Square Test

The environment, such as the air around me, allows me to be productive.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	56.831^a	39	.032
Likelihood Ratio	51.300	39	.090
Linear-by-Linear Association	.671	1	.413
N of Valid Cases	50		

There were certain variables tested that supported the hypotheses but the statistical analyses, overall, do not provide evidence that CAFOs are associated with a number of health problems. Environmental surroundings and a reduction in quality of life for people living in the regions studied in Central Mississippi were tested differently.

Surprisingly, the responses regarding water advisories being implemented in the regions reported 18 people stating they either disagreed or strongly disagreed (with the statement “My community has been under a ‘boil water’ or ‘do not drink the tap water’ ordinance at least once in the last 3 years”) and 25 people stating they agreed or strongly agreed with that statement. Eight answered “don’t know”. Respondents that use a well water system, as opposed to municipal or city water that is tested frequently, need to have their water tested. In addition, with the average distance of residences to a CAFO being 2.60 miles, testing of well water is crucial to the health and environmental safety of residents and geographic regions. In the region of this study, it can be the residents’ financial responsibility to test their own wells for any abnormalities or pathogens present in their water.

Table 9: The Percentages of Responses to Quality of Life and Environmental Surroundings Questions.

Statement on Survey	Percentages					
	SD	D	N	A	SA	DK
1. Play Outside without worry of pollutants in air.	17.6	5.9	5.9	25.5	43.1	2
2. Open windows to get fresh air.	17.6	11.8	0	35.3	35.3	0
3. Environment allows me to be productive.	9.8	11.8	0	41.2	37.3	0
4. Active in community with church.	3.9	5.9	3.9	21.6	64.7	0
5. Active in community with family.	0	5.9	2.0	21.6	70.6	0
6. Active in community with neighbors.	5.9	11.8	7.8	33.3	41.2	0
7. Active in community with friends.	0	5.9	0	25.9	68.6	0
8. Odor/pollution does not allow me and family to use outdoor living areas.	52.9	11.8	3.9	17.6	11.8	2
9. Community has been under a water advisory at least once in last three years.	23.5	11.8	0	25.5	23.5	15.7
10. Noise such as 18 wheelers etc. cause problems	37.3	29.4	2	15.7	15.7	0
11. I use a well water system.	52.9	11.8	2	3.9	19.6	9.8
12. Tap water in home tastes different frequently.	49	21.6	3.9	11.8	9.8	3.9
13. Air around my home is normal or acceptable.	3.9	19.6	9.8	27.5	39.2	0

Note: SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree; DK = Don't Know

Questions regarding the surrounding environment and pollution have already been analyzed in a general manner and the same trend was reported (See Table:9). Statements 1 through 7, and 13 are positive statements and the respondents mostly agreed (or strongly agreed) with them (agreed mean percentage = 29%; strongly agreed mean percentage = 50%). Statement 8 indicates the respondents in the sample strongly disagree with the statement regarding “odor and pollution does not allow them and/or their family to use outdoor living areas” which is in

line with the theme of the other responses. While those answers indicate a positive quality of life and minimal environmental degradation in the region sampled, there were two particular statements on the questionnaire, the first being the well water presence (#11) and the answers indicated that 23.5% of the respondents used a well water system, with almost 10% not knowing if they use one or not. As mentioned earlier, it is the residents' responsibility to frequently check their well water for any bacteria or pathogens. The city is not responsible to do this. The second statement (not included in the table above) "Activities of chicken (poultry) farms are the major source of pollution in my community" needs to be addressed more explicitly:

Table 10: Major Sources of Pollution in my Community

Activities of chicken (poultry) farms are the major source of pollution in my community.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	14	27.5	28.0	28.0
	Disagree	10	19.6	20.0	48.0
	Neutral	4	7.8	8.0	56.0
	Agree	6	11.8	12.0	68.0
	Strongly Agree	13	25.5	26.0	94.0
	Don't Know	3	5.9	6.0	100.0
	Total	50	98.0	100.0	
Missing	System	1	2.0		
Total		51	100.0		

The responses to this question indicate that 27.5% of the respondents strongly disagree with the statement. However, 25.5% of the respondents strongly agreed with this statement, almost distributing the answers in half. It appears that about a fourth of the respondents strongly disagree and about a fourth of the people strongly agree that chicken poultry farms are a major source of pollution in their community. When the percentages of answers are added together, for example, disagree and strongly disagree = 47.1%, while agree and strongly agree = 37.3%. These numbers are not as suggestive as the first two percentages, but it still appears the responses indicate the regions' outlook on chicken farm pollution could be split in the belief that chicken farms are the major source of pollution in their area.

There was not enough secondary data to accept hypotheses 1, 2, or 3 either. As previously mentioned (in the GAO Report) the USEPA does not efficiently regulate CAFOs and relies on regional departments of public works to report instances that may compromise the drinking water of citizens in certain parts of Mississippi. According to Mississippi's website, inquiries on environmental problems require filing a Freedom of Information Act Inquiry. Once approved, the person may go to the MDEQ and view the files requested (Mississippi.gov).

