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Joseph Shea April 17, 2013

Relocalizing the Joy of Food

A Sustainable, Desirable Future

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Abstract

Relocalizing the Joy of Food

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By Joseph Shea

Food production has become an ecologically destructive, socially detrimental, and even economically unsound process that has complicated and erased the simple farm-to-table systems upon which humanity used to rely. In a word, the process has become unsustainable. This thesis brings together academic theory to explore sustainability and apply it to the food production process, examining the effects of industrial food and small-scale alternatives. As an interdisciplinary work, the thesis draws on many fields of study and culminates in a sociological exploration of the effects of commitment to local food on quality of life. The ultimate goal of this project is to conceptualize a sustainable future, and posit that such a future is not only viable long-term, but desirable for individuals and communities today.

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Introduction

My generation faces deeply complex and volatile threats to both the global ecosystem and the global human community. Changes that will be realized in the near future if the world continues on its current path will irreversibly (at least in the foreseeable future of our species) damage the earth—forcing most species into extinction, raising sea levels high enough to drastically change land masses on the planet, and changing weather patterns that will scar landscapes. Anthropogenic global climate change is warming the earth; melting the ice caps that keep sea levels as low as they are, and the earth as cool as it has managed to stay; acidifying oceans making the life within them suffer; creating super storms of previously unimagined size and strength; and effectively destroying the ecosystems that sustain life on the planet, including our own lives.[1]

As the world's ecology, that sacred backdrop upon which all human progress depends, struggles to survive, so do the people of the world. Rampant social inequality, oppressive systems, and ghastly imbalances of power not only persist in the world, but also to dominate global society. Globally, resources are concentrated in first world (Global North) countries, leaving comparatively little for third world (Global South) nations. Just as Global North countries represent a concentration of wealth to an elite global minority, the same pattern holds within these countries themselves—for instance, the richest one percent of Americans own over 30 percent of the nation's wealth. This massive inequality leads to, and is perpetuated by oppressive structures woven into the fabric of global society—racism, sexism,

[1] Bill McKibben's *Eaarth* provides an accessible account of environmental degradation due to climate change.

heterosexism, ableism, classism etc. Hundreds of millions of people in the world struggle for access to clean drinking water, basic healthcare, and food. While one nation complains about an 'epidemic of obesity' far more have populations that are dreadfully malnourished, facing famine constantly. Such inequality, injustice, and destruction in the world demands action.

Contemplating this situation is, in my view, viewing the world through the intellectual framework of sustainability. Categorizing social systems, business practices, economic structures, and environmental relationships as sustainable or unsustainable allows scholars to apply sustainability to the situations of the world, and places sustainability studies squarely in the tradition of interdisciplinarity. Given the situation of the world, the moment is ideal for interdisciplinary scholarship to address such issues and challenges.

The study of sustainability as an academic field is an ultimately practical, active participation. Understanding the dangers and challenges our world faces now and will face in the future is an inherently interdisciplinary task. One must be able to grasp complex systems' interactions from economic, social, philosophical, psychological, and environmental points of view. Thus, this project will be synthesize many fields of study for the purpose of contemplating the current state of sustainable systems in the world and the future possibilities of such systems. In my experience, the more I was exposed to the challenges we face and possibilities for more sustainable lifestyles, the more I felt called to act. The social inequality and environmental degradation, the central aspects of sustainability studies, require action. The field of sustainability is not one that allows for purely intellectual work,

but one that fosters and even demands activism. Thus, the nature of this study is atypical in that it hopes to use a strong academic background (theoretically and methodologically) to address material problems facing the world today. This project is a practice of academic, political activism.

This project is an exploration of my own education in the field of sustainability that has led me to understand our current world systems as unsustainable. I have structured this thesis to explore first the theoretical background of my position from a sociological and philosophical perspective as it relates to the ecological pressures humans now face as a species, and then to move toward describing a more sustainable societal solution by using food as a vehicle for that imagination. I have brought together the works of central authors in the field of sustainability, including journalist Bill McKibben, activists Andrew Kimbrell, researchers and scientists Brian Halweil, Daniel Lerch, Richard Heinberg, and Richard Manning, as well as sociologist Robert Bullard and philosopher Murray Bookchin in an attempt to fuse science, social theory, and philosophy into a holistic understanding of sustainability in food systems. The work of these authors outlines the theoretical situation of this study and calls attention to levels of societal decay and environmental destruction that urgently demand action.

The thesis will thus turn from a broader discussion of sustainability as it relates to environmental degradation and social injustice toward an explanation of the importance and salience of food within that discussion. After an examination of the global industrial food system's social consequences and environmental destruction, I will turn to local alternatives and their ecological sustainability,

economic support, and social benefits. I contend that such benefits make local food systems desirable alternatives, and will introduce my own research comparing quality of life of individuals who are committed to local food initiatives with those who do not share that commitment as evidence to support this desirability. The core of this project, however, is not an interest in food per se, nor an interest in philosophical social theory.

The core of this project is the recognition that sustainability is a framework necessarily applied to social inequality and environmental degradation alike. The core of this project is examination of and action in response to ecological degradation on a global scale. A consensus of sustainability authors demonstrates that such destruction puts the human race in an urgent situation, calling on us to act or suffer unimaginable environmental changes to our societies and the planet upon which we rely.

Chapter 1: Defining Sustainability

1.1 Linking Environmental Destruction and Social Inequality

Much of my understanding of sustainability comes from sociology and philosophical study of ideological connections. I have drawn from philosophy, sociology, and economics to construct my understanding of sustainability, and am now convinced that these fields coalesce into an interdisciplinary framework I call sustainability theory. Beyond the academic theory associated with the body of literature I am examining, the manifestations of this ideology are diverse and multitudinous, weaving through literature, film, media, and television discourse, in fields as different as politics, business, and art. The rhetoric of sustainability is becoming increasingly popularized and, clearly, increasingly amorphous. In many realms, 'sustainability' has been relegated to the status of a buzzword or catchphrase, a simple gesture toward something good and responsible. While I agree that sustainability is something 'good' and 'responsible,' the term, field, and framework are more specific than that. I have chosen to begin this thesis with a reminder of the massive inequality extant in our world because I see sustainability as a term contingent upon two concepts: longevity and justice. When taken in this broad intellectual direction, sustainability itself begins to play a role in all aspects of discourse, interaction, and ideation.

In the way I will treat sustainability in this study, an inherently sustainable idea, system, action is one that may continue indefinitely—meaning it does not consume resources faster than they are replenished or undermine its own

structure—while positively affecting the world around it, flourishing while nourishing the resources that fuel it. A sustainable initiative is one with a great deal of longevity and which benefits all parties that depend upon it and implement it. I recognize that this understanding of sustainability is so overarching that it may seem either impossible at a material level, or meaningless for its ambiguity, but I posit that such initiatives do exist, and that they are recognizable and definite even within this expansive definition. Many initiatives exist, however, that are unsustainable by this definition—many of which form a status quo. To illustrate both an unsustainable status quo and a sustainable alternative, I draw on my own experience living in Costa Rica and outline structures of ecotourism that fit these descriptions.[2]

During my time in Costa Rica I was exposed to multiple paradigms of ecotourism development throughout the country. In my experience, there are two major development strategies for incorporating ecotourism into a new region: one focused on economic development; and one focused on development and conservation. An area that uses ecotourism largely as a means for economic development will build up quickly, constructing new lodging options, multiple tour options, and increasing infrastructure to allow for greater access to the natural wonders of the country. Many towns and villages in Costa Rica have chosen to

[2] The example that follows, and others in this piece, is admittedly anecdotal. Though I have been careful in choosing examples that are accurate and applicable for the logical points they support, I recognize that they may not be as rigorous as some academic fields may demand. In part, however, this is the nature of an interdisciplinary work. A scholar dealing with so many fields cannot be responsible for a rigorous treatment of each. To achieve synthesis of larger points, and fuse information and concepts from diverse disciplines, certain steps must necessarily be outlined lightly rather than imprinted deeply. In the case of ecotourism, much literature can support the claims I make here, but a thorough examination of such literature was outside the scope of this project, so I chose to draw on my own experiences instead, and present it as evidence despite its anecdotal status.

develop in this way, with the consequences being ecological damage that can lower the amount of biodiversity in the region through pollution and deforestation. This paradigm has social impacts too; a common critique of ecotourism in the Global South is that the profits and economic benefits (including effects on quality of life and standard of living) often do not stay with local communities. There are many examples of Global North or multinational companies based elsewhere buying land and developing it to trade on its abundance of natural beauty or diversity and profiting greatly in the process, leaving few economic benefits for the local communities. Thus, this structure of ecotourism can actually degrade the natural ecosystems that attract tourism agencies in the first place, and do little for local denizens who work in tourism. Such a system cannot continue forever because of its damages to surrounding ecosystems and the subsequent economic pressures such degradation would cause to an industry trading on ecological health. This structure's lack of social empowerment means that it is an unjust system, benefitting a minority by subjugating local populations to hard work for little profit.

In contrast, I saw how ecotourism could be used as a means for powerful conservation of natural systems. Rather than prioritize economic development (often of non-local companies), ecotourism can prioritize environmental preservation and use ecotourism as a generator of economic and social stability that encourages local citizens to benefit from a pristine landscape. The joy derived from experiencing a natural ecosystem nourishes the people who take tours, encouraging continued conservation, further appreciation for the natural world, and serving the local economy and infrastructure. When anyone has access to nature walks and

guided tours, the system provides practically infinite opportunity for learning for the entire community. This capacity for teaching also generates continued respect and value of the natural system upon which it depends, and encourages further preservation. In this system, tourism agencies are owned and operated by locals that share directly in the benefits of the tours, while still recognizing the value of the environment. Agencies can be owned by non-locals, but the value of the local environment and of sharing the profit locally must not be compromised for a system to be put in place which nourishes and enriches the resources that sustain it: preserving natural ecosystems and empowering local communities. Economic development and infrastructure build-up certainly still take place in such a system, but because the driving force for development is conservation, the environment is not degraded, and the system may continue indefinitely. When local residents share in the benefits of economic development and the community is empowered to preserve the natural environment so that the group as a whole can continue to benefit from it, the system includes justice and longevity.

The example of ecotourism serves to illustrate my definition of sustainability and how I extend the applicability of the terminology to the level of a framework that operates in any context. As I began to understand sustainability more as a framework and less as a buzzword, I found sustainability applied to academic work—from philosophy to sociology, economics to natural sciences—and popular discourse—movies, television, journalism, and music. It was this widening of the scope of sustainability that led me to see sustainability theory as a coalescence of so many different disciplinary and extra-disciplinary knowledge bases.

The driving impetus of this study seeks to understand the societal inequality and oppression of both the world's population and the world's natural ecosystems within this framework of sustainability. Given that inequality of all forms plagues society[3] worldwide, the study must have an understanding of global inequality and global environmental degradation. Global social inequality is manifest in many ways. Hiring practices, promotion opportunities, money lending disparities, housing options, healthcare access, criminal prosecution and incarceration, and education quality are all affected heavily by race, class, and gender identity, and are all traditional foci of sociological study. But I contend that such inequality is one with environmental degradation, and thus this study is a globally situated examination of societal and ecological oppression within the burgeoning field of environmental justice (a field that includes studies of environmental racism, ecofeminism, political capital, community health, among other topics).

This field relates clearly to my work, as it increasingly reveals how the disenfranchisement of poor dark-skinned women and children are subjected to environmental destruction in their communities that affect their livelihoods and health (Pacheco, 2008, p. 715). In my view, no environmental issue is an exception to this rule; these issues all fall on the oppressed people of the world in subversive, covert ways. My work suggests that the intellectual basis for an extractionist, dominating relationship to nature matches that of an oppressive relationship between social groups. My theoretical approach contemplates a commonality

[3] To use the United States as an example, on average women earn only $.82 for every dollar earned by men (Dept. of Labor 2012). Median weekly household incomes for Black and Hispanic Americans are still lower ($615, and $549, respectively) than that of White and Asian Americans ($775, and $866, respectively) (Dept. of Labor 2012).

among all oppression ideologies, and is convincingly presented in the social theory of Murray Bookchin and Mikhail Bakhtin as Luiz C. Barbosa and Michael Bell read it, respectively.

1.2 Ideological Commonalities

Examining this theory and working under this definition over the past three years have led me to recognize of the unity of sociological issues and environmental issues. Luiz C. Barbosa's chapter "Theories in Environmental Sociology" (2009) was vital in this recognition, and introduced me to the fascinating work of Murray Bookchin, a social philosopher. Bookchin is credited with the creation of social ecology, a school of thought that examines how a society may be equated to an ecosystem, and how principles of study in either field can be applied interchangeably. Barbosa's chapter introduced me to Bookchin's philosophy as a new view of ecology that did not contemplate all ecological issues as a function of preservation or destruction of the natural world, but rather posited that "ecological problems arise from deep-seated social problems" (in Gould and Lewis, 2009, p. 30). Barbosa used Bookchin to expose an insightful view of the connection between social inequality and environmental destruction.

Bookchin's philosophy explicitly eliminates the division between social issues and environmental issues, and suggests that environmental issues cannot be resolved without an attention to the social contexts in which they reside. Barbosa's rehearsal of Bookchin's philosophy convinced me that social inequality is intrinsically connected to environmental degradation, to the point that "he saw

hierarchical mentality and class relationships prevalent in society as giving rise to the very idea of dominating the natural world" (in Gould and Lewis, 2009, p. 30). This thrust of Bookchin's social philosophy intrigued me, and forced me to examine similarities between the relationship among humans and the relationship between humans and the environment. I began to understand that social problems were inherently connected, if not in a causal way certainly in a direct way, to environmental degradation, and I was forced to consider what commonality two such issues could have. In search of the basis upon which these things were connected, I turned to Michael Bell's chapter "The Ideology of Domination" in *An Introduction to Environmental Sociology* (1998) to expose that connection.

Bell points to ideology within Western thought as the connective tissue that supports the relationship between social and environmental problems Bookchin posited. Bell traces the relationship between humans and the environment along the ideological shifts in Western thought, focusing on individualism, Christian doctrine, and patriarchy. Though understanding how hierarchical, oppressive views of social groups relates to environmental domination is an important and enlightening exercise, Bell's most compelling points come from his understanding of Mikhail Bakhtin's concepts of the Western understanding of the body, and how such an understanding is tied to individualism.

Bell's reading of Mikhail Bakhtin traces the generation of domination relationships (of all kinds, perhaps, but certainly to the natural world) to a schism between Western philosophy and the individual's body. The 'classical body' is an idealized, ritualized, and polite concept of the body, one that is reasonable and

removed from the desires, needs, and crudeness of the body's functions. The 'carnivalesque body' in contrast, is a body completely in tune with its rude actions, with no rituals to disguise its inherent grossness. To Bakhtin, the 'carnivalesque body' is one in tune with nature, connected to the wildness of the world, and free from societal constraints and the socially constructed minutia of politeness. For Bakhtin, the preference for the 'classical body' over the 'carnivalesque body' is the root of the disconnect between humans and nature. Bell uses Bakhtin to map the prioritization of the 'classical body' over the more naturally engaged 'carnivalesque body' onto a prevailing disinterest in the interconnectivity inherent in nature and, in its place, a heightened focus on the individual's success in society.

As a result Western thought shifted toward ferocious individualism—devaluing interconnectivity in favor of individual advance and growth.[4] Bell argues that the West has "understood [such] emphasis on the self in competitive and hierarchical ways" (Bell, 1998, p. 144). Such individualistic focus, founded on the competition and hierarchy Bell points out, leads to an oppressive view of nature—one that pits humans against and above nature, taking us out of the interconnection upon which nature depends. In fact, the end of Bell's chapter echoes sentiments found in Barbosa's reading of Bookchin: "the various theories of environmental significance of religion, individualism, and patriarchy all have a common theme: the central roles of inequality and hierarchy in the way that we think about the

[4] Later in this thesis I will address the contemporary debate between the value of growth (individualism) versus that of durability (interconnectivity) in economics as it is manifested in our food system's obsession with "efficiency" and increased productivity. This debate is central to popular rhetoric and discourse of economy and viability in the United States, and is at the heart of the creation of unsustainable or sustainable systems here.

environment" (Bell, 1998, p. 153). Bell applies a theoretical framework similar to Bookchin's to oppressive social systems in search of a commonality between social oppression and the oppression of the natural world. He goes on to remind us that "social inequality has not only material but ideological roots," (Bell, 1998, p. 154) demonstrating further his belief in an intellectual connection between all types of oppression. Bell's insightful examination problematizes the oppressive relationship humans have developed to nature (at least in the West, but increasingly, it seems to me, throughout the world as the Western lifestyle proliferates), and questions whether it can be seen as the ideological root of all oppressive systems.

I do not point to Bell's and Barbosa's readings of scholarship to indict individualism wholesale, or to place blame for environmental destruction on any singular idea shift in Western thought. I also do not place major significance on the 'original' oppressive system, provided that the idea that oppressive systems have commonalities is accepted, because the focus on individualism prevalent in contemporary Western capitalist society is clear. Such emphasis on individualism allows for the degradation of social structure and the environment by encouraging hierarchical valuation. The evidence Barbosa and Bell provide can be challenged or rejected entirely. The arguments they make, while intriguing and compelling for me, are not the focus of this thesis. Their positions highlight my belief that some of the cornerstones of western thought (from monotheism to capitalism) are connected to an antagonistic relationship between western subjects and the environment. I chose to revisit them simply to point out theoretical connections that have been drawn

between the mentality of Western subjects and environmental domination and destruction.

The work of Barbosa and Bell forces us to question whether or not unsustainable relationships between humans and nature—dominator relationships—are essentially discrete from unsustainable societal relationships prevalent in our world today. Simply put: is social inequality brought on by a wholly different intellectual apparatus than that which allows for environmental destruction? I contend that these issues are linked by ideological commonality along the lines of what Bell reads in Bakhtin and Barbosa reads in Bookchin, and, further, that such inequality is reified in our current food system today.

1.3 Examples of Social Inequality Paired with Environmental Destruction

These oppressive systems have many manifestations, from environmental domination to domination of the poor. Equipped with the social philosophy mentioned in the previous section, I began to consistently see both social inequality and environmental destruction as systems of domination. Which level of domination preceded which is not, for the moment, an important consideration because the focus of this thesis is not historical, but rather contemporary. Systems of oppression have been reified in our culture, as much as they may also be challenged, and allow for social and environmental degradation. The more important consideration is that these systems pervade global society, and examples of them can be found here in the US, tracing themselves onto both environmental devastation and social oppression. I

will focus on a domestic example of the link between social inequality and marginalized communities and environmental destruction. After showing how environmental degradation targets poor communities in the US, I will show this same phenomenon in an international context, and culminate with my views of climate change as it relates to social justice work—a planetary context.

In our own country, the poorest counties in the union suffer some of the greatest environmental destruction and subsequent public health effects. Mountain top removal (MTR) coal mining in Appalachia, specifically in West Virginia and parts of Kentucky, is a practice that has systematically leveled Appalachian mountains for years. Coal mining has long been part of the Appalachian culture, but only more recently has tunnel mining given way to the super efficient, deeply destructive MTR process. I use the word 'efficient' here mostly from the point of view of coal mining companies, as it is incredibly effective at extracting coal from mountains and providing a high return on investment. Unfortunately, it is also strikingly efficient at destroying surrounding ecosystems and endangering the health of nearby communities.

MTR is a process that relies on blasting to remove mountain peaks to expose coal veins underneath. Rather than tunnel into the center of the mountain, which takes a good deal of time, labor, and care, companies now employ fewer people to blow these mountains apart and use huge machines to harvest the coal. MTR is incredibly effective at destroying mountain ecosystems, not only by removing the physical land upon which these ecosystems exist, but also by devastating the topography of entire regions, filling in valleys while leveling peaks. Larger and

larger swathes of Appalachia, in one of the oldest mountain chains in the world, more closely resemble high plateaus than mountains as this process continues. In addition to changing the physical layout of mountains, the slurry—a toxic mixture of coal, chemical, and mud—poisons the groundwater of the surrounding area, making it unsafe to drink and unfit for life in mountain streams. Beyond that, ash and soot from coal collection and washing inevitably contaminates the air, forcing nearby communities to deal with increased rates of respiratory diseases (Geller, 2011, *Coal Country*). This is the basic ecological devastation of MTR, but communities surrounding these operations are also damaged.

As the environment around them deteriorates, members of communities near these coal-mining operations suffer the consequences of being among the poorest in our nation. The connection between this ecological devastation and social justice is simple. These people are trapped in their situations, with neither the economic nor political power to make changes, while the coal mining corporations make huge profits and have strong allies in the US congress and state legislatures alike. Communities deteriorate, torn apart by internal conflict on a communal and individual level. Research demonstrates that coal companies in Appalachia have made efforts to connect individuals' identity in the community with traditional economic identities of the region (i.e. coal mining) (Bell and York, 2010, p. 112). Such efforts are often successful in affecting identities (Snow et. al. 1986) even as coal-mining no longer "plays a dominant role in the local or regional economy" (Bell and York, 2010, p. 112). While some groups of people become activists in opposition

to the coal companies, many remain fiercely, even violently, loyal to the interests of companies that have employed their family members for generations.[5]

Poor Appalachian communities are being victimized by rich, powerful coal companies. By sucking the vast majority of money away from these communities, these companies continue to impoverish the people that must bear the brunt of consequences to their health, social and economic mobility, and a core part of their identity—the mountain environment. Only by preserving the inequality of political voice and economic influence in affected communities, and devastating the environment can these companies continue to profit at the level they have. We should recognize the international examples of domination systems as well. Around the globe, corporations preserve an inequality-riddled economic climate so that they may enjoy unlimited profit opportunities while causing devastation in communities and natural environments foundational to the functionality of their endeavors. [6]

Such systemic inequality was clearly demonstrated to me in Costa Rica, when I learned there about deforestation and its relation to banana plantations. Plantation workers are very poor people willing to do serious manual labor for little pay. Plantations offer exactly that opportunity, and tend to employ immigrants with very few job options. These plantations run based on global market demand, and are often owned by multinational corporations. These highly profitable companies open plantations when demand is high, and just as readily close entire operations to avoid

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[5] The documentary video *Coal Country* explores the actions of coal companies, anti-coal environmental activists, and communities in West Virginia effectively, and is a good introduction to the issues communities in Appalachia face.

[6] See *The Corporation* for an overview of corporate damage to communities and ecosystems around the world. The film points to many further resources for such information.

losses. Plantations include housing and basic infrastructure for their workers, and employees bring their families to these jobs. As the market fluctuates, fruit companies call more and more modern day peasants to work, and eventually saturate the market, driving demand down. With lower demand comes closed plantations, and low-skill, poorly educated workers are left stranded with their families, surrounded by rainforest, and unemployed. Their only option becomes subsistence agriculture at the expense of rainforest.

Slash and burn agriculture is often rooted in these situations, and is deadly for the rich tropical rainforest ecosystem. The process destroys some of the most biodiverse habitat on earth, and unfortunately does not even serve well as farmland. Because there are so many plants drawing from the soil in tropical rainforests, nutrients are depleted and soil is poor. The nutrient poor soil, as well as the increased erosion from the lack of an established root system, makes farming on such land a short-lived endeavor. Slash and burn agriculture will only allow a few growing seasons before the soil will no longer produce good yields.

Deforestation, though certainly caused directly by large monoculture plantations, including bananas, is indirectly caused by the global commodity crop market. The choice left to those who participate in slash and burn agriculture is a false choice—feed the family or preserve the rainforest. Clearly any head of household's priority must be feeding the family, but the origins of that choice stem from a system that disallows a more diverse set of options long before individuals reach that position. Those forced into perpetrating deforestation in the Global South, just like those who suffer the consequences of MTR coal mining in the Global

North, are forced there by a lack of political voice and economic power. These people's comparatively meager power stems from and leads to further inequality in the world, fitting the description of a self-perpetuating oppressive system. These oppressive systems are deeply detrimental to the people of the world and to the environment. I contend that the broadest and most dangerous of these systems, for both the planet and its people, is climate change.

1.4 Global Climate Change: A Global Injustice

The key example of the ecological destruction endemic to our global system of social injustice is climate change. Climate change causes or exacerbates many environmental issues, from water overuse and sea level rise to the spread of vector borne diseases and mass extinction events. Our climate is the basis for life on our planet, and its alteration and degradation has myriad consequences and repercussions. I contend that the connectivity between our climate and our whole environment reveals a relation to wide-ranging social justice considerations as well when common ideologies are granted between environmental degradation and social oppression.

Directly, climate change is already having a disproportionate effect on the oppressed people of the world. Coastlines recede, and those without the means to transport themselves away from their disappearing seaside homes are being displaced and left helpless. Air pollutants obscure views and increase respiratory disease rates, and people are stuck clinging to manufacturing jobs in factories that

poison the very cities in which they reside, damaging our climate at the same time. Peasants work terrible cash crop farm jobs as the health of their families is endangered by an ever-warmer climate that produces more and more challenges agriculture. Cruelly, many modern agricultural solutions rely almost exclusively on fossil fuel combustion that exacerbates the warming climate and the problems farm workers around the world face.

It is my contention that climate change is the greatest injustice the world has ever seen because it is the ultimate injustice perpetrated by the Global North against the Global South. As one sliver of the world's population consumes at ever-increasing rates and greenhouse gases spew into the air, the vast majority of the world's population suffers drastically irregular weather patterns, massive, overpowered storms, increased disease, and decreasingly available natural resources, without the security, infrastructure, or, in some cases, knowledge to mitigate such challenges. While a majority suffers desperately, a minority profits and prohibits the dissolution of the structure.

1.5 The Importance of Food

Including social justice and environmental destruction in the scope of sustainability makes clear the motivations for examining the field in an honors thesis—it contains the greatest challenges to our society in the future. But this study will turn its specific focus on food as a microcosmic consideration of the broader interplay of sustainable initiatives and unsustainable systems. The motivations behind choosing food are simple as well. Part of the appeal of studying sustainable

food is rooted in the approach of worldwide peak energy production. Many scientists have warned about fossil fuel energy production's decline over the past few decades. Wes Jackson, an international leader in the sustainable agriculture movement, explains clearly: "energy scholars now project that global oil production will peak and begin its permanent decline around the year 2020, and that by the latter half of this century, it will drop to ten percent of the present annual production" (in Kimbrell, 2002, p. 69). By stopping to consider the implications of such a precipitous decline in the dominant energy source upon which modern society relies we can better understand the vital importance of cutting down on energy use and releasing ourselves from dependence on finite energy sources.

Food is a major consumer of fossil fuel energy. Again, according to Jackson (2002) "US agriculture requires ten fossil fuel calories to produce a single food calorie" (in Kimbrell, p. 69), and such an inefficient process can certainly not continue as the world draws closer to lower and lower fuel availability. The issue of energy consumption in food production is complex and pervades all phases of the industrial food process, and the specifics of industrial food's energy overuse are addressed later in this thesis. Suffice it to say at this point that the problem is so severe that the United Nation's Millennium Ecosystem Assessment in 2005 claimed that, "on a global basis, agriculture is the greatest threat to biodiversity and ecosystem function of any single human activity" (Jackson in Heinberg and Lerch, 2010, p. 134). The single greatest threat from human activity for the planet's living organisms is agriculture—not transportation, not manufacturing, not mineral extraction, but agriculture. Studying food production and sustainable methods of

agricultural growth is not a whimsical choice, but rather it is the single largest opportunity to serve the planet's health by changing human behavior and infrastructure.

Though agricultural production is strongly tied to reduced energy use, food itself also presents a unique mix between the ecological connection of farming and the cultural heritage of food cultures and food identities. Food is a basic necessity for all humans, and carries with it aspects of ethnic identity, individual health, and even status and power. Such powerful social apparatus force me to think that a more sustainable food production system that benefits natural systems, could be key for a flourishing societal structure as well, one which has a great deal of longevity, is just, and is desirable for the future. Food is a major part of human life, and is at the core of sustainable living. It is an immediate, deep connection between humans and the environment, and serves as a paragon of both sustainable options and unsustainable ones. This thesis examines the unsustainable industrial food production system as it compares to sustainable, local food production systems. The intent of this examination is to demonstrate how a more sustainable social structure taking into account all community members and recognizing its place within the world's ecosystems leads to community benefits that make alternative food production schemes truly desirable for the future.

Chapter 2: Industrial Food

2.1 History and Evolution of Modern Food

The landscape of modern food production looks very different than it ever has before. Gone are the small, hand made and hand maintained family farms of the millennia before industrialization. Gone are most subsistence farms and self-sufficient farms. Where small, diverse farming communities once existed, rolling monocultures with fewer people than machines are now likely to dominate. These monoculture farms, growing corn, rice, soy, potatoes, wheat, cotton, sugar cane, coffee, cocoa, and other staple food and commodity cash crops, were made possible by the green revolution of the 20th century and the industrial revolution before it.[7] The modern food production system has leapt away from a relatively harmonious cultivation of nature's bounty and been coaxed to emulate the image of industrial mechanization—more machines and fewer people, higher reliance on technology, and high fossil fuel energy input—all in the name of relentless, efficient, economic growth.

Bill McKibben, a key author for this thesis and in popular sustainability literature, gives a lucid review of the history of farming in the US in his book *Deep Economy*. Since the industrial revolution, the world's population has left the fields of family farms, in desperation or by choice, for urban centers of manufacturing and

[7] It is worth noting, here, that there has been a concerted effort throughout the 20th century up till now to maintain such a system in spite of obvious social, environmental, and even economic obstacles and warning signs. Though I do not thoroughly explore how or why this system has been perpetuated over its life cycle, I recognize the interests of large agribusinesses and oil companies and their role in this process.

service. The focus on industrialization and mechanization of the workforce, and more advanced understanding of the science behind soil fertility and crop growth, allowed farms to produce more food with fewer farmers. Though the trend is well documented throughout modern world history, in the US the pattern has been most striking since World War II: over those 60+ years, "the US has lost a farm about every half hour" (McKibben, 2007, p. 54). The only way to compensate for decreasing numbers of farms and farmers while increasing US food production is for farms to get bigger and more mechanized—planting, irrigating, maintaining and harvesting with technology rather than people power—which is exactly what has happened at the urging of the US government.

A consistent narrative championing unfettered economic growth has dominated media discourse through the 20th and 21st centuries in the US candidates for political office have competed on platforms of economic growth, the differences being only in *how* to achieve the growth, not whether or not more growth is the answer. [8] Indeed, economic growth can be, and has been, vital to the survival of the western way of life and to raising the quality of life of developing nations around the world. However, few have publicly questioned whether or not there is a point at which growth should be slowed or stopped for the sake of durability or stability. The interest of the American economy has seemingly always been growth and expansion, at ever increasing rates, to ever increasing size. Political leaders who are seen as economically savvy champion the success of multinational corporations as a

[8] Bill McKibben discusses this in an especially lucid and helpful manner in the introduction of his book *Deep Economy: The Wealth of Communities and the Durable Future*. Many of the fundamental questions he posits there deeply inform this thesis in general, and especially these few pages.

paradigm of ideal American ingenuity, determination, and triumph. Even in our most recent election, Mitt Romney refused the possibility of higher taxes on the richest of Americans and on big businesses on the basis that such taxes punish success and stagnate economic growth, de-motivating individuals to strive for more success in business. Business must have no limit to its profit potential, in the confines of this rhetorical structure, because such limit is contrary to growth, and growth is good; more is always better.