The Environmental Compliance and Enforcement division oversees the enforcement of regulations in agriculture according to Standard Industrial Classification Codes (SIC codes). The SIC code for Animal Feeding Operations (AFOs) is 0251. The contact link "Branch of the ECED" was attempted three times but the website was down.

Just comparing Mississippi's website to other states' websites, especially Michigan's, when searching for CAFO related statistics is extremely frustrating. Michigan encourages requests for information regarding CAFOs and animal feeding operations (AFOs). Indeed,

Michigan is responsible for the website nocafos.org which provides a wealth of knowledge on the environment. Also, The University of Michigan has the School of Natural Resources and Environment which is another resource outlet that the state offers its citizens and anyone researching environmental and natural resources on the Internet.

H4: Malodor will be the most prominent complaint among the citizens living near CAFOs in Central Mississippi.

This hypothesis can be accepted. The additional comments on the survey about the smell of the chicken farms, conclusively supports this hypothesis. A list of the comments verbatim is available in the Appendix. As mentioned earlier in previous studies, malodor has been a prominent complaint among CAFO neighbors and how the odors cause frustration and anxiety among residents (Horton et al. 2009; Wing et al. 2008). CAFO malodor may be more than just an inconvenience for neighboring citizens. The air around poultry CAFOs may contain particles of the poultry litter (described earlier) which transforms into uric acid and then ammonia and is water soluble; absorbed quickly in upper airways (USEPA Report 2004). This problem can be easily fixed or at least partially alleviated through proper composting of eligible materials by the CAFO organizations (USEPA 2004).

These odors also contain nitrous oxide, methane (which stays in the atmosphere for up to 10 years and contributes a significant amount of greenhouse gasses), and volatile organic compounds (VOCs) such as benzene, chloroform, and formaldehyde (USEPA 2004). In addition, the odors (or air affecting the communities with CAFOs) contain volatile fatty acids (VFAs) resulting from lipids and protein that does not completely degrade producing a list of

several air pollutants (USEPA 2004), none of which I could pronounce, nor do I have the expertise to discuss them.

H5: The majority of respondents will be African American.

This hypothesis cannot be accepted. The majority of respondents were White/Caucasian. Seventy-eight percent of the sample is White/Caucasian which is due to the small sample size and the demographic make-up of the region. However, the previous literature and discussion in this thesis, describe CAFOs being placed in minority and low SES communities, which is the reason of my fifth hypothesis. Further investigation into this anomaly is warranted.

Ethics

The surveys did not cause any harm to the subjects. They remain anonymous. Consequently, there are no ethical violations involved. The survey and other supplementary procedures were presented to the Institutional Review Board who endorsed this thesis based on the determination that it poses no threat to human subjects. Thus, there is no physical, emotional, ethical, or moral harms to the subjects involved in this research.

Chapter 5

Conclusion

Discussion

Technological advances have enabled the mass production of animals for food to provide it quickly to citizens. The technology, innovation, mechanization, efficiency, and speed at which slaughterhouses and CAFOs run is impressive and achieves the highly coveted economies of scale that business demands, to make a profit in a capitalist market. These kinds of advances are apparent in all realms of society including extraction of renewable and non-renewable energy, transportation, information technology, and engineering, just to name a few. Such advances have allowed unprecedented economic and social growth in major developed countries and the principles of technological development, efficiency in business, and achieving a profit are what capitalism stands for. These principles have been applied to agriculture involving the production of animals for food.

The modern practices of animal husbandry are completely unrecognizable from what they were at the turn of the 20th century. Animal husbandry is so different today that it requires a new term, “animal warehousing”¹¹. The production of animals for food has been unnaturally forced to adhere to the requirements of capitalism, but the externalities of animal warehousing, such as the risks and consequences mentioned earlier on human health and the environment can no longer be ignored. People can no longer be complacent when confronted with problems

¹¹ Author’s terminology.

created by animal warehousing. This thesis has exemplified the reality of living close to a CAFO or factory farm.

Other Findings in the Survey Data

Interestingly, the number of respondents that knew what the term CAFO meant was slightly over one half. When the entire sample was asked how far they believed an animal factory farm was from their residence, the average reported distance was 2.60 miles (with one resident reporting 30 miles). This indicates that the sampling was successful in staying within close proximity of a CAFO. The majority of people responded they had not had a problem with a CAFO and the majority of the type of CAFOs reported near the respondents was chicken.