This principle—more is always better—has extended to the industrial food system in the same way that all economic commodities have been subjected to it. Examining the history of this narrative's effect on food production in the US shows how deeply and intentionally ingrained in American society the mantra of expansion and efficiency is—even when that efficiency and productivity is in decline, even when it does not beat other alternatives. When food is seen as a commodity to be manufactured, distributed, and sold, it is subject to just the same streamlined efficiency as all business, even at the expense of the ecosystems that support it, the nutrition of the food produced, and the livelihood of farmers.

McKibben explores the vehement support of economic growth through industrialization of the agricultural sector by tracing rhetoric from recent administrations back to Dwight D. Eisenhower's reign. Ezra Taft Benson, as Eisenhower's secretary of agriculture commanded American farmers to "'get big or get out,'" and his advice was reinforced by Earl Butz's advice to "'get bigger, get better, or get out'" when he was secretary of agriculture under President Richard Nixon (McKibben, 2007, p. 55). These men spoke with the intention of championing

an ever-increasing scale of production, and an ever-increasing efficiency in that production, as though it were imperative for the economic health of the nation. Their statements trace the desire for consistent growth, but belie no limit to the growth, no possibility of satisfaction drawn from having grown *enough*.

These remarks do not offer a picture of what the ideal 'bigger' could look like. The message is clear: increase production by increasing the efficiency of your farm and expanding operations to greater size. Right through the beginning of the 21st century, the message continues, clearer than ever. President George Bush's undersecretary of agriculture and rural development "believe[d] that 'the right scale for farms in the future will be about 200,000 acres of cropland under a single manager'" (McKibben, 2007, p. 56). So, though the rhetoric admits a finite goal, the goal is only possible through more of the same mechanization, expansion, and commodification food production system. Such a process, as I will show, hurts the planet almost as much as the very people who grow our food, despite obvious economic challenges to the model.

Politicians have been supporting massive farms that have succeeded in producing more food than the world has ever seen. A focus on size has required: more machines to prepare fields, irrigate crops, and harvest them; industrially created fertilizers to force topsoil to support such a heavy load of crops; and new technologies to ward off the multitude of pests ready to feed on massive monocultures of crops. Such monocultures disallow life of almost any other kind within the limits of the 'growing' field—especially in the soil itself, where synthetic fertilizer kills biota and microorganisms. The industrialization process, due to the

strong administrative support for its proliferation, has pervaded American agriculture. Before attending to the effects of this process on both the environment and individual communities, I will briefly focus on characterizing the ultra-industrialized American food production system.

2.2 The Industrial Means of Production

R. W. Apple investigates the necessary measures farmers must now take to make a living in his 2003 New York Times article "For Baking, For Mashing, Forever." One of Apple's sources, Richard Polatis, a potato farmer in Idaho, confessed:

> "We use global positioning satellites to make sure that our roads are straight'. […] 'We use sensors in the ground to measure moisture. With all that you need 1,500 to 2,000 acres to make a decent living, and I have neighbors—I mean individuals, not big corporations—who have 3,000, even 4,000 [acres]."

Farmers these days need advanced technology to keep up with modern production standards and massive demand. Such an industrialized process requires more capital costs, and, therefore, higher yields to pay for investments in the mechanized systems. In addition to what Mr. Polatis himself mentions above, Apple reports that the Polatis farm has eight $130,000 tractors, an irrigation boom costing $68,000, and a large harvester that costs $95,000 (Apple, 2003). But mechanized farming is not the only major technological advancement that has allowed for factory farming on the scale prevalent now. Potentially even more integral to industrial agriculture

than the machines that now dominate the growing and harvesting process is the use of synthetic fertilizers.

Fossil fuel based fertilizers have enabled modern agriculture to load topsoil with enormous quantities of one crop at a time, season after season, year after year—a key cog in the 'super-efficient' industrialized farming process. High-nitrogen soil used to be cultivated with field rotation and intermediate crop plantings that could allow the soil to recharge and revitalize. Legume crops were a common natural cover crop because they fix nitrogen from the atmosphere and transfer it to their roots.[9] The process of growing these plants, and allowing them to lie in the field after being tilled, replenishes nitrogen levels in the soil, making it more fertile for the next round of crops. In addition to the added nitrogen, soil erosion is decreased because the root systems help the soil keep its integrity, permitting it to hold water and nutrients for longer.

Nitrogen saturated synthetic fertilizer, however, is constantly reapplied to enrich soil artificially. This process does not require a farmer to leave a field fallow, and is, therefore, more conducive to the relentless crop production that characterizes growing seasons on an industrial farm. The high concentration of nitrogen even allows plants to grow faster than normal, which permits farmers to get more harvests out of a single season, on a single field—another crowning achievement of the ruthless efficiency integral to today's factory farms.

The true miracle of the modern industrial system, however, is that, even with all the expenses of farming and the cutting-edge technologies on the frontier of

[9] Much of this basic information about farming techniques comes in bits and pieces from sustainable farming experts like Wes Jackson and Jason McKenney

agricultural engineering, food is cheaper than ever for US consumers. As Bill McKibben reported in 2007, citizens spend "11 percent of their paychecks on food, less than half of what their grandparents spent before WWII" (McKibben from Friedman, 2007, p. 54). We now have access to more food than ever before, for less than we've ever had to pay. Finally, people can eat all the food they want without losing the ability to spend money on clothes, cars, TVs, computers, speaker systems, vacations, and the like. Of course, this abundant, cheap food is not healthy, and not always accessible, but, in general, it seems that the US should approaching a level of absolute food security (not counting on the depletion and pollution, current and potential, of our water supply due to this food production system). Unfortunately hunger in this country and around the world has not been alleviated by industrial food, but has instead been exacerbated (Kimbrell, 2002, pp. 6-9). It is undeniable that food remains cheap on the supermarket shelf, however, even as food itself and the process of growing it becomes increasingly technologically advanced.[10]

[10] Yet another important industrial food process that I will not address but encourage further scholarship on is the use and proliferation of Genetically Modified Organisms (GMOs) in today's agriculture. Michael Pollan's *The Omnivore's Dilemma* addresses this in the first section during his conversations with Iowa corn farmer George Naylor for a basic introduction to these products.

Chapter 3: The Impact of Industry: Embedded Externalities

3.1 Environmental Impacts: Fossil Fuel Use in Agriculture

All the food we now produce, and the variety the average supermarket affords us, is the product of our industrial food system. I have tried to outline the way in which this system works, and want to attempt to present its benefits to modern day society as well as a critique of its detrimental effects. Our current system has, truly, produced more food than at any time in history.[11] However, this relentless production has serious consequences for both the planet and its people—especially those most involved in this production. With regard to the natural systems upon which we rely two major ecological consequences of industrial food production—oil consumption and agricultural runoff—represent intrinsic systemic dangers.

In general, the industrial food production process is energy intensive, requiring huge amounts of petroleum to plant, tend, harvest, process, and (especially) transport food products. Our industrial food system's addiction to oil and other fossil fuel energy pervades every step of the production, distribution, and even (in many cases) preparation process. Bill McKibben (2007) reports that half a gallon of oil is used in the production of a bushel of corn, of which "a quarter of [the half gallon] is used to make fertilizer, 35 percent to power the farm machinery,

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[11] As I alluded to above, though more and more food has been produced, world hunger continues to grow. Andrew Kimbrell, who was a fundamental author for this project, explains that even as 800 million people go hungry each day, food production has outstripped human procreation—to the point that our global food systems provide 4.3 pounds of food per day. In fact, between 1970 and 1990 (years dominated by industrial food) the number of people who went hungry in every country in the world except for China rose by more than 11 percent (Kimbrell, 2002, pp. 6-9).

seven percent to irrigate the field, and the rest to make the pesticides, to dry grain, and to perform all the other tasks of industrial farming" (p. 64). All of these oil-using steps can be avoided—and were—in systems that do not rely on large-scale monoculture farms. Modern food production overcomes the limits of family farms—size, labor hours, even natural soil fertility—by substituting oil consumption.

Richard Manning writes about the ubiquity of fossil fuels in our food system in his piece *The Oil We Eat: Following the Food Chain Back to Iraq*; Manning (2004) writes: "David Pimentel, an expert on food and energy at Cornell University, has estimated that if the entire world ate the way the United States eats, humanity would exhaust all known global fossil-fuel reserves in just over seven years." Manning highlights both the rate at which Americans consume and the danger to our future that a worldwide adoption of such a lifestyle would present. Even if Pimentel's calculations were wrong by 30 percent, which would represent massive oversight/miscalculation, our consumption rate would still result in the disappearance of one of the most important energy sources to which humankind has access within one generation. The industrial food system is a conversion of crude oil into food—of fossil fuel energy into calories. Pimentel and Manning make it clear that oil is necessary for modern industrial food production, and that this process is consuming an increasing amount of resources even as the consumers do not increasingly benefit. So, if American food production's voracious appetite for oil grows just to sustain itself, where does all the oil go? This question is complicated, and one that prompted my original claim that energy use in our food system pervades the entire process as well as the products necessary to perpetuate the

system. The ecological effect of such rampant consumption is increased greenhouse gas emission and exacerbated global climate change. Simply put, industrial agriculture plays a major role in the threat humans pose to the earth's atmosphere because of its dependence on fossil fuel energy, and specifically oil.

In planting/food production, oil comes in the form of pesticides to protect crops, gasoline to operate machines, and synthetic fertilizer to enrich soil. Food processing, which may take a relatively inedible raw food product (genetically modified corn, for instance) and turn it into an additive for taste (high fructose corn syrup), color, or shelf life, relies entirely on fossil fuel power for its machine induced chemical reactions. In the packaging portion of the process, fossil fuels are central to the creation of our plastic food containers.[12] One of the clearest incorporations of oil into our food system comes in the form of food miles—the distance a given ingredient travels until its final resting place on our plates, trays, disposable containers, or cups.

As I mentioned before, fewer, larger farms now supply the majority of our food. Where smaller farms used to supply food to nearby population centers, those same population centers are now dependent upon distant agricultural centers for their food. Because these monocultures now dominate the industrial food production system, handling all that food requires entire distribution centers as central hubs for inspection, processing, packaging, and redistribution to consumer outlets. This system was created to manage the massive quantities of food coming

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[12] In his discussion of oil in food and food miles, Bill McKibben writes, "if what you're eating comes in a package, then the calculations (of energy use per food calorie) get really wild: to package a box of breakfast cereal requires 7 times as much energy as the cereal contains" (2007, p. 65).

from super-efficient, large-scale farms, but it now serves to confuse the simple farm-to-table food chain that our ancestors relied on for generations.

In fact, in many cases it is downright unimaginable how the simple process of growing food and selling it directly to a consumer has been extended to include multiple middlemen and checkpoints. For instance, Larry Swain, a professor at the University of Wisconsin, Madison claims that, "if a lettuce farmer outside Lincoln [Nebraska] wants to sell lettuce to a Wal-Mart in Lincoln, it must first be shipped 225 miles to North Platte for inspection, then be shipped back up to Lincoln" (Halweil from Swain, 2004, p. 7). So food travels around the state, around the country, and sometimes around the world, to get to us, the consumers—even if it is grown in our backyards. The absurdity continues: with Chinese apples on Iowa supermarket shelves, though Iowa has apple orchards; and with Peruvians shopping not for their multitudinous native potato species (of which there are more than in any other country) but for potatoes from the US (Halweil, 2004, p. 8). What does this all add up to? The Worldwatch Institute estimated in 2003 that food in the US travels, on average, "between 1,500 and 2,500 miles from farm to table," (Nijhuis, 2003) and every one of those miles burns fossil fuels, putting more carbon into the atmosphere and exacerbating the effects of global climate change. The massive ecological dangers inherent in global climate change make food miles, along with other carbon emissions embedded in our food system, one of industrial food's greatest ecological threats.

However, oil consumption is important to the *entire* industrial agricultural process, beyond transportation alone. Synthetic fertilizer is an immeasurably

important piece of the industrial food production system, as it allows farmers to flood soil with nitrogen. German scientist Fritz Haber discovered how to artificially fix nitrogen gas from the atmosphere into useable nitrogen compounds in 1909, allowing for the creation of fertilizer compounds. Later in the 20th century, the process was industrialized by Carl Bosch and it immediately became a necessary component of the food production system we have today (McKibben, 2007, p. 63). Unfortunately, such a chemical process is only possible through immense heat and pressure at a level completely dependent on fossil fuels.

Vaclav Smil, in an important article in *Nature* in 1999 explains how important this process has become to feeding the world's growing population: "without [the Haber-Bosch synthesis of Ammonia] almost two-fifths of the world's population would not be here—and our dependence will only increase as population grows from six to nine or ten billion people" (Smil, 1999, p. 1). The dependence Smil indicates is dangerous for our planet. Since this process relies entirely on the energy of oil to create the pressure necessary for this reaction, increased dependence on synthetic fertilizer is increased dependence on oil consumption—a chief contributor to greenhouse gas emissions and global climate change. As we continue to threaten our atmosphere with the combustion of hydrocarbons in oil, we rely increasingly on a resource that is depleting very quickly.[13]

[13] His implicit assumption—that human population can only be fed by industrial food production—is tenuous. As I will address later in this thesis, small farm systems are much more productive than industrial food systems, allowing for far more food to be produced even while improving economy and community in a given area.

Where Smil elucidates the effect of nitrogen fixation on human population, Michael Pollan explains the vital importance of nitrogen to the natural world as "the building block from which nature assembles amino acids, proteins, and nucleic acids" (Pollan 2006, p. 42). Though the majority of our atmosphere (about 78%) is nitrogen gas, in its gaseous form it is useless to most life forms—a notable exception being nitrogen-fixing bacteria (Rhizobium) like those that inhabit the roots of legume plants (Smil, 1999, p. 1). The natural nitrogen cycle depends almost entirely on such bacteria, but industrial nitrogen fixation has changed that drastically. Where life used to depend on plants' bacteria that used the energy of the sun to take nitrogen from the air, humans have shifted food's dependence on the sun to dependence on fossil fuels. Fossil fuels now provide the energy to fix atmospheric nitrogen, and when that nitrogen is used in fertilizers for our crops, the food chain's nitrogen becomes directly related to fossil fuel availability. With the clear challenges coming up to fossil fuel production and consumption, our food supply looks increasingly vulnerable.

But in addition to the fossil fuel dependence that synthetic fertilizer necessitates in our food system, the constant application of such chemical fertilizers has an entire separate set of ecological consequences. Later on, I will address how the overuse of synthetic fertilizer has degraded the soil it enriches, and how such degradation affects the energy input of the system, but for now I want to focus on another externality—the effects of agricultural runoff. As I explained earlier, nitrogen is vital for the formation of life forms on Earth, but when a given system is flooded with nitrogen, it can have disastrous effects. When nitrogen-enriched soil

runs off agricultural fields, it fills surrounding waterways. Higher concentrations of nitrogen cause algal blooms. Increased algal populations die, and decomposers of their organic material hog dissolved oxygen, reducing the available oxygen for other organisms. This state of anoxia kills organisms at higher levels on the food chain, like fish. Richard Manning contextualizes the process of eutrophication, as it is known, by saying, "Here there's no need to calculate long-term effects, because life in such places has no long term: everything dies immediately" (Manning, 2004). The best-known, tragic example of rampant eutrophication is the Mississippi River and its destination the Gulf of Mexico. Due to all the runoff from the agricultural heartland of the US, the Mississippi has had its ecosystems seriously endangered, and it has delivered "deadly fertility" (Pollan, 2006, p. 47) to the Gulf of Mexico, where it "has created a dead zone […] the size of New Jersey" (Manning, 2004).

Beyond the suffocation of aquatic ecosystems, there is more to the ecological damage synthetic fertilizer inflicts upon the earth. Though much of the fertilizer runs off into aquatic ecosystems, some of it evaporates into the air, and some of it sinks deeper under ground. The fertilizer that evaporates contributes to acid rain, which then reacts in the air to form nitrogen oxides, which further contribute to global warming (Pollan, 2006, p. 46) and photochemical smog. The fertilizer that seeps deeper into the ground infiltrates groundwater, poisoning the drinking water supply for surrounding areas. In fact, in Des Moines, Iowa, the spring brings "'blue baby alerts,' warning parents it's unsafe to give children water from the tap" because "nitrates in the water convert to nitrite, which binds to hemoglobin, compromising the blood's ability to carry oxygen to the brain" (Pollan, 2006, p. 47).

Both of the effects Pollan describes introduce the dangers of industrial agriculture to public health as well as natural ecosystem. Nitrous oxides and smog are commonly recognized as contributors to exacerbated respiratory disease in urban areas. The degradation of water quality due to agricultural runoff is even more disturbing, as it can have serious, long-term health effects. And if we are unable to drink the water, the surrounding natural ecosystems must suffer with such polluted water.

3.2 Increasing Inefficiency

The food production system in the US has been specially designed to churn out as much food as possible as cheaply as possible. The mantra of efficiency and increasing yield has dominated the logic of agriculture, with "politicians, business leaders, and the media continu[ing] to reassure us that our food is the cheapest in the world" (Kimbrell, 2002, p. 15). This 'cheapness' avoids taking into account the ecological destruction and social detriments of industrial food production, the "real cost of industrial food" that "not even our wealthiest citizens could afford" (Kimbrell, 2002, p. 15). The fact that local, organic food is more expensive on the supermarket shelf than industrially produced food provides industry with further marketing material—"[g]et rid of the industrial food system, we are told, and you won't be able to afford food" (Kimbrell, 2002, p. 15)—even though "there is strong evidence that local food often costs less than the equivalent food bought […] from a supermarket, because transportation costs are lower and there are fewer middlemen" (Halweil, 2004, p. 18). Now, I want to revisit the cheapness of the food,

and therefore its profitability. Neither the economic cost nor the profit of industrial food is examined holistically; scholars suggest that such an examination clearly demonstrates that the externalities of the system outweigh its economic benefits.

As I will continue to show, farmers and rural communities suffer from this industrialization, economically because they are forced to front massive capital to keep up with a modern system that pays them less and less every growing season, and socially because the system puts people out of work and leads to the steady decay of rural communities. These effects are rarely part of the general discourse on food production, overshadowed by the 'bigger is better' rhetoric of agribusinesses and the US government alike (Kimbrell, 2002, p. 22). As far as the general understanding of our food system is concerned, as long as food is being produced faster, bigger, and cheaper, the system is working.

The more I learned about industrial food, however, the more I saw that practically every facet of the structure is costly—economically, environmentally, and socially. These externalities show that the industrial food production system is beginning to fail. Though even that statement is not accurate. The system is not *beginning* to fail; it has *always* failed.

The very structure of large-scale, monoculture-based farming cannot be seen as more productive than small-scale agriculture. Kimbrell (2002) writes, "it is indisputable that this highly touted modern system of food production is actually less efficient, less productive than small-scale alternative farming" (p. 22). The section on sustainable future options will address the structural advantages small-scale farming has over the industrial food production system we have now. This

section addresses the concept of efficiency within the confines of industrial food itself, rather than in comparison to alternative systems. An exhaustive overview of industrial food's externalities is a large project in itself, so I will focus on just one that is particularly ecologically destructive and particularly dependent on soon-to-be-impossible oil consumption—the heavy use of synthetic fertilizer. Synthetic fertilizer facilitates consistently high yields on monoculture fields and is a paragon of 'efficiency' in the system, but its ecological effects undermine its efficiency and require increasing inputs into the system, exacerbating negative effects and leading to a self-defeating cycle.

This cycle makes the system less and less efficient with each growing season. Thomas Philpott quotes Jason McKenney, a Californian organic farmer, who traces the efficiency of fertilizer: "In 1980 in the United States, the application of a ton of fertilizer resulted in an average yield of 15 to 20 tons of corn. By 1997, the same ton of fertilizer yielded only 5 to 10 tons" (Philpott from McKenney, 2006).[14]The very products that allowed us to grow more food, faster than at any time in history, are failing to achieve the same results now. When viewed in the context of peak oil production, the urgency of this situation is severe; we have a system that is totally dependent on a finite resource. Synthetic fertilizer, specifically, has begun to degrade the fertility of soil, putting the industrial food system into an auto-

[14] McKenney's explanation of the degrading efficacy of synthetic fertilizer reflects the larger issue of energy use in food production more generally, and his position is well illustrated when food production is considered on a per-calorie basis. Richard Manning, in his impressive article on fossil fuel use in industrial food, claims that food calorie production per fossil fuel calorie input has declined markedly between 1940, when our agricultural system produced 2.3 food energy calories for every one fossil fuel calorie, and 1974, when it dropped to 1:1 (Manning, 2004). These figures only apply to production, though; processing is even more energy intensive—and at this point, Manning echoes Wes Jackson's claim, that industrial agriculture is producing one calorie of food for every 10 calories of fossil fuel input (Manning, 2004).

cannibalistic pattern that requires more synthetic fertilizer to compensate for the destruction that very fertilizer is causing.

Why would application of the same amount of fertilizer yield more food 30 years ago than it does today? Jason McKenney explains that application of fertilizer "has dramatically increased the productive output of our farms, but at the cost of soil health, water and air quality, and future fertility of our land," leaving us "a devastating environmental debt" (McKenney in Kimbrell, 2002, p. 121). Fertilizer destroys the ecosystem of soil, taking the place of (normally) essential nitrogen-fixing bacteria, and allowing populations of organisms that fed on nitrogen to explode. In the same way that influxes of nitrogen increase the role of decomposers in aquatic ecosystems, the number decomposers in the topsoil break down organic matter and humus at an accelerated rate. With less organic matter and humus in the soil, the physical structure of the dirt is fundamentally altered, diminishing the soil's capacity to trap air, water, and other nutrients. With this altered structure "[m]ore irrigation is needed. Water leaches through soils, draining away nutrients that no longer have an effective substrate on which to cling" (McKenney in Kimbrell, 2002, p. 125).

McKenney continues, explaining that as nutrients drain out of the soil ecosystem, the normally "complex interrelationship between soil organisms which feed off of plants, help plants grow, feed off of each other, exchange nutrients, nurture one another, eat each other, parasitize each other, form colonies with each other, and on and on" (in Kimbrell, 2002, p. 122) breaks down due to "less available oxygen" and slowed growth of microbiology (in Kimbrell, 2002, p. 125). Lower

levels of microorganisms decrease soil's density and ability to "physically hold together in groups called aggregates" (McKenney in Kimbrell, 2002, p. 125). Of course, the most serious problem with this process is its cyclical aspect. With soil that struggles to retain water, increased irrigation to satisfy the crops' needs erodes the weakened earth. Water drains through the soil more easily because there is little organic matter to trap it, and leeches even more nutrients out of the soil, forcing industrial farmers to compensate by applying more fertilizer. McKenney exposes the structure of this system "as a negative feedback loop; a more blunt comparison is substance abuse" (McKenney in Kimbrell, 2002, p. 126).

Thus, the heavy use of synthetic fertilizer necessitates the heavy use of synthetic fertilizers. Farmers use these fertilizers to meet *economic* demand that a system of large-scale monoculture farms requires. But the process becomes self-perpetuating in that the ecological basis for growth is sabotaged by the process to the point that topsoil is infertile. An *ecological* demand develops where it never existed before, forcing farmers to continue using synthetic fertilizer to compensate for the damage it has done to their soils if they are to keep up with the demands of industrial 'efficiency.'[15]

[15] For more information on the breakdown of soil structure due to over-application of synthetic fertilizer, look to the work of Wes Jackson and Jason McKenney.

Chapter 4: Social Consequences of Industrial Food

4.1 Rural Emigration

With this brief elaboration of the ecological issues at the heart of our food system finished, I will now address the social consequences of industrial food to both the farming communities responsible for our food production, and our consuming communities that depend, at least presently, on industrial food. The first social effect of industrial food was discussed in the introduction of chapter three: migration of communities from rural areas to urban and suburban areas. Going back to the history of food production in the US, industrialization and economic expansion have lead to fewer and fewer farms and farmers. Michael Pollan writes, "one in four Americans lived on a farm [in 1919] less than a century after, fewer than 2 million Americans still farm" (Pollan, 2006, p. 34). Contemporary research shows that rural communities are evaporating even today.

In Idaho, a state that is known for its potato production, "'times are changing. Only 15 years ago, there were about 1,600 potato farmers in the state; now there are no more than half that many,' according to Mel Anderson, the retired president of the Idaho Potato Commission" (Apple 2003). Farmers who used to be responsible for farms passed down through generations of their families are being forced off these ancestral lands, unable to keep up with modern farm production standards or the economies of scale with which they are now forced to compete. John Ellis, a farmer in Nebraska, claims, "'[y]ou can't live on corn and soybeans,'" and "'lots of people sold their heritage farms'" (Halweil, 2004, p. 3). Ellis' comment is more

insightful, possibly, than even he realized. Farmers can no longer live on corn and soybeans' profits unless they aggressively expand their farms, embracing the mechanized energy-intensive monoculture model, but it is also true that simply growing corn and soybeans in industrial quantities will not feed a farming family. The experience of other farmers in the industrial system illustrates this fact.

George Naylor, an Iowa corn and soybean farmer, has unhappily followed this model, and his struggle sheds light on Ellis' insight. Naylor has been able to keep his farm by adding 150 acres to his family's 320-acre heritage plot, buying GMO corn and soy, and planting, fertilizing, and harvesting in the most efficient, modern, yet thrifty way possible. But even Naylor's begrudging attempt to meet modern industry standards has left his farm dangerously close to untenable. In fact, only by "Peggy Naylor's paycheck […] and an annual subsidy payment from Washington, D.C." keep the farm afloat (Pollan, 2006, p. 34). His efforts still do not keep the family financially stable, and echoes of Ellis' lamentations about the unsupportive nature of corn and soy farming abound. Another, more shameful, fact of the Naylor farm is that, "the Naylor farm [can no longer] literally feed the Naylor family" (Pollan, 2006, p. 34). Large-scale farms that are key components of a system producing more food than at any time in history can no longer even provide the nutrition necessary for the ever-decreasing number of farmers tending to them, because they have become devoted to "crops [that] are basically inedible […] commodities that must be processed or fed to livestock before they can feed people" (Pollan, 2006, p. 34). So Ellis' comment has, at least, two meanings: farming is no longer economically viable for the small farm, and farming no longer provides the nutritional sustenance for

even the farmers themselves. In our current food system, farmers are consistently encouraged to grow commodity crops like corn and soy, but "tractor makers, agrochemical firms, seed companies, food processors, and supermarkets take most of what is spent on food, leaving the farmer less than 10 cents of the typical food dollar," (Halweil, 2004, p. 63). With farmers taking in less and less of the money spent on their products, their only options are to expand to produce more or find a new job (and, subsequently, way of life).

As farming becomes less viable economically, rural communities built on farming traditions dissolve. Emigration from rural areas into urban and suburban settings has a well-documented history, and literature supports that industrial food systems contribute to increased rural emigration. Brian Halweil (2004) discusses this emigration and the growing attitude of farmers—like Ellis, perhaps—toward the occupation and tradition of farming in the US:

> Much evidence suggests that farmers aren't so much being lured to the city as they are being driven off their farms by a variety of structural changes in the way the global food chain operates. Bob Long, a rancher in McPherson County, Nebraska, stated in a recent *New York Times* article that passing the farm onto his son would be nothing less than "child abuse" (p. 62)

The miserable situation for farmers in today's industrial system has so reduced the number of American farmers that the US Census Bureau no longer lists it as an occupation (McKibben, 2007, p. 55). Farming communities are suffering in an industrialized system that forces high volume production and quashes opportunity for small, diversified farms, not only from emigration, but also from fracturing and degradation of the social structures that do survive.

4.2 Community Dismemberment

Researching the social structures of rural communities that have constituted this shift from heritage farm systems to factory farms has led me to believe that communities are becoming fractured and disconnected from themselves. I believe this process could appropriately be called 'community dismemberment.' When industrial farming begins to dominate rural community, members become part of a complex, multi-faceted food system that changes patterns of consumption and production from small-scale and local to enormous and multi-national. I contend that this process de-unifies rural communities, disconnecting members from one another as a function of increased participation—willing or not—in the global foodscape.

Where once small-farm communities grew food for themselves—growing, buying, and selling many different crops within a relatively small geographic and social area—industrial food has forced food production, consumption, and vending into a national or even multi-national context. Such a system keeps communities from the autonomous, self-sustaining food systems prevalent in the past. Rebecca Spector in Kimbrell's *Fatal Harvest Reader* (2002) claims that the "centralized distribution and export system […] has created a huge separation between food consumers and producers […] a lost connection between farmers and the public at large" (p. 289). I deem this breakdown of interconnectivity community dismemberment. The turn from communities buying and selling nature's bounty

within themselves toward large-scale export and import systems has negative effects on communities and individuals within those communities. These effects are the many social consequences of industrial food production, and they constitute the dangers of community dismemberment.

In a system that devalues interconnectivity and human interaction, community well-being can suffer. Brian Halweil illustrates this point by examining a study done by William Goldschmidt in 1947, just at the start of industrial agriculture, that compared the well-being of two farming communities. The communities were "alike in all basic economic and geographic dimensions, including value of agricultural production, except in farm size." Goldschmidt found "an inverse relationship between the sizes of the farms and the well-being of the communities they were part of." The community with smaller farms "supported about 20 percent more people, and at considerably higher level of living—including lower poverty rates, lower levels of economic and social class distinctions, and a lower crime rate—than the large-farm community." The small-farm community also had "more schools, parks, newspapers, civic organizations, and churches, as well as better physical infrastructure," characteristics that point to a community invested in itself, in its members (all quotations from Halweil, 2004, p. 68). In the section of this thesis that examines sustainable options for the future, I will argue that the structure of communities that rely on small farms encourages and facilitates engagement with neighbors and community organizations through food production and consumption strategies. For now, I wish to focus on the negative effects of industrial food on communities.

Halweil continues to critique industrial food's social effects claiming that "when the economic prospects of small farms decline, the social fabric of rural communities begins to tear," as farming families are "more than twice as likely to live in poverty," and "have less education and lower rates of medical protection, along with higher rates of infant mortality, alcoholism, child abuse, spousal abuse, and mental stress" (Halweil, 2004, p. 69). Halweil's concerns are echoed throughout sustainability literature, with many authors pointing to "mass starvation in the rural communities, epidemics of farmer suicides, and the annihilation of farm communities throughout the globe" (Kimbrell, 2002, p. 8). Rural communities are fracturing under the stress of stifled economic opportunity and dying cultural traditions. Members of these communities are either leaving for suburbia or suffering through the decay of their hometowns.