Chi-Square Tests and Frequency Tables have given enough statistical information for the scope of this project. Chi-Square Tests were run on the following variables with the resident's response to how far they believed they lived from a CAFO. Here are the following results listed:

Sex and Distance = $X^2(13) = 16.1999$, $p=.239$ (Not related)

Race and Distance = $X^2(39) = 56.336$, $p=.036$ (Related)

Education and Distance = $X^2(65) = 95.943$, $p=.008$ (Related)

Income and Distance = $X^2(65) = 59.794$, $p=.659$ (Not related)

Marital Status and Distance = $X^2(52) = 81.510$, $p=.006$ (Related)

The variables race, education, and marital status are related to variable distance (race only being slightly related based on its p value) from a CAFO (due to the p values) but the sample size is too small to make any conclusive or inferential statements. The sample's race was also highly skewed. Seventy-eight percent of the sample responded white when asked what race

they identified with. This runs counter to what the previous studies and literature reviewed had indicated. Studies have shown that race is a factor when analyzing where toxic waste is dumped (Bullard 2000). More specifically, elementary schools with “low-white/low SES enrollment” reported to have more CAFOs closer to them and more occurrences of CAFO odors than “high-white/high SES enrollment” schools in North Carolina (Mirabelli et al. 2006:539). Class is also a factor not only in that North Carolina study, but in this study, as well.

The responses for education level achieved indicated the majority of the sample, 33.3%, achieved a high school diploma or a GED, while 23.5% held an associate’s or vocational degree and another 23.5% held a bachelor’s degree. The majority indicated they were married and almost half of the sample had a household income of \$0 to \$29,999 per year. The relatively low education level achieved and the low household income reported, define the sample’s class as having a low socioeconomic status. Therefore this study may conclude that the inequality experienced in Mississippi is based on class and not race even though (based on the previous literature and studies discussed earlier) inequality in regards to CAFO placements experienced nationally is based on both.

Cancer and Neurological Diseases Reported

Health questions regarding cancer and atypical childhood illnesses reported compelling results. There were 13 adults diagnosed with cancer (n=51) including kidney, stomach, prostate (2), melanoma, uterine, pancreatic, breast (3), and bladder. The number of children under the age of 18 living in the households was 16 and two of them have been diagnosed with epilepsy and a

seizure disorder. Other disorders in adults included: aneurysms¹², seizures, asthma, wet macular degeneration, numbness, Parkinson's (2), and autism. Many of these are neurological diseases with both the infected child and adults living between .25 and 4 miles of a chicken CAFO; therefore the connection between roxarsone used in poultry feeding and neurological illnesses and cancer, in children and adults, is suspected and requires further investigation.

Due to the proliferation of chicken broiler CAFOs in such a small geographic area, more extensive testing needs to be done to definitely say there is no relationship between cancer and neurological diseases in humans living near CAFOs and the organizations themselves that use roxarsone in their feed.

(1) How has the feeding of our citizens turned into such a risky, alarming, and negative sociological issue? (2) What factors have led to the spread of environmental degradation and disease among society's members? (3) What are the unintended consequences of CAFOs? (4) What exactly needs to be done about these unintended consequences? (5) How is modern agriculture affecting our society? (6) What do we know about Risk Society theory and how does it apply to modern agriculture and its deleterious effects on society? (7) Who is most likely to live close to a CAFO? (8) What can we learn by taking qualitative measures into the field and studying communities affected by CAFOs?

These research questions have preoccupied me throughout this study. All of them have prominent themes attached to them, some more than others. The themes I derived from them are: Social change in food culture, the culpability of large food companies destroying the

¹² The respondent suffering from aneurysms was diagnosed with a hole in her brain but was diagnosed as having a muscle disorder. She is on a strict daily medicine regime and has appointments with her doctor once per month. The respondent is disabled and told the survey administrator her condition only happens "one in a trillion" although this statistic has not been researched for verification.

environment, socioeconomic status and class inequality. Obviously risk society as well, but more specifically the externalities these CAFOs create, pass on to citizens, and then not held accountable for their involvement. Environmental injustice and the consequences of modernity are two more. Risk society theory states that the advances that modernity is responsible for are contributing to unintended consequences and negative ramifications (Beck 2010). The advances in agriculture and mass production of animals for food are causing negative health consequences and environmental harm to the communities who live near CAFOs. Not to mention the diseases carried in the packaged meat and eggs destined for grocery stores and restaurants.

Question four is especially pertinent. What needs to be done about these externalities? To add to the questions I ask, “What needs to be done to prevent the unintended consequences, risks, and externalities that are happening not just in rural America, but across the entire globe?” As stated earlier: The John Hopkins University School of Public Health has already determined that the current industrial methods of farming present risk to public health and the environment, as well as harm to the animals raised for food (Imhoff 2010). The examples, discussion of previous studies, and empirical analyses presented in this thesis clearly supports this statement and it is the responsibility of governments and CAFO owners to make the necessary changes in order to avoid such risks. This is the underlying theme of what is known as the Precautionary Principle which has become the “central principle of environmental risk assessment” (Barry 1999:248). In short, the precautionary principle when it is discussed in the realm of food production, guides the belief that companies and CAFO owners should proceed in business with avoiding risk and if environmental or human health problems occur, the burden of proof should not be on the victims but on the businesses themselves.