Kimbrell's allusion to farmer suicides should not be overlooked. The stress of farming in the industrial system, of struggling to maintain a heritage farm's economic stability, is causing more and more farmer suicides around the globe. Halweil (2004) provides especially chilling statistics and commentary:

> Since 1998, officials estimate that tens of thousands of farmers in the Indian state of Andhra Pradesh committed suicide, including many who took their lives by swallowing pesticides that they had gone into debt to purchase but that had nonetheless failed to save their crops. In Britain, farm workers are twice as likely to commit suicide than the rest of the population. US farmers, according to one survey, are five times as likely to commit suicide as to die from farm accidents, which have been traditionally the most frequent cause of unnatural death for them […] suicide hotlines report that they often receive calls from farmers who want to know which sorts of accidents (falling into the blades of a combine? getting shot while hunting?) are least likely to be investigated by insurance companies that don't pay claims for suicides. (p. 70)

> Farmer suicides seem the cruelest form of irony. As Halweil (2004) says, farmers "produce perhaps the only good that the human race cannot do without" (p. 60) and their value to society has been so lowered—by the roles of chemicals, machines, processing factories—that they are now choosing death over continuing to participate in our current system.

Note that these effects are not specific to farming, but rather to industrial farming. Andrew Kimbrell (2002) reports:

> The US Office of Technology Assessment studied 200 communities and discovered that as farm size increases, so does poverty. As farm size and absentee ownership increase (both endemic to industrial agriculture), social conditions in the local community deteriorate. Businesses close and crime increases. It is difficult to put a dollar value on the loss of farmers and communities; clearly much of what is lost is priceless. However, numerous studies have put the costs of such dislocation since World War II in the tens of billions of dollars. (p. 18)

Kimbrell's comments shed light on the myriad social, cultural, and economic damage industrial food causes. Note, also, that the end of World War II is the starting point again, reiterating the fact that the trend toward mechanization and industrialization of food production is strongly related to the effects we see today.

These depressing statistics demonstrate that farming, as an occupation that is closely tied to a way of life, has gone from being a form of simple, hardworking life to a struggle for survival in an economic and social climate that discourages that way of life. I contend that this stress, both mental and societal, is dismembering communities—destroying the interconnectivity and interpersonal relationships that used to characterize of rural life. In place of cohesive, connected rural communities that produce food for themselves and for wider communities, that have strong local business sectors, that respect and preserve the natural environments around them

because their value is understood and cherished, broken communities now struggle to continue.

Chapter 5: The Sustainable Present and Future

5.1 Resilience

Up to this point I have focused on the status quo food system in the US, but now I turn to a set of alternatives that pose a more sustainable future for individual communities. With the massive environmental destruction, pervasive social injustice, and perpetuated economic oppression present in today's industrial foodscape, more sustainable alternatives are not difficult to find. Local, sustainable food initiatives, however, provide the best alternative to our current system in terms of food production by yield, economic opportunity, ecological security, and community connectivity. Such systems cultivate benefits in all of these four categories, and evade the damages to such categories done by the industrial food system.

The critiques of the industrial food system's ecological destruction, community dismemberment, economic externalities, and inefficiency in productivity can all be understood as critiques of resilience within the system—that these systems unsustainable characteristics make it incapable of adjustment in the face of catastrophe or change (peak oil, for instance). Sustainability literature extols the virtues of 'resilient' systems and attacks the agricultural structure we have today, along with many others, as fundamentally unstable and fragile. A 'resilient' system is one that can withstand change or challenge and still serve the communities that depend on it. Such challenge can come in the form of attack, as Bill McKibben illustrates with Tommy Thompson's comments upon his resignation from the

position of Secretary of Health and Human Services in 2004: "'For the life of me, I cannot understand why the terrorists have not attacked our food supply, because it is so easy to do'" (McKibben, 2007, p. 61). Our food system, specifically, is vulnerable, and though Mr. Thompson's concerns were based on military attack, food production is vulnerable to far more than that; pointing out the ecological, economic, and social limitations it now faces exposes its failure, by any standard, and the lack of a contingency plan for such failure.

Wes Jackson writes in his essay "Tackling the Oldest Environmental Problem: Agriculture and its Impact on Soil"[16] in the *Post Carbon Reader* that "humans have the powerful capacity to create abstractions—and one of the most important abstractions we ever made was the one that allows us to ignore that our Petri dish has a wall," that is to say, that we live in a world of finite resources (in Heinberg and Lerch, 2010, 134). Such fragile and vulnerable systems are the consequences of such abstractions. Pressure to find alternatives is becoming increasingly high, and the urgency of the world's situation requires hopeful, durable, resilient alternatives to current lifestyles.

Of course, there are a myriad of examples of options for a more sustainable lifestyle, but I have chosen to focus on farmer's markets and community supported agriculture programs (CSAs) because they provide opportunities for resilient local communities with an abundance of food, with thriving economies and social atmospheres, and that are far less destructive and negative than industrial food

[16] Jackson's title is apt and highlights, again, the tragedy that is soil degradation due to synthetic fertilizer overuse. Truly, it is soil that sustains our food systems, and much of Jackson's incredibly innovative farm systems work is directed at preserving and even enriching soil as the cradle of production.

systems. Local food systems, including the models of CSA and farmers' markets, are sustainable because they support and preserve the environment and communities upon which such infrastructure depends, but they are resilient because they are not dependent on self-destructive or fragile systems, and avoid reliance on fossil fuel energy to function.

5.2 Ecological Sustainability

Examining the characteristics of local food production that detach it from total dependence on fossil fuel is key to understanding resilience and ways to achieve it. A system that depends on fossil fuel energy to survive is, in light of peak energy production, massive population increase, and economic development worldwide, doomed to fail—and fail soon. This examination will also expose the major difference between our current dominant food production paradigm (deeply tied to oil) and the alternatives that provide hope for a sustainable future (free from dependence on oil). Central to the resilient nature of local food systems is their liberation from excessive food mile accumulation. By growing food within 100 miles[17] of its final destination, the amount of carbon burned in transport of our food is largely eliminated. Of course, the shorter the distance traveled, the safer and healthier our planet, but even eating food sourced from within 100 miles, or a region of the US (Southeast, Midwest, etc.) will help profoundly to shrink agriculture's carbon footprint. Our current food system's design centralizes food

[17] Varying definitions of 'local' exist in sustainability literature. I have chosen a distance that I see as both attainable and contained enough to significantly shrink the carbon footprint of food in the US.

production and forces consumers and retailers to source food from thousands of miles away (think again of the average piece of food that travels between 1,500 and 2,500 miles before consumption) (Nijhuis, 2003). "Large-scale, specialized agriculture [monoculture factory farms] is best suited to a global and centralized market" (Halweil, 2004, p. 46), but localizing food production decentralizes the process and allows geographic accessibility to food purchasers.

Many of the food miles accumulated in industrial food come from moving food products from centers of production to processing, distribution, and packaging plants. Local food initiatives solve this problem as well. Industrial food necessitates large-scale centers like these because only large, central plants can handle the amount of food produced from singular sources. Living with local food initiatives in place does not include living within a few miles of thousand acre cornfields, or other industrially produced monocultures. Such proximity does not alter the systemic issues inherent therein. Large-scale farms, monocultures, and massive animal production zones (CAFOs)[18] will always require huge, centralized inspection, processing, packaging, and distribution, to the extent that food will always travel much farther than it should before landing on a consumer's plate. I return to the example of lettuce farmers near Lincoln, Nebraska selling to Wal-Mart stores in Lincoln itself. Food must be shipped 225 miles away from the city, and then 225

[18] CAFOs—Concentrated Animal Feeding Operations—are as destructive, if not more so, to the environment as monoculture crop production, but addressing the dangers of animal waste to surrounding ecosystems, the overuse of hormones and antibiotics to treat chronically sick animals in a system that facilitates such sickness, the fossil fuels used to create said antibiotics and hormones and to run the facilities, not to mention the dangers CAFO meat production poses to human health, is, unfortunately, outside the scope of this paper. I want to focus on farming and produce production. I note, however, that some of the most sustainable farming systems in operation synthesize the ecological roles of animals and the production of crops. The documentary *Food, Inc*., has a heavy focus on CAFOs and the damage it does to animals, humans, and the economy.

miles back, to be sold at retailers much closer to the farms that produced the lettuce (Halweil, 2004, p. 7). Such inefficiency—even absurdity—is inherent in large-scale industrial food production, and whether or not residents of Lincoln are 'local' to these large farm producers, food miles will accumulate.

Local food initiatives create networks of smaller producers selling directly to consumers and retailers. People attend farmers' markets for variety and freshness, for wholesome ingredients that can be creatively turned into delicious, nutritious, complete meals. CSA systems provide the same variety, freshness, and creativity as farmers' markets based on an ever-changing collection of seasonal food dependent upon the capacity of the farm, climate, soil, and farmers. These options are only possible when a multitude of farms growing a wide genetic diversity of crops exists close to a willing corpus of buyers, when the infrastructure is fundamentally different from the one that exists to support industrial food. No redistribution, processing, or even major packaging is necessary because food is not produced in quantities that cannot be bought directly by consumers, and is not processed, preserved, or extensively packaged because it does not travel far.

Oil in food, as has been examined earlier, does not only come from food miles, however. Much of the hidden usage of energy in industrial food is embedded in the production and use of synthetic fertilizers and pesticides. Industrial food production relies on these products out of necessity. For soil infertility and erosion, the panacea is fossil-fuel-based fertilizers—a dual *protective* measure that, as previously examined, degrades soil structure and natural fertility while exacerbating the need for more fertilizer (other ecological/public health dangers

aside). Central to the necessity of these protective measures in the industrial foodscape is the support and implementation of large monoculture farms. Andrew Kimbrell, whose book *The Fatal Harvest Reader* (2002) offers an informative mosaic of essays and commentary on industrial food and alternative systems from some of the leading agronomists, food justice organizers, and nature writers in America, explains: "a 1989 study by the US National Research Council [concluded that] 'well-managed alternative farming systems nearly always use less synthetic chemical pesticides, fertilizers, and antibiotics per unit of production than conventional farms'" (p. 20). Large farms necessitate practices that destroy ecosystems, burn carbon, unbalance economies, and disenfranchise workers. But the structure of small farms is so different from the monocultures we now rely upon that, not only do small farm systems avoid many the aforementioned detriments of industrial food production, they have the potential to actually benefit natural ecosystems, local economies, and the people who rely on them.

5.3 Small Farms: A Model of Productivity

The true beauty of local food initiatives is that they avoid these necessarily unsustainable and self-perpetuating practices, while simultaneously providing ecological, economic, and social services to local communities. The infrastructure of such farms allows them to use techniques that industrial agriculture cannot. The use of different techniques provides the first example of avoiding unsustainable outputs from the system while providing benefits: small farms are actually *more productive*

than industrial farms. Andrew Kimbrell makes this claim, and ties it to small farms' use of normally "empty 'weed' spaces […] for crop planting," by writing, "small-scale integrated farms produce far more per unit area than large farms" (2002, p. 21). Kimbrell (2002) continues, citing a US Agricultural Census report from 1992 to expose the inverse relationship between farm size and productivity:

> Relatively smaller farm sizes are 2 to 10 times more productive per unit acre than larger ones. The smallest farms surveyed in the study, those of 27 acres or less, are more than 10 times as productive (in dollar output per acre) than large farms (6,000 acres or more), and extremely small farms (4 acres or less) can be over 100 times as productive. (p. 22)

There is more to this super productivity than dollar output, though. Small farms can actually produce more food per unit area, and that is why they have a higher total yield than larger farms. Kimbrell's claim is echoed in much of the literature.[19] This translates to economic empowerment as well as higher nutritional output. When one views small farms' potential in this way, Bill McKibben's statement that "as population continues to grow […] and the amount of farmland and water available per person continues to shrink, a small farm structure may become central to feeding the planet" (McKibben from Halweil, 2007, p. 67) seems increasingly plausible and accurate. Understanding the ways in which small farm structures lead to higher productivity is essential for appreciating the benefits of small farms and local food initiatives. Small farms are better for local economies, productivity, and efficiency. They have these effects largely due to their positive ecological impacts, and self-sustaining rather than self-destroying relationships to nature.

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[19] Throughout the work of Wes Jackson, Jason McKenney, Bill McKibben, and according to multiple reports and studies done by the US Government agree with Kimbrell's assessment.

So, even before the social and economic benefits of local farming initiatives are taken into account, small-scale sustainable agriculture actually defeats industrial agriculture by its own golden standard of efficiency and productivity. The key to the super-productivity of small farms, as Kimbrell alludes to above, lies chiefly in the inclusion of diversity (polyculture) and the use of natural models and systems to aid in agriculture. Halweil (2004) supports polyculture as a technique for avoiding dependence on heavy fossil fuel use: "local crop diversity […] helps to reduce dependence on expensive agrochemicals and other inputs" (p. 83). Where industrial agriculture seeks to overcome such systems and grow in patterns that do not exist in nature (monocultures), small-scale agriculture uses the ecological services of multiple plant species to preserve and even improve soil fertility, avoid erosion, and increase total production per unit—and it can all be done without dependence on synthetic fertilizers, pesticides, or heavy mechanization.

Rather than monoculture a few acres, small farmers preserve natural soil fertility by planting a variety of crops. Simple genetic diversity decreases the risk of crop blights because plant-specific pests are not as attracted to an area. Soil nutrients are maintained by multiple root systems, and synthetic fertilizer does not alter its physical structure because it is not needed when nutrients are retained and replenished by the crops that grow in the fields. Small farms rely less on fossil-fuel-based products (which makes them much more resilient), and more on allowing natural productive systems to flourish (which makes them inherently sustainable). Focusing on these natural processes allows for sustainable improvement of fertility and productivity of farm ecosystems. According to Jules Pretty, an English

agronomist with extensive experience and study in farm productivity and farm communities, the effects of agriculture that relies on natural ecological practices can be stunning. Recounting the story of a corn farmer in Honduras who, after some training from a nonprofit, began planting beans along with his corn[20], then graduating to "twenty-eight types of crops and trees to his small farm, along with pigs, chicken, rabbits, cattle, and horses" (McKibben, 2007, p. 69). This man, Elias Zelaya, has transformed the land with his farm: "'the unimproved soils on the edge of Elias' farm are no more than a few centimeters deep […] but in the fields […] the soil is more than half a meter deep'" (Pretty in McKibben, 2007, p. 69).

Pretty's example above illustrates how soil can be improved by sustainable agriculture—in stark contrast to the effects of industrial food on soil. Enriching soil and its fertility is one of the key ecological benefits of sustainable agriculture, but small-farm production strategies also increase productivity by avoiding one of the most challenging and persistent issues facing agriculture—soil erosion.

Wes Jackson, a pioneer of the sustainable agriculture movement in the US and beyond and the founder of the Land Institute in Salina, Kansas, has been experimenting with modeling agriculture after natural systems in search of productive, sustainable alternatives to current agricultural practices for 30 years (Heinberg and Lerch, 2010, p. 128). His efforts, knowledge, and insight are invaluable to a discussion of the productivity of small farms and sustainable

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[20] Legumes, like beans, are nitrogen fixers, and help replenish nitrogen levels in soil depleted by other plants. Corn is an especially nitrogen-greedy plant and benefits greatly from increased nitrogen levels. Corn plants' need for nitrogen explains the heavy use of synthetic, nitrogen-heavy fertilizer on industrial cornfields as well as the practices of Native Americans' three sisters planting system which grew corn alongside beans and squash to replenish nitrogen levels and other nutrients while providing highly nutritious calorie combinations. See Michael Pollan's *Omnivore's Dilemma* for more.

agriculture. Jackson operates from the position that problems in agriculture "cannot be solved within our current conventions of thought and action" because they "are based on the idea that nature is to be subdued or ignored" (in Kimbrell, 2002, p. 71).

In response to such flawed, unproductive ideology, Jackson advocates agriculture that uses nature as a model for emulation, a guide for sustainable growth. Central to his position is the importance of perennial plantings, instead of or in tandem with annual ones. Annual plants, which complete their growth cycle within one growing season and re-grow only when a seed grows an entirely new plant, are the dominant form of crops relied upon in US agriculture. Unfortunately, annuals do not contribute to farm ecosystems as helpfully as perennials do, because their smaller root systems and impermanent life cycles do not retain or replenish soil fertility. Jackson's claim that "the primary killers of soil on the continent are our top annual crops: wheat, corn, and soybeans" is especially disturbing in light of the soil destruction outlined earlier in this thesis due to synthetic fertilizer use, and highlights the need for a system that protects against erosion and soil degradation. Jackson's experiments with perennials shows that their more extensive root systems hold soil in place to avoid erosion and retain the nutrients and biota central to soil fertility.

While the implementation strategies of the use of perennials are still being perfected, and the potential extent of their use still being explored, the most exciting part of Jackson's projects is the possibilities they represent for sustainable agriculture free from pesticide and fertilizer inputs. An agricultural system that enriches natural ecosystems while producing food from them would allow food

growing without the fossil fuel use inherent in pesticide creation or machine operation. Such systems, whether reliant on perennials or not, would be able to sustain themselves ecologically over long periods of time, rather than destroy the ecological basis for their productivity. Further, if such systems were multisource and served local communities rather than central distribution centers, energy use inherent in processing and distribution is reduced or cut out entirely. Thus, this becomes a system where we can produce more food with less energy input without degrading, and in fact benefitting, the environment.

Once the model of small-scale farming is more extensively reviewed, the fallacy of industrial productivity is exposed and reversed. Though agribusinesses consistently claim that industrial farming is the most productive option available, understanding the ecological benefits of small farms and the relation such benefits have to increased productivity per unit area proves that industrial farm systems cannot be defended as more efficient, productive models.

5.4 Economic Sustainability

Local food production is not simply more ecologically sustainable or more productive per unit than status quo food production. Such initiatives are more economically productive as well. Rather than scattering costs and income of food production along the long chain of middlemen that is part of our food system now, local initiatives create direct economic relationships between growers and consumers of food. Such relationships benefit local economies in two major ways:

more money stays in circulation in the community, and growers earn a larger share of money spent on their products. With more money staying in the community, more goods and services can be invested in without needing as much influx of new wealth or income. The more economically viable business venture farming becomes, the more economies can benefit because "small-scale sustainable agriculture restores rural communities and *creates farm jobs*" (Kimbrell, 2002, p. 18, emphasis added). Globally, the fact that economies become less dependent on importing products and services because money stays local and provides the capital to pay for such work within the community itself highlights the importance of such initiatives worldwide. On the global economic scale, small systems allow for more export "because they are more likely to have some surplus and because the stronger farm sector is likely to indicate a wealthier population" (Halweil, 2004, p. 54).

Quantifying the effect of increased local investment is easy. A circulation multiplier simply measures the number of times a dollar is spent within a community before it is spent in another place (to a processor in another town, or a corporation in another country, for instance), and is used by economists as a metric of economic health (Estill, 2008, p. 167). Communities with many locally owned and operated businesses will have higher multipliers than those with many chain businesses. The circulation multiplier metric would point to vibrant local economies as being healthier, but 'healthier' can easily be replaced with 'more stable' or 'more durable.'

Many communities have experimented with new forms of currency, outside federal currency structures, to encourage local economic activity. Rather than spend

US dollars on local goods or services, a buyer might choose to spend the local form of currency, and a producer may accept, knowing that they can trade local currency for other local goods and services. Lyle Estill, a writer and highly involved member of the local resilience movement in Chatham County, NC, explains that local currency, called 'Plenties,' are spent more or less depending on the goods they buy. Estill claims that "lunch dollars probably stick around longer than most" (2008, p. 169) which makes sense because Chatham County is a relatively rural place with a lot of local food production (one reason I have studied it for this project). The fact that, according to Estill, "fuel dollars, on the other hand, tend to leave town quickly [because] North Carolina has no petroleum refining capacity, which means every dollar spent on petroleum goes first to the Gulf Coast of Louisiana" follows logically as well (2008, p. 169). Estill's experience demonstrates the power food has to give back to local economies—a power not shared by other goods like fuel. Local currency initiatives are meant to foster local economic connection and health, and they lend themselves to economic exchange of local food.

Bill McKibben's examination of Burlington Bread, the local currency in Burlington, Vermont, is remarkably consistent with Estill's experience. McKibben (2007) explains, "faced with the choice of buying local food at the farmers' market or food imported from California at the Stop 'n Shop, I'd be more likely to buy the local product, which I could pay for in Bread and save my US dollars for something that had to come from a distance" (p. 162). That these two men point to food purchasing as their first examples of local consumption is no coincidence. Local food initiatives provide an inroad into building local economies, and the results can be

powerful. I return to McKibben (2007) on the subject of Vermont: “a recent study found that if local consumers ‘substituted local production for only 10 percent of the food we import, it would result in $376 million in new economic output, including $69 million in personal earnings from 3,616 new jobs’” (p. 165). Local currency is not possible or practical in every community, but experiments like those that McKibben and Estill expose show the power of money circulation in local communities and the integral role food can play in that process. Reinvestment of resources into local food production reinvigorates community economies.

5.5 Social Benefits: Community Connectivity, and Inclusive Membership

Many of the authors cited in this thesis have worked toward proving that local economies, and especially those localizing food production, allow communities to be more resilient and avoid massive ecological destruction like that which exists now. Where I believe these authors do not go far enough is in the effects of local food initiatives on community members—the social effects of local food.

Where industrial food production causes community dismemberment, local food systems provide opportunities for cohesion and interconnectivity between community members. Where our current food system separates producers from consumers and allows us to see food purely as a commodity, local food initiatives connect consumers directly to the producers of their food and encourage food to be seen as the bounty of the earth that sustains our livelihoods. Where industrial food limits access to fresh, healthy, whole and unprocessed ingredients to the wealthy,

local food systems open such options to all community members. Such systems can offer these benefits because of at least four key factors: strong interpersonal connections, increased inclusion, economic benefits to farmers, and heightened awareness of natural systems and biosphere within which humans operate. All of these factors contribute to increased community food security and autonomy—key aspects of a resilient social structure.

Increased connections between community members are a central part of benefits of local food initiatives. Examining these increased connections can be challenging in light of the lack of sociological study devoted to such systems' effects on individuals and groups. Thus it is important to draw from multiple sources—academic and anecdotal—and allow them to inform one another to construct an understanding of the social benefits of local food piecemeal. Examples abound of successful local food initiatives and their positive benefits for community membership, all over the country and in may different contexts.

Farmers' markets and CSA groups allow communities of farmers and food producers to connect to consumers directly; such connections are manifested in many different ways, and often have many different consequences. One academic study supporting the connections born from farmers' markets was done in 1981 and compares the behavioral ecology of supermarkets and farmers' markets. The study found that "more than three quarters of the supermarket shoppers arrived alon3 while at farmers' markets over three quarters arrived in the company of others (Sommer, Herrick, and Sommer, 1981, p. 13). This simple finding provides insight into both the atmosphere and the social effects of these two food-vending sites. The

study posits that supermarkets encourage isolated shopping with massive selection, restrictive aisles, and up-tempo purchasing practices (today, the increasingly common self-checkout options are a perfect example of streamlined, impersonal purchasing structures). The structure of supermarkets leads scholars to include them on a "list of institutions that depersonalize social contacts" (Sommer, Herrick, and Sommer, 1981, p. 13). Thus supermarket structures do not encourage social connection or cohesion; on the contrary, they eliminate consistent, meaningful interaction between consumers and producers. This structure simultaneously relegates food purchasing to a position of quick commodity consumption rather than an understanding of the sources and growers of food. This study presents the possibility that without the personal connections to growers, consumers are encouraged to avoid considering either the individuals responsible for food production, or the source of food. I contend that such a structure allows consumers in this structure treat food as a commodity to be purchased and consumed, but not as a connection to a food producing community or ecological system. This mindset is, to me, another example of Wes Jackson's abstraction that our world is infinitely abundant, a mental apparatus built to evade difficult considerations of limitation, finitude, and consumption.

Farmers' markets, in contrast, increase social contact and put consumers in direct contact with the producers of food and sources of the food, challenging the abstraction encouraged by supermarkets. Such an atmosphere encourages shopping with a group. Perhaps this atmosphere explains why going to a farmers' market often feels like an event, even a gathering, while supermarket shopping often feels

like a chore. Sommer, Herrick, and Sommer (1981) suggest that farmers' market structures are conducive to increased social interaction: consumers must by from a vendor directly, purchasing is not rushed, and the increased contact between people allows for social interaction to flourish. I suggest that such characteristics allow market structures reintroduce joy and friendship to food purchasing.

The same study explains consequences of farmers' market structures that are significant for understanding farmer's markets' potential effects on communities. The study's results claim that farmers' markets are perceived as more "friendly, personal, rural, smaller and happier setting[s]" than supermarkets, and that "there were over two and a half times as many encounters per person at the farmers' markets […] and the greatest differences between the two settings occurred in informational and social encounters respectively" (Sommer, Herrick, and Sommer, 1981, p. 16). These findings are significant not only for the increased volume of social interaction to be found at markets, but also for the quality of these interactions.

The study broke social interaction into three categories: perfunctory, which are encounters between people that do not require response or conversation; informational, which are interactions that requires some basic level of question/statement and answer/response; and social, which are conversations "between two or more people on any topic" and may not be shopping related (Sommer, Herrick, and Sommer, 1981, p. 16). So in a setting that is friendlier and more personal, consumers are more likely to have interactions in which they learn something—usually about food—through informational encounters, and more likely

to have social conversations as well. Farmers' markets then, by virtue of their structure, encourage and promote people to learn about their food, its sources, its growers, and its characteristics, directly from other people, as well as talk to one another socially. These structures force people to be more social, and the study's findings on consumer characterization of farmers' markets as friendly and happy show that such social interaction is positively received.

These findings are important to understand the potential effects of local food initiatives on society. They support the contention that if food production became more decentralized, localized, and was sold largely at farmers' markets and through CSA systems, consumers would be shopping primarily in a more social, friendly, and personal setting. They would be having more conversations with those around them, shopping with company, and would be constantly exposed to information about where food comes from and how it is grown. The effects of such a setting change are still being academically understood and supported, but evidence of their benefits exists in the stories of communities that have adopted these systems as central parts of their structures. The work of these communities is part of a national food security movement in the United States and beyond.[21]

The leader of one such movement is Erika Allen, a nationally recognized and acclaimed food justice activist and organizer of the Chicago chapter of Growing Power. She works in Chicago communities promoting CSA systems, and draws an immediate connection from community food systems to sovereignty and land and

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[21] For examinations of the food security movement, see work from Wes Jackson, Erika Allen, Will Allen, Michael Bomford, Rob Hopkins, Rebecca Spector, LaDonna Sanders-Redmond and Andrew Fisher. Many of these writers are cited in this study, but all have much to offer with respect to community food security and food justice.

water rights (Heinberg and Lerch, 2010, p. 140). Her position is important to understanding the benefits of increased personal connections within a community. When communities come together, ownership of and responsibility for common resources—chiefly land and water but also air, flora and fauna—can become part of the community's tenets. Allen claims that, in her experience, CSA simply "transform[s] communities […] secures the community" (Allen in Heinberg and Lerch, 2010, p. 142). By having direct access to food growers and productive land, communities can secure themselves, become more resilient. I contend that one way in which CSA transforms and secures communities is through increased interpersonal connection found at farmers' markets—individuals building membership as part of a community through interaction with other members that breeds a sense of unity and empowerment. But Allen's work brings up another method of transforming communities through CSA: inclusion of all community members.

Looking at our current food system again, many community members, even entire communities, are voiceless and powerless in the framework of industrial food production. The concept of "food desert neighborhoods"[22] exemplifies communities suffering from little or no political and social capital to push for healthy options and access to higher quality food. Local food production is essential for "poor communities that are not attractive to distant food companies"; "the best hope for

[22] Food desert neighborhoods are areas where fresh, healthy food options are scarce or non-existent and grocery shopping often occurs and convenience stores or gas stations because no supermarkets, much less farmers' markets, can be found in the area. Such neighborhoods are usually low-income, minority populated areas that are systematically targeted by snack food and soft drink companies for business, and as a result often have very poor health conditions.

good nutrition will continue to be local food" (Halweil, 2004, p. 85). Further, Emile Frison, the director general of the International Genetic Resources Institute, said in a keynote speech in 2004 that "one of the simplest solutions [to persistent hunger] is to promote diversity in the diet" (Halweil, 2004, p. 86). Diversity is a central focus of small farms, and the link between these farms and alleviating hunger should not be ignored. This is a digression, however, from the focus of Allen's work—inclusivity and fairness.

Allen is quick to point out, however, that "in a locally operated food system we engage all members of the community, taking special care to engage the most marginalized members and those most [affected] by food and land degradation" (Allen in Heinberg and Lerch, 2010, p. 141). Rather than make this ultra-local food source inaccessible and elitist (a common, misguided critique of the organic/local food movement) Allen's group pushes to include all members of the community from the beginning by allowing all to participate in the growing *and* consuming of food. Such participation becomes part of the fabric that ties the community together. This simple inclusion is one of the most important pieces of community food infrastructures, because it immediately ties food infrastructure to justice and universal accessibility—avoiding the exclusion and discrimination inherent in our food system today. When coupled with ecologically sustainable farming techniques, as small-scale food production is built to do, these systems have the longevity and just qualities that allow them to be defined as truly sustainable.

Allen's focus on justice allows local food initiatives' effects and manifestations to pervade a social structure, and it is in this pervasiveness, based on

the inclusion of entire communities, that offers the most exciting and hopeful future for society. Allen elucidates:

> True sustainability in terms of community food systems means that disenfranchised people, especially youth and their families, are involved in the process not only as beneficiaries of "good (and carbon-neutral) food" but as central participants in the planning, development, and execution of the food system, including its interlocking parts: energy, housing, public transportation, economic development, and so on. You're building a whole infrastructure that supports local food systems. (in Heinberg and Lerch, 2010, p. 141)

Allen's view demonstrates how local food initiatives can change our entire social structure and infrastructure to value justice and inclusion over growth and profit. She knows that local food systems that are purely administratively implemented, or have an elite, well-intentioned minority guiding them, will never last as long or transform communities as fully as a more inclusive model. Her focus on "youth and their families" illustrates the importance of incorporating future generations into these plans, and growing these initiatives into the lifestyles of families and youths that they may flourish as an intrinsic part of life in a resilient and sustainable society. She asserts that simply providing for these marginalized community members is not enough, but that they must be "central participants" in every aspect of the food infrastructure so that they may then be key components in every aspect of community design.

Allen's perspective on local food initiatives demonstrates the true hope I feel that these initiatives can provide. Matching community food system management with justice and inclusion provides the basis for such positive ideologies to have beneficial impacts throughout society. Allen's work shows how community food systems can benefit previously unengaged community members when they are

given the opportunity to participate in food production, but two other entities should be strongly considered when justice is the chief concern of food systems: farmers and ecosystems. Inclusion and increased personal connection are deeply important for a more just food system, and they are tied to benefits for farmers, and community members' connection to the biosphere, which necessary pieces of a sustainable and socially beneficial system.