Limitations

The findings of this study may be considered insufficient by some readers. This study had many limitations including the time frame for which to complete it (“to my satisfaction,” which was a hindrance), the sample frames, the cities chosen to sample, limited financial resources, myself being non-focused for the last 30% of the project due to extenuating circumstances, lack of reputable and peer reviewed qualitative articles, and inadequate qualitative measurements to supplement the quantitative data.

In order to overcome some of the statistical insufficiencies, analytical techniques used were: Microsoft Excel 2010 and IBM SPSS V 19 and 20 for descriptive statistics, Chi-Square Tests, and Frequency Tables. These techniques are suitable for analyzing the survey data employed in this thesis. Chi-Square Tests assume that your variables are categorical and they may not be continuous variables (such as distance). Distance is important in this study, especially for hypotheses one through three, so the distance variable was re-coded to a categorical, ordinal variable (from a continuous variable) to test whether the closer a person lives to a CAFO is related to respiratory illnesses, gastrointestinal problems, or psychological issues. An ANOVA or Multi-variate regression model would have produced more accurate data to make inferential statistics about the population; however, there was a fundamental flaw in the sample frames which may have been one of the causes for such a small sample size achieved.

I based the RDD sample frame on the cities with the most CAFOs in the counties with high numbers of pounds of chicken meat produced, reasonable population and household counts, and radii from the addresses of three different CAFOs, in three different cities. The radii I chose were 6 miles for Philadelphia, 4 miles for Carthage, and 2 miles for Walnut Grove, all based on

the population and number of households. Survey Sampler Inc provided me with 1,000 RDD phone numbers within that criterion and immediately screened them for non-working numbers, equaling 457 remaining numbers. During my field work in Central Mississippi, I acquired a phone book of the area to supplement my sample frame and add a new city to be sampled (Union, encompassing Edinburg). The numbers of who answered, who completed, and which ones were businesses are all in the Data & Methods Chapter. What was apparent, after about two weeks of calling, was the hostility of the answerers, who of course declined, and the number of calls not being answered. The other telephone administrators and I knew what was happening. The people in the cities were talking about the survey calls they had been receiving. In addition, Fowler (2009:81) states the telephone is “less appropriate” to ask sensitive and personal questions, especially within the first section of the questionnaire, as mine did. However, the hostility and anger encountered was happening before any questions on the questionnaire could be asked so I cannot conclude for sure that the order of questions was an issue.

The moment that made me realize the mistake I made by clustering the populations to be sampled, too close together, was one particular call. A lady answered and I went through my introduction and her response was “I’m eating supper now.” I then heard her husband (or a male’s voice) in the background say “Is that the survey people? Damn survey people.” The lady laughed and I said I was sorry for interrupting her dinner and thanked her for taking my call. As she was hanging up the phone, the man’s voice could be heard yelling “Let me talk to them!” The other telephone administrators mentioned to me that they had been experiencing more and more hostile people as the days went on. An undergraduate sociology student was able to help one weekend (towards the end of making the telephone calls) and she was met with hostile and rude people answering. Comments made were “I don’t care about this crap!” and “take my

number off your list” as well as blatantly hanging up on her during her introduction. The same hang up experiences were shared with myself and the other administrator towards the end.

Looking back, I would have done a few things differently, but I am proud of the work I have accomplished. In future research, more cities, in a larger geographical area, will be sampled to achieve a larger sample size. This may also rectify the geographical problems of “close knit” communities talking to one another about the telephone surveys. The survey instrument may need to be adjusted as well. In all, more time and resources are definitely needed to research this social conflict issue.

The modernization of animal food production is only going to cause more and more problems for society and the environment which may not be recognized right away because most disease and environmental degradation is insidious. It is hard to prove legally so a majority of society does not take it seriously enough. As previously discussed, Barry (1999) explains that society views nature and the environment as non human. Moreover, much of current society is still in the mind frame of the Human Exemptionalist Paradigm (HEP) as evidenced by the mass consumerism of not just food, but of everything tangible. The environment will not be taken seriously by mass culture unless major inconveniences or more environmental catastrophes and disasters continue to happen at a more frequent pace. It will take a major inconvenience to shift peoples’ perception of food production and the environment as a means to succeed in capitalist society. A pandemic, a loss of oil (either due to supply or unattainable pricing), and /or a series of natural or man-made disasters are the only three major issues possibly happening that could make our society change its current materialistic ways. In addition, materialism in our capitalist society has fueled more and more social class inequalities. More and more consuming leads to

more and more externalities from CAFOs such as pollution of the air and waterways that low socioeconomic and minority (according to previous literature in this thesis) citizens have to live near; not to mention the increases of methane and other greenhouse gasses the CAFOs are responsible for as well.

Complacency is a consumer's escape to not worry about the polar ice caps melting or the fact that at some point in the near future this country will not have gasoline to fill the cars that are now massively produced and consumed. If the United States does have gasoline, only the elite will have the financial resources to buy it. In addition, the producers of these animals for food, such as Tyson Foods, Smithfield, and Perdue hold power over not just the animals produced, but over the people living in the communities where they contract farmers or have their own facilities. They hold enormous power over the farmers as well, but the competing interests of both farmers and multi-national food companies hold the most power over the citizens in the surrounding communities. Money and power, which are the goals of competitive businesses in capitalism, are inhibiting the changes that need to be made by both, for the sake of animals, humans, and the environment. Money is also inhibiting these food production companies from instilling the precautionary principle in their daily business activities. Improvements to CAFOs can be made which would relieve some of the social injustice, inequality, detriments to the environment, as well as human health, these businesses cause in communities. However, these improvements cost money, which in turn lower profits and cause these animal production facilities to not be able to compete in the capitalist society they were built and designed to do.

Beck and Giddens, as well as other scholars, have written about this topic. Technology has improved our lives in unprecedented ways. There has been a shift from the HEP to the New Ecological Paradigm (NEP), but still society relies on finite biophysical environmental resources (Catton and Dunlap 1980). Eventually, Taylor (2000) wants society and businesses to adopt the Environmental Justice Paradigm (EJP) and the costs of not adopting this view on nature and environment can only lead to more harm, injustice, sexism, and racism due to the environmental conundrums society finds itself in now. Mass consumers have choices their earlier ancestors did not, such as what car to purchase, what house to buy, and which computer to buy. Mass consumers even have a choice to buy a chicken sandwich from a restaurant that previously bought the chicken from a place where the animal had to spend its entire 45 days alive in a CAFO. This, I call the “warehousing of animals for food” or simply “animal warehousing.”

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Appendix A

Central Mississippi Telephone Survey conducted February – March 2012

Telephone dialogue for surveys:

Page 1

“Hello, my name is Bryan and I am a graduate student at the University of New Orleans. You have been selected for a telephone survey regarding health, quality of life, and environmental issues in your area. I’m not a marketer and I’m not selling anything. I am a student trying to finish my research and I’m interested in your opinions on these matters. It will not take more than 15 minutes to complete. Can we start?”

“The first set of questions deal with health. First, Are you 18 years or older? How many people including yourself live in your home?”

If one person, including themselves they’ll just be answering the left side of the page:

“I’m going to read a list of ailments and I’d like you to tell me if you’ve experienced any of them in the last six months. If you haven’t, you may say *never* or *don’t know*. If you have, tell me how often you’ve experienced them – 1 is *once per month*, 2 *three times per month*, 3 *once per week*, 4 *twice per week*, and 5 is *every day*. I can reread these choices to you during the first part if you’d like me to.”

If more than one person lives there, ask them about themselves, then ask about anyone in their household. After a couple of responses, it moves much quicker:

“I’m going to read a list of ailments and I’d like you to tell me if you’ve experienced any of them in the last six months. Also, I’d like you to tell me if anyone in your household, other than yourself has experienced any of the ailments. You may say *never* or *don’t know*. If you have, tell me how often you’ve experienced them – 1 is *once per month*, 2 *three times per month*, 3 *once per week*, 4 *twice per week*, and 5 is *every day*. Then you may answer for the other person(s) living in your home. I can reread these choices throughout the study to you, if you’d like me to.”

Page 2

“The next section deals with quality of life and environment. I will read a statement and you can tell me if you 1 *strongly disagree*, 2 *disagree*, 3 *Neutral*, 4 *Agree*, 5 *strongly agree*, and if you don’t know you may say *don’t know*. I can reread the choices to you at anytime too.”

Demographics and the rest of the survey

“I’m going to ask some general questions and for the questions with choices available, please tell me which choice refers to you best.”

Appendix A Continued

Never	Once per Month	Three times per Month	Once per week	Twice per week	Everyday	Don't Know									
0	1	2	3	4	5	9									
Do you suffer from (or have you suffered from these) ailments in the last 6 months?							Does anyone in your household suffer from (or have they suffered from these) ailments in the last 6 months?								
Headaches?	0	1	2	3	4	5	9	Headaches?	0	1	2	3	4	5	9
Runny Nose?	0	1	2	3	4	5	9	Runny Nose?	0	1	2	3	4	5	9
Sore throat?	0	1	2	3	4	5	9	Sore throat?	0	1	2	3	4	5	9
Burning Eyes?	0	1	2	3	4	5	9	Burning Eyes?	0	1	2	3	4	5	9
Excessive Coughing?	0	1	2	3	4	5	9	Excessive Coughing?	0	1	2	3	4	5	9
Excessive sneezing?	0	1	2	3	4	5	9	Excessive sneezing?	0	1	2	3	4	5	9
Breathing Difficulty?	0	1	2	3	4	5	9	Breathing Difficulty?	0	1	2	3	4	5	9
Asthma?	0	1	2	3	4	5	9	Asthma?	0	1	2	3	4	5	9
Diarrhea?	0	1	2	3	4	5	9	Diarrhea?	0	1	2	3	4	5	9
Constipation?	0	1	2	3	4	5	9	Constipation?	0	1	2	3	4	5	9
Neurological problems?	0	1	2	3	4	5	9	Neurological problems?	0	1	2	3	4	5	9
Depression?	0	1	2	3	4	5	9	Depression?	0	1	2	3	4	5	9
Anxiety?	0	1	2	3	4	5	9	Anxiety?	0	1	2	3	4	5	9
Stress?	0	1	2	3	4	5	9	Stress?	0	1	2	3	4	5	9
Muscle Tension?	0	1	2	3	4	5	9	Muscle Tension?	0	1	2	3	4	5	9
Skin Irritation?	0	1	2	3	4	5	9	Skin Irritation?	0	1	2	3	4	5	9
Anger/Rage?	0	1	2	3	4	5	9	Anger/Rage?	0	1	2	3	4	5	9