Rebecca Spector's essay "Fully Integrated Food Systems" in *The Fatal Harvest Reader* points to a mindset called bioregionalism that can be drawn from small-scale food systems and that integrates well with Allen's tactics of inclusion. When community members connect to food growers through participation in food production and interpersonal relationships with the growing community, more of the community is included in the process of growing and consuming food. In a community that also follows the mentality of bioregionalism, according to Spector and Kirkpatrick Sale, we have a way "to understand ourselves as participants in and not masters over biotic community […] to understand place" (Kirkpatrick quoted by Spector in Kimbrell, 2002, p. 291) that connects our food system, our sustenance, to natural systems' health and functionality.

Such an understanding as that which is attributed to bioregionalism by Spector and Sale is only possible when consumers connect more directly to food sources, and food sources are connected to the ecology of a region. Jackson's comments on humanity's ability to create abstractions that allow us to forget about the natural limits of the world inform the goals of bioregionalism well. Bioregionalism is an attempt to avoid such abstractions and connect to natural

systems. My contention, and Spector's piece supports this, is that connection of this kind also increases community connectivity and strengthens interpersonal connections because of the structure of small-scale food production systems discussed above. When farmers grow more types of crops together for local communities, community members are exposed to these growers at farmers' markets and through CSA, and communities grow stronger. Spector defines a "'fully integrated food system' [as] one that connects the farm to the local community and allows the public to regain a long-lost connection with the people who are growing food" (Spector in Kimbrell, 2002, p. 292). Spector says that the consequences of such a system are "the freshest produce available locally and farmers with a higher percentage of the food dollar" (Spector in Kimbrell, 2002, p. 292).

Such a mindset does not only improve social connectivity, however. Spector specifically includes a focus on the biosphere (hence *bio*regionalism, rather than simply regionalism) within this mindset. Communities with a bioregional mindset will respect and feel responsible for the natural world around them because it is recognized as essential for the livelihood of the community. In such a community "people tend not to pollute or damage the natural system on which they depend […] if they *participate in* and see directly what is happening to that natural system," (Spector in Kimbrell, 2002, p. 291). Increased connection to the land through food production forces communities to consider the ramifications of unsustainable or ecologically destructive behavior and discourages it. Again, the structure of small-scale food production systems encourage ecological responsibility by opening up opportunities for community members' participation in the systems and relying on

farming practices that work with natural systems to enrich production capacity and fertility rather than dominate such systems and work to artificially replenish fertility.

A system that relies on polyculture from many farms that lie geographically close to consuming communities has a high degree of resilience. The ecological benefits of small-scale farming—the retention and replenishment of soil fertility without synthetic fertilizer, the preservation of genetic diversity and ecosystems by avoiding the pesticide use often necessary when tending monoculture farms—joined with reduced carbon combustion, economic durability, and social benefits inherent in local food production systems make multiple small, polyculture farms growing food for nearby communities an socially inclusive alternative to our current societal structure that can carry on through the foreseeable future. This model of production and decentralization is a truly sustainable opportunity.

5.6 Examining Quality of Life

In researching for this thesis, I found that alternatives to industrial food systems create potential social benefits, including reconnected communities, long-term security of quality of life, collaborative problem solving, better mental and physical health and higher standards of well-being. Yet these benefits have not yet been empirically examined to the same extent as alternative food production's benefits to local economies and ecosystems have been. Whether or not these benefits exist, not to mention to what extent they affect individuals and communities in today's society, is largely still an open question. Here I explore the connections local food initiatives may have to our social environments in an attempt to address this gap in the literature.

In an attempt to understand some of these social effects, I designed a study to examine how commitment to local food initiatives might affect quality of life. After studying the structure of local food initiatives, and specifically farmers' markets and CSAs, I recognized that they potentially afford opportunities to expand interpersonal relationships, build and extend relationships with farmers and growers, improve cohesion between community members, form a positive relationship with the natural world by understanding food as part of ecological systems and understand the concept of 'community' as inclusive of people and the natural environment on which we depend. These benefits, some tangible and others more philosophical, enhance individuals' networks and sources of support, both of which contribute positively to individuals' mental health (Keyes, 2002). In fact, the

benefits of local food initiatives outlined above clearly apply to the five social dimensions of well-being posited by Corey Keyes, a leading sociologist of happiness, mental health, and positive psychology. Keyes suggests that social coherence and social integration are contributors to mental health, in other words people are highly functioning "when they feel they belong to and are accepted by their communities" (Keyes, 2002, p. 209). Meaningful relationships are also positive contributors to mental health, measured as both social and psychological dimensions of functionality (Keyes, 2002, p. 208). Quality of life is a distinct yet similar measure to mental health; both are based on "individuals' perceptions and evaluations of their own lives in terms of their affective states and their psychological and social functioning" (Keyes, 2002, p. 208).

Assuming the potential benefits to communities that adopt local food production as a principle tenet of their infrastructure, I propose that commitment to local food initiatives will enhance individuals' assessments of their quality of life. . Quality of life is defined as an important measure of health (Burckhardt et al., 2003) that is holistic enough to quantify aspects of individuals' lives that are not strictly related to physical health. Quality of life serves well as a holistic measure of health that takes into account activity, attitude, and mental health as much as physical health. Commitment, as it is defined here, includes both attitudinal interest in such initiatives as well as active participation in them. Given greater human connections that cultivate a respect and understanding of the natural systems on which we rely, as well as the freshest food possible, I hypothesized that commitment to local food initiatives would allow an individual to feel more satisfied with life, and perhaps

happier with her/himself. Below I describe how I collected data relevant to assessing a positive correlation between commitment to local food and quality of life.

Methods

This study drew from surveys collected from community members living in the Atlanta area. The survey had three sections: quality of life assessment, commitment to local food initiatives, and finally some demographic information. Respondents spent about five minutes completing the survey and received no compensation for doing so. Participation was entirely voluntary and could be terminated at any time.

In total, I collected over 170 surveys, 55 in paper form at farmers' markets, and over 120 online. The study population was diverse in age, income, and commitment to local food. Respondents ranged from 21 to 71 years old with a mean age of just over 40 years (40.8). Income ranged from below $25,000 to above $250,000 per year with a median between $75,001 and $100,000. The sample was 79.4 percent white and 19.1 percent non-white. Most respondents were female, 70.9 percent, with males making up a minority 27.7 percent (1.4% of valid surveys did not include a response to the question about gender). All other independent variables had higher levels of variation. Because of the lack of variation in race and gender, I analyzed results with and without them as control variables; the pattern of results is consistent across the analyses with and without race and gender.

Procedures

I solicited participation either in person at local farmers' markets or online via email. Regardless of format, all responses were anonymous.

Farmers' market questionnaire distribution relied on convenience sampling. I asked local residents who attended the farmers' markets for their participation. At the farmers' markets I also invited vendors/farmers to participate, thinking that their commitment to local food initiatives would be higher than the average consumer. Participants were presented with basic information about the study and a one-page information sheet that informed them of the nature of the study and their rights as a study participant. They were encouraged to keep this sheet for future reference. Consent was given orally, to protect anonymity of respondents.

Online surveys began with the consent information and included exactly the same questions as those found on the paper survey. Participants could not complete the questionnaire if they did not click 'agree' to the consent information and no names were associated with any responses. The surveys were distributed via an email message modeled after the recruitment pitch I gave to potential participants at the farmers' markets. Because I did not have access to listservs or personal email addresses for local residents, I employed a snowball sampling system that relied on friends, acquaintances, and mentors to be the primary contact for new participants. Questions about the survey were still to be directed to Dr. Karen Hegtvedt, the faculty mentor for the study, or to me. Online data were collected without targeting

groups interested in local food to achieve variability in the sample and increase sample size. This strategy allowed the survey to reach a more general population rather than stay confined to the local-food-committed community (e.g. farmers' market shoppers and vendors etc.).

Measures

The first section of the survey measures quality of life. I chose to use Flanagan's quality of life scale, which is an established scale for studying quality of life created in 1970s and amended in the early 1980s to include the 16th item "independence, doing for yourself" to allow the scale to be applied to the medically infirm, a group that professed that this category is important to their self-assessed quality of life (Burckhardt et. al 2003, p. 1). The Flanagan scale prompts participants to rate their satisfaction with each of 16 elements on a 1 to 7-point scale, where one represents being very dissatisfied and seven being very satisfied. The satisfaction ratings reflected how satisfied the individual is with the presence or absence of a given relationship or activity in his/her life. For example, rate your satisfaction with "having and rearing children" even if you have no children, or do not plan to have children. Example of other items include: material comforts, having close friends, positive family relationships, close relationships with significant others, and participation in public affairs/organizations. A full list of the elements of the scale, along with the entire questionnaire, can be found in Appendix A.

Although exploratory factor analyses using principle component analysis indicated multiple factors potentially providing the basis for sub-scales, reliabilities for the subscales were rather low compared to the reliability of a scale involving all items. This is not surprising because the quality of life scale is built as a holistic measure of life satisfaction based on five categories of life—"physical and material well being, relationships with other people, social and civic activities, personal development, and recreation" (Burckhardt et al., 2003, p. 1). The scale is based on a sum of the respondent's answers; thus scales consisting of only a few questions would hardly capture the entirety of quality of life. I created an overall additive scale, standardized by the number of items (16), for the analyses. The alpha reliability of the quality of life scale is .88.

The second section measures commitment to local food. Unable to find an established, satisfactory metric for commitment to local food, I designed my own items. I asked respondents, "how committed are you to each of the following activities," and listed six activities related to local food initiatives. These items included consuming locally produced food, helping to produce local food, and participating in community supported agriculture. Individuals indicated how committed they were to a particular activity on a scale ranging from 1 "not very committed" to 7 "very committed." All items constituting the additive, standardized scale can be found in Appendix A as well. The alpha reliability for the local food commitment scale is .893.

Both of these measures were scored in the same way. The Flanagan scale is meant to report a sum score of individuals' quality of life. To make comparisons

between the two additive quantifiable scales easier, I took the mean response to each scale for each respondent. Thus, comparisons could be done between two numbers between 1 and 7 rather than the summed scores that would have been a number between 16 and 112 for the Flanagan scale and a number between 6 and 42 for the commitment to local food scale.

I also incorporated several single item measures of local food commitment. I asked whether the respondent was a member of a CSA and dummy coded responses 0=no and 1=yes. Respondents also indicated: how frequently they attended farmers' markets (six levels ranging from 'never' to 'weekly'); number of days spent producing local food (0-7); and frequency of considering buying locally sourced food (four levels ranging from 'never' to 'every time for every product'). Respondents also indicated the percentage of their food that is locally sourced, but many did not indicate a percentage so the item was excluded from analysis.

The final section of the survey was focused on demographic information. These were standard control variables for sociological inquiry—age, race, gender, responsibility for dependents, income, and highest level of education. Participants were asked to fill in their age and gender as open-ended responses (dummy coded 0=male, 1=female). Questions about financially supporting dependents (0=no, 1=yes) and identifying as vegan or vegetarian (0=no 1=yes, a salient control for this survey population). Income and education were interval measures with standard response categories, with 8 yearly income brackets ranging from below $25,000 to above $250,000, and 6 levels of education ranging from some high school to post-graduate work. Racial categories were standard for sociological research—Asian/

Asian American/ Pacific Islander, Hispanic/ Latino/ Chicano, African American/ Black, Caucasian/ White, Native American/ American Indian/ Alaskan native, and Multiracial/ Multiethnic—and included a space for added information for those who selected "multiracial." Because of poor variation or concentration of data in certain response categories for race and education, I recoded the categories to offer a better distribution. Race had very little variability and was recoded into two categories of 'white' and 'non-white. Education was re-coded into a binary scale of any level of completed education up to a bachelor's degree and any education above that level.

Analysis

Using SPSS software I ran bivariate correlations for all variables (Table 1). At this level of the analysis, no significant relationship existed between quality of life and measures of local food commitment. The bivariate correlation showed significant positive relationships between quality of life and some of the demographic controls. Older respondents and those with higher education tended to indicate higher quality of life. And, not surprisingly, significant positive correlations existed between frequency of buying local food and commitment to local food. Demographic factors also influenced local food commitment in the following ways: income was positively related to CSA membership; supporting dependents increased commitment to local food and frequency of buying local food. Having taken the survey in paper form was positively related to local food commitment and attendance at farmers' markets, which is to be expected because

paper surveys were only given out at farmers' markets, and thus were going to a population (including farmers and food producers) that is more likely to be more strongly committed to local food.

The only significant negative relationships between variables were between the survey type and education, income, and supporting dependents. This result signals that those that took the survey online (coded as number 0) were more likely to have a higher level of education, income, and to financially support dependents than those that took the survey on paper (coded as number 1). Since all questions were identical on both the paper and online survey, however, linear regression results should still be trusted.

Findings in Table 2 provide some evidence for the hypothesis that a higher level of commitment to local food is positively related to a higher quality of life. Specifically, regression results show a significant positive relationship between commitment to local food and quality of life at the $p < .05$ level. Respondents indicating greater commitment to local food, as measured by the comprehensive scale for commitment to local food, indicate higher levels of quality of life. In contrast, however, there were no effects of frequency of buying local food, CSA membership, or frequency of attending farmers' markets on the quality of life measure.

The multivariate analysis also pointed to a relationship identified in the bivariate correlations. Education level exerts a positive effect on quality of life, controlling for all other factors.

Discussion

This study was meant to address what I see as a dearth in sociological literature on the social effects of local food initiatives. The potential effects of these initiatives on interpersonal relationships, community cohesion, and positive individual action in the world are all tied to positive mental health (Keyes, 2002) but have not been studied in relation to quality of life, happiness, or mental health. This gap in the literature presents an opportunity to understand local food initiatives as desirable social alternatives that may positively affect individuals' mental health and well-being. Though more research is needed to fully appreciate the potential of these initiatives, the findings of this study address that gap and point to positive effects of commitment to local food on individuals' quality of life.

When controlling for demographic variables, there was a significant positive relationship between quality of life and commitment to local food. This finding is important because it suggests that local food systems may have positive social effects on individuals. Such effects should be seen as reasons to incorporate such systems into community infrastructure, and as evidence of their desirability. They also open the possibility that a more sustainable food structure would actually make community members more satisfied with their lives.

While such results are encouraging, other measures of local food commitment did not enhance quality of life. In fact, relationships between quality of life and attendance at local farmers' markets and frequency of buying local food were far from significant ($p=.193$ and $p=.832$, respectively). The effect of

membership in CSA on quality of life approached significance (p=.09), but had a negative effect on quality of life, indicating that CSA members express a lower quality of life than nonmembers. These results are contrary to the expectation that local food commitment improves quality of life.

Two possible explanations emerge for these inconsistent results. First, there may be disparities between the multi-item commitment scale and the single indicator questions. Yet all of the single indicators are positively correlated with the commitment to local food scale (see Table 1).

Second, the scale and single indicators focus on different phenomenon. The commitment scale was designed to measure an attitudinal or cognitive relationship to local food initiatives, and asks for the individual's 'level of commitment.' The single indicator questions, however, measure the behavioral relationship of people to local food production. Attending farmers' markets often, being a member of a CSA, or buying local food very frequently requires behavioral commitment and active participation in local food initiatives. This disparity reflects a commonly noted sociological phenomenon—the difference between attitudes and behaviors. While individuals may feel that buying local food, attending farmers' markets, or buying food in season is very important, it may not affect where they shop or how they spend their money. Considering that there were very few valid responses for how many days a week an individual spends helping to produce local food, and that many respondents struggled to answer what percentage of food that they consume is locally sourced, the possibility that commitment to local food is not the same as active participation in local food grows more probable.