Have you been diagnosed with cancer? _____

If yes, may I ask what kind? _____

Has anyone in your household been diagnosed with cancer? _____

If yes, may I ask what kind they were diagnosed with? _____

Do you have any additional comments you would like to add concerning your personal health history or well-being? _____

Appendix A Continued

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Don't know
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1	2	3	4	5	9
---	---	---	---	---	---

I can play outside with my children or sit on my front or back porch without worrying about pollutants in the air. 1 2 3 4 5 9

Activities of chicken (poultry) farms are the major source of pollution in my community.

1 2 3 4 5 9

I can open the windows to get fresh air when the weather is nice.

1 2 3 4 5 9

What kind of work do you do presently? _____

The environment such as the air around me, allows me to be productive. 1 2 3 4 5 9

What was your age on your last birthday? _____ (Years)

I am active in my community through:

*Sex: Male*____ *Female*_____

- a. church, 1 2 3 4 5 9
- b. family relations 1 2 3 4 5 9
- c. neighbors. 1 2 3 4 5 9
- d. friends 1 2 3 4 5 9

How many people live in your home (including yourself)? _____

My community has been under a “boil water” or “do not drink the tap water” ordinance at least once in the last 3 years. 1 2 3 4 5 9

How many of them are under the age of 18? _____

Noise, such as 18 wheelers, tractors, or similar vehicles, has caused problems in my community.

1 2 3 4 5 9

Other than typical childhood illnesses do any of the children in your house hold have any major medical problems diagnosed by a doctor? _____

I use a Well Water system (not municipal or city water). 1 2 3 4 5 9

If so, may I ask what kind of disease or illness? _____

The tap water used in my home tastes different on a frequent basis. 1 2 3 4 5 9

The air in and around my home is normal or acceptable. 1 2 3 4 5 9

Odor or pollution does not allow me and my family to use our outdoor living areas.

1 2 3 4 5 9

Appendix A Continued

Your household level of income per year: (Circle one) 1. \$0 – \$20,000 2. \$20,001 – \$29,999

3. \$30,000 - \$39,000 4. \$40,000 - \$49,999 5. Above \$50,000

What race do you identify with? (Circle one) 1.White/Caucasian 2.African American 3.Asian American

4. Hispanic/Non White 5. Native American 6.Other Please Specify _____

Education Level achieved: (Circle one) 1.Grade School 2. High School/GED

3. Associate or Vocational Degree 4. Bachelor’s Degree 5.Masters

6.PhD 7.Professional (Doctor, Lawyer, Pharmacist, etc.)

What is your marital status? (Circle one) 1.Single/Never Married 2.Married

3.Divorced or Separated 4.Widow 5.Living with someone (Romantically)

6.Living with family 7.Other (Please Specify)_____

Just a few more questions and you’re done!

Do you know what a Concentrated Animal Feeding Operation (CAFO) or factory farm is? Y N

How far would you say your residence is from the nearest animal factory farm? _____(in miles)

If so, do you know if it is a chicken, cattle, or swine farm, or a combination of animal farms? Y N

If yes, please identify the type of farm. _____

Have you had any problem with a CAFO or factory farm in the last 3 years? Y N

If so, please explain _____

Is there anything else you would like to add to this survey?

Thank you so much for helping me today and participating in our research!

Appendix B



Appendix C

Illustrations

Illustration 1: A typical sign in front of a poultry CAFO in Mississippi



Illustration 2: Another typical sign at the entrance from the highway in Mississippi



Appendix C Continued

Illustration 3: Feed Silos at a CAFO in Mississippi



Illustration 4: Mississippi CAFO



Appendix C Continued

Illustration 5: Mississippi CAFO 2



Illustration 6: Mississippi CAFO 3



Appendix C Continued

Illustration: 7 Mississippi CAFO (Notice the Red barns, the irony is not lost on me)



Illustration 8: Mississippi CAFO (the size is amazing)



Appendix C Continued

Illustration 9: Same Mississippi CAFO up close



Illustration 10: same Mississippi CAFO as previous two with home on property



Appendix C Continued

Illustration 11: Tyson Plant less than 2 miles north from Walnut Grove, MS



Illustration 12: Edinburg, MS (Between Philadelphia and Carthage)
Picture taken from a church Parking lot



Appendix C Continued

GOOGLE EARTH RECORDING

Please install Google Earth on your computer to View this Recording. It is free and a great resource!

Edinburg, MS CAFOs Recording.kmz

Edinburg, MS CAFOs between Philadelphia and Carthage, Mississippi

Driving from Philadelphia, MS to Carthage, MS on HWY 16 E. Turned left on HWY 427 and found a CAFO complex in a rural community next to a relatively nice looking church. Parked in the lot and took pictures (see illustration 12 on previous page). After getting home from Mississippi, I found Edinburg, MS and the church on Google Earth and made a recording.

The Google Earth recording does not have sound. The video begins with the church on Hwy 427 on the left and in the back of the church you can faintly see some of the CAFO structures. I switched from Streetview to Aerial View and it shows the number of CAFOs next door to the church and then I recorded aerial footage of Edinburg, MS. Notice not only the amount of complexes but the actual number of warehouses which house the animals.

Appendix D

IRB Approval 04Feb12

UNO Institutional Review Board [unoirb@uno.edu]

Sent: Monday, February 13, 2012 10:20 AM

To: Francis O Adeola

Cc: Bryan Richard Clarey

University Committee for the Protection of Human Subjects in Research

University of New Orleans

Campus Correspondence

Principal Investigator: Francis O. Adeola
Co-Investigator: Bryan R. Clarey
Date: February 10, 2012
Protocol Title: "CAFO: Hazards, Environmental and Health Risks as the Latent Products of Late Modernity"
IRB#: 04Feb12A

The IRB has deemed that the research and procedures described in this protocol application are exempt from federal regulations under 45 CFR 46.101 category 2, due to the fact that the information obtained is not recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects.

Exempt protocols do not have an expiration date; however, if there are any changes made to this protocol that may cause it to be no longer exempt from CFR 46, the IRB requires another standard application from the investigator(s) which should provide the same information that is in this application with changes that may have changed the exempt status.

If an adverse, unforeseen event occurs (e.g., physical, social, or emotional harm), you are required to inform the IRB as soon as possible after the event.

Best wishes on your project.
Sincerely,

Robert D. Laird, Ph.D., Chair
UNO Committee for the Protection of Human Subjects in Research

<https://bl2prd0310.outlook.com/owa/?ac=llcm&t=IPM.Note&id=RgAAAA...> 2/13/2012

Appendix E

Additional Comments Regarding the Respondent's Health and the Health of Anyone in their Household (if applicable).

ARTHRITIS

BEING TESTED FOR ASTHMA SOON

BOTH STILL KICKING

DAUGHTER HAS SEIZURES 7 YEARS OLD. SHE'S ON MEDICATION SINCE SHE WAS BORN.

GOOD HEALTH – GOOD SHAPE

GOOD HEALTH FOR BOTH OF US

HELL WITH MY BODY. JOINT PROBLEMS. WORRIED WON'T HEAL.

HUSBAND HAS EPILEPSY

HUSBAND IS BEING TESTED FOR ASTHMA NEXT WEEK.

I'VE HAD TWO SEIZURES IN 3 YEARS. SON HAS EPILEPSY.
IN REMISSION 2 YEARS

JUST STRESSED OUT.

MACULAR DEGENERATION WET TYPE. SHE TAKES INJECTIONS

MY CHILD HAS ASTHMA. 7 YEARS OLD

NON RESPONDENT HAD AN ANEURYSM. SHE HAD A HOLE IN HER BRAIN A FEW YEARS AGO. THIS HAPPENS ONE IN A TRILLION. HER DIAGNOSIS IS A MUSCLE DISORDER. SHE IS DISABLED. SHE SEES A DOCTOR EVERY MONTH. SHE'S ON MEDICATION EVERY DAY FOR THESE COMPLAINTS.

NON-RESPONDENT IS GOING TO BE TESTED FOR ASTHMA

NUMBNESS

OKAY DESPITE HAVING PROBLEM (PARKINSON'S)

PARKINSON'S

PRETTY GOOD HEALTH

RESPONDENT HAD HEART ATTACK IN 2001 AN 5 BYPASSES. HUSBAND HAD THROAT AND LUNG CANCER. DIED 8 YEARS AGO

SON HAD LIVER TRANSPLANT ONE YEAR AGO AT AGE 45 AT OSCHNER HE HAS HEP C

THYROID AND BLOOD PRESSURE

TOTALLY FINEWIFE HAS BAD HEART, ASTHMA, HERNIATED DISK AND BAD KNEE

Appendix F

Additional Comments Regarding any Problems the Respondent May have had with CAFO(s) near residence (if applicable).

BAD SMELL, CAN'T GO OUTSIDE. OWNERS ARE RUDE. BEEN CALLED A "WET-BACK"

CHICKEN HOUSES – THERE ARE PROBLEMS. THE SMELL. THEY ARE REALLY NICE TO THE KIDS. WHEN THE CHICKENS ARE LEAVING YOU CAN REALLY SMELL IT.