These results suggest a more nuanced understanding of individuals' relationships to local food initiatives than my study originally contemplated. Future research must make a distinction between local food *commitment* and local food *involvement* as it relates to quality of life. While this study provides evidence to suggest that an ideological or attitudinal commitment to local food initiatives positively affects quality of life, future research should consider the effect of active participation, involvement, in local food initiatives. With a larger sample size and more reliable sampling tactics, future research can build upon this study to further understand the social effects of local food on individuals. I would also suggest introducing measures of community interconnectivity, interpersonal relationships, social cohesion among members of groups committed to these initiatives, and personal health, along with a measure focusing on involvement. These extra measures would further explore whether the relationship found in this study was spurious, or if there is another variable that affects quality of life more directly.

Given that the results of this study that indicate different patterns for attitudinal and behavioral commitment, I would also suggest that if current systems were to change to the point that involvement in local food production systems was easier and more normative, the positive effect that attitudinal commitment to local food has on individuals' quality of life might be further enhanced and, perhaps, eventually translate into measurable behavioral changes. Community-incorporated initiatives that reinforce attitudinal commitments may facilitate behavioral involvement. With both forms of commitment, quality of life may be further enhanced.

Conclusion

Within the literature of sustainability, scholars have come to a consensus about the dominant food production system. In the US, industrial food has been portrayed as the singular option for affordable, diverse food choices by groups that directly benefit from this message—agribusiness companies, chemical producers, and politicians who support and draw support from these businesses.

Unfortunately, this message is shortsighted at best and disingenuous at worst. It elides the pervasive, costly environmental damage endemic to the system, the perpetuated economic disadvantages it breeds, and the disruption and dismemberment of communities. This system contributes to global ecological destruction through its consumption of fossil fuels, and endangers the fabric of our global community by marginalizing workers and food eaters by relegating them to the positions of means of production and consumer, respectively. I believe that the rigidity of this systems' reliance on importing resources and exporting products perpetuates social injustice locally, nationally, and globally. Alternatives are arising, however, and though many groups that consistently support this system, an increasing number oppose and challenge it in an attempt to change the status quo.

Because scientists, journalists, philosophers, and community members agree on the destruction inherent in industrial agriculture, movements to rediscover, invent, and employ alternative initiatives that provide hope for a sustained, positive future are spreading throughout our country and the world.[23] In the US alone, the

[23] Paul Hawken's book *Blessed Unrest* takes up these movements and joins social justice activism, environmental advocacy, and sustainable solution problem-solving into a single movement that he claims is the largest the world has ever seen.

number of farmers' markets increased between 1994 and 200 by 63 percent and in 2002 over 2,800 farmers' markets operate with sales totaling approximately $1 billion annually (Fisher in Kimbrell, 2002, p. 297). The number of CSA systems in the US "was estimated at 50 in 1990 and has since grown to over 1,000" (Spector in Kimbrell, 2002, p. 292). These systems "provide farmers with close to 100 percent of the food dollar" (Spector in Kimbrell, 2002, p. 293), which improves local economy and makes farming a viable economic path again. CSA and farmers' markets draw from multiple local sources, which cuts down on fossil fuel consumption in the food system, and enables growers to use techniques that avoid ecological destruction while being, often significantly, more productive than large-scale farms.

Alternative movements are forming and proliferating. These alternatives offer a more environmentally sound model that serves local economies and communities more efficiently than industrial food can. Increasing numbers of farmers' markets, CSA systems, and urban farming communities are wonderful indicators of a hopeful future, but they only represent a fraction of the existing efforts to create more sustainable societal structures. Rob Hopkins' work with the Transition Movement, a holistic mode of community design focused on ending dependence on fossil fuel use, exemplifies the inclusive nature of these movements. His *Transition Handbook* (2008) is a guide for community resilience and building a new paradigm for human populations.

The movement approaches sustainability and resilience from a diverse array of initiatives, from food production to building practices and urban planning. The

movement demonstrates, too, the possibility of these initiatives to be inclusive of the entire community, as one of the keys to his work is involvement and reliance on every member of a given community. Just as Erika Allen focused on including traditionally marginalized individuals as central participants, Hopkins' work does the same. Encouragingly, his movement is not alone in this characteristic. Many of the most impressive, hopeful alternatives to a reliance on industrial food (or other unsustainable systems, for that matter) are being led by people usually not given much power or agency in society. All over the world, including the US, poor women of color, young people, and inner-city inhabitants among others are rising up to find responsible, positive alternatives for themselves and their families in the future.

The beauty of this sustainability movement is its diversity and inclusivity. People are improving the world and finding responsible alternatives even without much political or economic capital. The possibility of such an inclusive and forward-thinking structure drives me to contend that these alternatives are not only a more *responsible* choice, however, but also that they are a more *desirable* choice. While I have indicated that more research is necessary to prove and support such claims, I see great potential in local food initiatives for the benefit of individuals in communities. I see the potential for a more respectful relationship between people and the environment to contribute to a deeper sense of place and belonging. I see the potential for connected food producers and consumers to enrich each other's lives and professions, learning from one another and valuing each other more. I see more connected communities cherishing each community member and incorporating each of him or her into the social structure productively and

positively through food production and consumption. I hoped to begin an empirical support of such claims through the study on quality of life as it relates to local food initiatives, and though the study is small, it nonetheless presents evidence to defend these claims and link these systems to better lives for those involved.

The empirical aspect of my thesis, along with the ever-increasing number of inclusive, positive groups working for a sustainable future inspired the title of this work. Though sustainability is the broadest of intellectual frames, food serves well as a microcosm of sustainable and unsustainable forces at work in the world. In studying for this work, I found that many of the most exciting 'alternatives' for the future were the status quos of the past. Food previously existed as a source of community development within specified geographic regions, bringing families, friends, and local social networks together around farming, trading, preparing, and eating. I see that as a great source of joy. I see it as a return to systems that now seem vague, glowing memories of lost generations living in plain, carefree times. We can reassert that lifestyle, reclaim that joy by relocalizing our food production systems.

The ultimate goal of this project is to explore what might characterize a sustainable society, one that holds justice and sustainability at its core. This thesis combines the consensus of sustainability scholars, thinkers, and authors with my own empirical defense of the position that these initiatives present a vastly improved model for our future. A future that is just for all people and for the planet, enjoyable for its constituents, and ultimately hopeful, sustainable.

Table 1: Bivariate Correlations with Means (and Standard Deviations) on Diagonal

Correlations

	Quality of Life	Local Food	Farmers' Market	CSA Member	Local Buying	Age	Race	Gender	Education	Income	Dependents	Paper
1. Quality of Life	5.47 (.742)											
2. Local Food Commitment	.108	4.937 (1.35)										
3. Farmers' market Attendance	-.062	.493**	4.23 (1.62)									
4. CSA Membership	-.061	.270**	.130	4.45 (1.88)								
5. Frequency of Buying Local Food	-.005	.620**	.465**	.296**	2.47 (.772)							
6. Age	.200*	.042	.052	-.035	-.015	41.4 (12)						
7. Race	.007	-.063	.045	-.088	-.137	-.033	.19 (.397)					
8. Gender	.023	-.028	-.010	.042	.032	-.093	.107	.72 (.451)				
9. Education	.218**	-.020	-.046	.049	.010	.168*	-.094	.085	.51 (.502)			
10. Income	.142	.083	-.115	.356**	.063	.171*	-.244**	-.084	.286**	3.85 (1.99)		
11. Supporting Dependents	.118	.084	.018	.291**	.021	-.100	.096	.144	.099	.362**	.53 (.501)	
12. Paper	-.100	.185*	.312**	-.108	.096	-.016	.161	-.150	-.348**	-.340**	-.207*	.40 (.491)

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2: Unstandardized Linear Regression Coefficients (Standard Error) for the Effects of Commitment to Local Food Initiatives on Quality of Life

Independent Variable	Coefficient and Standard Error
(Constant)	4.526 (.338)
1. Local Food Commitment	.125* (.063)
2. Farmers' Market Attendance	-.025 (.110)
3. CSA Membership	.009 (.005)
4. Frequency of Buying Local Food	.103 (.141)
5. Age	.037 (.040)
6. Race	.280* (.138)
7. Gender	.101 (.168)
8. Education Level	.009 (.144)
9. Income	-.060 (.048)
10. Financially Supporting Dependents	-.316 (.189)
11. Paper	-.004 (.152)
	N=141 R^2=.146

a. *p < .05, **p < .01

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Appendix A: Survey Questionnaire

Quality of Life and Local Food Involvement

Quality of Life: Please read each item and circle the number that best describes how satisfied you are at this time. Please answer each item even if you do not currently participate in an activity or have a relationship. You can be dissatisfied or satisfied with not doing the activity or having the relationship.

	Very Dissatisfied			**Mixed**			**Very Satisfied**
1. Material comforts home, food, conveniences, financial security	1	2	3	4	5	6	7
2. Health - being physically fit and vigorous	1	2	3	4	5	6	7
3. Relationships with parents, siblings & other relatives- communicating, visiting, helping	1	2	3	4	5	6	7
4. Having and rearing children	1	2	3	4	5	6	7
5. Close relationships with spouse or significant other	1	2	3	4	5	6	7
6. Close friends	1	2	3	4	5	6	7
7. Helping and encouraging others, volunteering, giving advice	1	2	3	4	5	6	7
8. Participating in organizations and public affairs	1	2	3	4	5	6	7
9. Learning- attending school, improving understanding, getting additional knowledge	1	2	3	4	5	6	7
10. Understanding yourself - knowing your assets and limitations - knowing what life is about	1	2	3	4	5	6	7
11. Work - job or in home	1	2	3	4	5	6	7
12. Expressing yourself creatively	1	2	3	4	5	6	7
13. Socializing - meeting other people, doing things, parties, etc	1	2	3	4	5	6	7
14. Reading, listening to music, or observing entertainment	1	2	3	4	5	6	7
15. Participating in active recreation	1	2	3	4	5	6	7
16. Independence, doing for yourself	1	2	3	4	5	6	7

Involvement in Local Food: How committed are you to each of the following activities?

	Not Very Committed						**Very Committed**
1. Consuming locally produced food	1	2	3	4	5	6	7
2. Helping to produce local food	1	2	3	4	5	6	7
3. Participating in Community Supported Agriculture	1	2	3	4	5	6	7
4. Basing food buying decisions on the distance that the food has traveled	1	2	3	4	5	6	7
5. Buying food based on seasonal availability	1	2	3	4	5	6	7

6. Purchasing food from local farmers' markets 1 2 3 4 5 6 7

About what percentage of the food that you consume is produced locally? _____% (or "don't know")

How many days a week do you spend helping produce local food? _____

How often do you attend local farmers' markets?
[ ] Never
[ ] A few times a year
[ ] 6-11 times a year
[ ] Once a month
[ ] 2-3 times each month
[ ] Weekly

Are you a member of a CSA (Community Supported Agriculture)?
[ ] Yes
[ ] No

When buying food, how often do you consider buying from local sources?
[ ] Never
[ ] Often for most products
[ ] Often for a few products
[ ] Every time for every product

Background Information:

What is your age? _____

How would you describe your racial/ethnic background?
[ ] Asian/ Asian American/ Pacific Islander
[ ] Hispanic/ Latino/ Chicano
[ ] African American/ Black
[ ] Caucasian/ White
[ ] Native American/ American Indian/ Alaskan Native
[ ] Multiracial/ Multiethnic (please specify) _____

What is your gender? _____

Do you identify yourself as vegetarian or vegan?
[ ] Yes
[ ] No

Do you financially support dependents? (parents, children, medically infirm)
[ ] Yes
[ ] No

What is your/your family's estimated annual combined income?
[ ] Less than $25,000
[ ] $25,001-$50,000
[ ] $50,001-$75,000
[ ] $75,001-$100,000
[ ] $100,001-$150,000
[ ] $150,001-$200,000
[ ] $200,001-$250,000
[ ] Over $250,000

What is the highest level of education you have achieved?
[ ] Some High School

[ ] Finished High School
[ ] Some College
[ ] Finished Undergraduate
[ ] Professional School/Technical Degree (MD, JD, MPH, MBA etc.)
[ ] Post-Graduate work (PhD)

Thank you!

Appendix B: Consent Information

INFORMED CONSENT
Department of Sociology, Emory University

Title: Relocalizing the Joy of Food: Quality of Life and Local Food Involvement
Principle Investigators: Dr. Karen A. Hegtvedt, Emory University
Co-Investigator: Joseph Shea, Emory University

My name is Joseph Shea, and I am a student at Emory University. I would like to invite you to participate in a study about involvement in food initiatives and quality of life. As a food producer or purchaser, your responses will be very helpful. I hope to involve up to 200 people in this study.

Participation involves completing a short, three-part questionnaire. First, you will be asked about your satisfaction with different aspects of your life, from material comforts to familial relations and friendship. The second section asks about your commitment to local food initiatives, purchasing practices, involvement in food production, and the sources of most of your food. The questionnaire closes with questions about your background. The questionnaire should take no more than 5 minutes to complete. You can ask me any question you have about the questionnaire or a specific question. I will do my best to answer. If any question makes you uncomfortable or you do not want to answer a specific question, you are free to skip it. You may also end the survey at any time.

Your name will not be attached to your responses, and your responses will be held confidentially. Only my advisor and I will have access to completed questionnaires and data files. Agencies and Emory units that make rules and policy about how research is done, however, have the right to review study records to make sure that studies are conducted and handled correctly. These include the US Office for Human Research Protections, the Emory University Institutional Review Board, and the Emory Office of Research Compliance. We will keep the study records as private as is allowed by law. All completed questionnaires will be kept in a locked file. Electronic data files will be stored on a password-protected computer on secure networks. Data analyses will be performed only on grouped responses. No names will be associated with these analyses. Facts that might point to you will not appear when we present this study or publish its results.

Participation in this research project is completely voluntary. You have the right to refuse to participate in this study. If you decide to participate in this study and you change your mind, you have the right to stop participating at any time. There will be no consequence to you if you withdraw from the study.

There are no known risks to participating in this study. There are also no direct benefits. Your responses will help me to more clearly understand links between commitment to food sustainability and quality of life. Such an understanding may help to incorporate localized food systems in communities.

If you have any questions about this study, please contact me at 919-619-8184 or at jtshea@emory.edu or Dr. Karen Hegtvedt (404-727-7517 or khegtve@emory.edu). If you have questions about your rights as a participant in this study, you may contact the Emory University Institutional Review Board. That office oversees protection of human study participants. They can be reached at (404) 712-0720 or irb@emory.edu.

We appreciate your willingness to consider participating in this study. Please keep this page for your records.

Appendix C: Recruitment Email Message

Hello!

I am an undergraduate at Emory University working on an honors thesis for my major. I am asking for your participation in a study of quality of life as it relates to local food involvement. Participation in the study involves completion of an online questionnaire that should take less than 5 minutes! The survey asks questions about your background, satisfaction with different aspects of your life, and ongoing participation in local food initiatives.

More information is provided on the first page of the survey to help you make an informed choice about your participation. Click on the link below for the survey:

(LINK)

Because participation in the study is voluntary, even if you go to the website, you may choose at any time not to participate or, if you choose to participate, you may skip items. Your responses will remain anonymous and be held confidentially. There are no foreseen risks connected to participation in the study, and your answers can not be attributed to you when submitted.

If you have any questions about this study, please feel free to contact us. If you have questions about your rights as a participant in this study, you may contact the Emory University Institutional Review Board, which oversees protection of human study participants, at (404) 712-0720 or irb@emory.edu.

Many thanks for considering this invitation!

Sincerely,

Joey Shea
Co-Investigator, Honors Student
(jtshea@emory.edu)

Karen A. Hegtvedt Principle Investigator, Advisor
(404-727-7517; khegtve@emory.edu)