EVERY ONCE IN A WHILE THE SMELL (IS A PROBLEM)

HATCHERY – SOMETIMES YOU CAN SMELL THE FEED. THE FEED IS YELLOW AND IT SMELLS

HE KNOWS ABOUT CHICKEN FACTORIES – HOGS ARE A BIG PROBLEM. IF YOU LIVE VERY CLOSE THERE IS SOME ODOR. THE GOVERNMENT IS VERY PARTICULAR ABOUT THE MANURE. THEY APPLY HEAT. YOU CAN ONLY PUT THE MANURE OUT IN CERTAIN PLACES

JUST ODOR EVERY ONCE IN A WHILE. FEATHERS AND DUST FROM THE TRUCKS WHEN THE CHICKENS ARE ON THEM.

JUST THE AROMA

JUST THE SMELL. CAN'T STAY OUTSIDE FOR TOO LONG

NO ODORS NO TRAFFIC* (POSSIBLE INTERVIEWER BIAS, LEADING)

ODOR PROBLEMS MOSTLY, DUST, FEATHERS, 18 WHEELERS

ODOR SOMETIMES IS A PROBLEM, NOISE FROM TRUCKS

SHE KNOWS ABOUT HOG FARMS AND HOW BAD THEY ARE BUT...
SMELL FEATHERS AND DUST. CAN'T GO FOR WALKS, DO GARDENING

SMELL, NOISE, WHEN THEY ARE MOVING THE CHICKENS OUT (OF THE CAFOS) YOU STAY INSIDE

SORT OF – THE SMELL, NOISE OF TRUCKS

THE SMELL AND NOISE. FEATHERS WHEN THEY ARE TAKING THEM OUT OF THE CHICKEN HOUSES. AND DUST

THE SMELL AND THE WASTE HAS BEEN A PROBLEM. WASTE LIKE MANURE, FEATHERS, DUST, MANURE SPRAY THINGS

THE SMELL. I DON'T SMELL THEM AT MY HOME BUT DRIVING PAST IT TAKES YOUR BREATH AWAY.

THE SMELL. DUST, FEATHERS AND DEAD CHICKENS ON HIGHWAY

THERE AREN'T ANY AROUND HERE
UNION IS 20+ MILES AWAY OR 28-29 MILES AWAY

YOU CAN'T GO OUTSIDE SOMETIMES BECAUSE OF SMELL. YOU SEE

Appendix G

Any Additional Comments the Respondent may have had at the end of the survey.

YOU CAN TELL WHEN THEY ARE MOVING THE CHICKENS IN AND OUT. FRESH LAUNDRY OUTSIDE IS IMPOSSIBLE. WASH OVER AGAIN OR PUT IN DRYER. THEY SHUT DOWN THEIR DAIRY FARM.

ANYONE NOT RAISED ON A FARM IS STUPID. WE NEED FARMS TO EAT.

BOTH MY WIFE AND I HAVE HAD HEADACHES, RUNNY NOSES, BREATHING DIFF. BEING TESTED FOR ASTHMA SOON. CANNOT USE THE YARD B/C OF ODOR- FARMS PROBABLY. WHEN WE'RE DOWN WIND AND IT'S BREEZY WE HAVE TO CLOSE EVERYTHING UP. BUT THEY (CAFOS) ARE THERE AND FAR ENOUGH UP THE ROAD SO IT DOESN'T AFFECT ME. SHE NEVER SEES THE TRUCKS CAUSE THEY USE ANOTHER PART OF THE HIGHWAY

EVERYTHING IS GOOD. CHURCH, GOT SAVED. FANTASTIC

I DEAL WITH THESE PEOPLE EVERYDAY. THERE ARE NO NEGATIVES INVOLVED. THEY ARE CAFOS. IT IS NOT GOOD FOR THE BIRDS.

I ONLY DRINK BOTTLED WATER. MY WELL WATER TASTES FUNNY SOMETIMES.

I'M TAKEN CARE OF. I HAVE A BIG FAMILY.

NONE – THERE ARE NO FARMS NEAR HERE.

ONLY DRINK BOTTLED WATER

PRETTY SURE IT'S A CHICKEN FARM. COULD BE MORE THAN JUST CHICKEN.

SHE ONLY DRINKS BOTTLED WATER. SHE WILL NOT DRINK TAP WATER. SHE WAS ADAMANT ABOUT THIS AND SAID IT SEVERAL TIMES.

THEY (CHICKEN CAFOS) ARE WELL KEPT. NOT LIKE THEY USED TO BE.

WE LIVE IN TOWN THERE AREN'T ANY AROUND HERE

Vita

The author was born and raised in New Orleans, Louisiana and briefly lived in Nashville, Tennessee where he obtained his Bachelor of Business Administration in Marketing from Middle Tennessee State University. He joined the Sociology Graduate Program at the University of New Orleans in August of 2010 to pursue a Master of Arts. He became a member of the Southern Sociological Society and presented at the 2012 Annual Conference in New Orleans. He is also a member of the Mid-South Sociological Association. He plans to pursue a PhD in Sociology in order to teach at the university level, research, and publish works on several topics affecting society today.