5-2013

CULTIVATING AMERICA'S WORKING LANDS: A STUDY OF THE SOCIOCULTURAL VALUE OF FAMILY FARMS

Katherine Lloyd
Clemson University, Katie@KatherineLloyd.com

Follow this and additional works at: https://tigerprints.clemson.edu/all_theses

Part of the Landscape Architecture Commons

Recommended Citation
https://tigerprints.clemson.edu/all_theses/1643

This Thesis is brought to you for free and open access by the Theses at TigerPrints. It has been accepted for inclusion in All Theses by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.
CULTIVATING AMERICA’S WORKING LANDS:
A STUDY OF THE SOCIOCULTURAL VALUE
OF FAMILY FARMS

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Landscape Architecture

by
Katherine Muriel Lloyd
May 2013

Accepted by:
Paul C. Russell, ASLA, Committee Chair
Dr. Matthew N. Powers, ASLA
Daniel J. Ford, ASLA
ABSTRACT

Our ability to produce food in a sustainable, healthy and humane manner is threatened, both in the United States and on the global scale. This difficulty is exacerbated by expected population growth, creating a need for 60% more food worldwide by 2050 to feed a population of 9.3 billion (United Nations Chronicle, 2012). How we produce food affects local economies, the cultural vitality of communities, and the health of regional ecosystems. Industrial or conventional agriculture is damaging all three of these systems, by draining local economies through corporate business practices, isolating farmers and attributing to rural population losses, while depleting natural resources and polluting the environment (National Research Council, 2010; Union for Concerned Scientists, 2008; World Bank, 2012). Additionally, the healthy agricultural lands that remain around cities are being developed at alarming rates in relation to population growth (Partnership for a Sustainable Community, 2011; USDA, 2012). In response to these threats, as well as inequities in global food supply and distribution, this study is concerned with how family farms that practice sustainable agriculture approach self-sufficiency within their local communities. This study address self-sufficiency from the perspectives of scale, practices, proximity, access, relationship, and engagement through case studies of nine southeastern family farms. The goal of the study is to define design solutions for managing working lands through sustainable agriculture, so as to ensure the long-term health of local communities, economies, and ecosystems. Results of the study indicate that there is a need to holistically address agriculture from the perspectives of government, farmers, and citizens through conservation, production, and education. Moving forward, this research implies a need to expedite the National discussion on food production and working lands management, so that we can begin to prevent the loss of productive lands, agricultural knowledge, and of able farmers, ensuring a future for food and farming in America.
ACKNOWLEDGEMENTS

In addition to Paul Russell, Matt Powers, and Dan Ford, I must give my deepest gratitude to Mary Beth McCubbin and David Pearson. These five people have made my academic experience undeniably memorable and rewarding. This thesis also would not have been possible without the participation of nine farmers, who are each active stewards of the environment and generous educators. I am additionally grateful for the support of my five best friends: Todd, Carl, Oliver, Monti and Donald.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>i</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vi</td>
</tr>
<tr>
<td>CHAPTERS</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>Problem Statement</td>
<td>5</td>
</tr>
<tr>
<td>Solution</td>
<td>6</td>
</tr>
<tr>
<td>Research Questions</td>
<td>8</td>
</tr>
<tr>
<td>Significance</td>
<td>9</td>
</tr>
<tr>
<td>Study Organization</td>
<td>9</td>
</tr>
<tr>
<td>II. LITERATURE REVIEW</td>
<td>11</td>
</tr>
<tr>
<td>Practices</td>
<td>11</td>
</tr>
<tr>
<td>Access</td>
<td>17</td>
</tr>
<tr>
<td>Scale</td>
<td>20</td>
</tr>
</tbody>
</table>
Table of Contents (Continued)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity</td>
<td>21</td>
</tr>
<tr>
<td>Relationship</td>
<td>23</td>
</tr>
<tr>
<td>Engagement</td>
<td>26</td>
</tr>
<tr>
<td>Analytical Framework</td>
<td>28</td>
</tr>
<tr>
<td>III. RESEARCH METHODOLOGY</td>
<td>30</td>
</tr>
<tr>
<td>Casey Study Approach</td>
<td>31</td>
</tr>
<tr>
<td>Operational Definitions &amp; Analysis</td>
<td>32</td>
</tr>
<tr>
<td>IV. RESULTS &amp; FINDINGS</td>
<td>37</td>
</tr>
<tr>
<td>V. DESIGN IMPLICATIONS</td>
<td>42</td>
</tr>
<tr>
<td>Key Elements &amp; Approach</td>
<td>46</td>
</tr>
<tr>
<td>Recommendations</td>
<td>48</td>
</tr>
<tr>
<td>VI. DESIGN APPLICATION</td>
<td>50</td>
</tr>
<tr>
<td>Analysis</td>
<td>63</td>
</tr>
<tr>
<td>VII. CONCLUSIONS</td>
<td>67</td>
</tr>
<tr>
<td>APPENDIX: CASE STUDIES RESULTS</td>
<td>69</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>75</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>The model of industrial agriculture (Partnership for a Sustainable Community, 2011; USDA, 2012)</td>
<td>2</td>
</tr>
<tr>
<td>1.2</td>
<td>Loss of American working and natural lands to development (American Farmland Trust, 2010; USGS, 2013)</td>
<td>4</td>
</tr>
<tr>
<td>2.1</td>
<td>Permaculture Vision (Bane, 2012 p.56)</td>
<td>14</td>
</tr>
<tr>
<td>2.2</td>
<td>Online farm finder (Local Harvest, 2012)</td>
<td>22</td>
</tr>
<tr>
<td>2.3</td>
<td>Analytical Framework</td>
<td>29</td>
</tr>
<tr>
<td>3.1</td>
<td>Case study participants</td>
<td>30</td>
</tr>
<tr>
<td>3.2</td>
<td>Questionnaire. Question development partially sourced from: (National Research Council, 2010)</td>
<td>31</td>
</tr>
<tr>
<td>3.3</td>
<td>Key for the visualization of common sustainable agriculture practices</td>
<td>34</td>
</tr>
<tr>
<td>3.4</td>
<td>Key for the visualization of access to government funding</td>
<td>34</td>
</tr>
<tr>
<td>3.5</td>
<td>Key for the visualization of the public engagement practices</td>
<td>35</td>
</tr>
<tr>
<td>3.6</td>
<td>Key for the visualization of the scale of the case study farms</td>
<td>35</td>
</tr>
<tr>
<td>3.7</td>
<td>Key for the visualization of the types and proximity of the case study farms’ distribution practices</td>
<td>36</td>
</tr>
<tr>
<td>3.8</td>
<td>Key for the visualization of the relationship of the case study farms’ surrounding land use</td>
<td>36</td>
</tr>
</tbody>
</table>
## List of Figures (Continued)

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Case studies results matrix</td>
<td>38</td>
</tr>
<tr>
<td>5.1 Implications of sustainable family farms compared to the conventional model</td>
<td>43</td>
</tr>
<tr>
<td>5.2 Three key elements of sustainable working lands</td>
<td>44</td>
</tr>
<tr>
<td>5.3 Application model for future family farms</td>
<td>45</td>
</tr>
<tr>
<td>5.4 Evolution of a family farm’s business</td>
<td>47</td>
</tr>
<tr>
<td>6.1 Design application site</td>
<td>50</td>
</tr>
<tr>
<td>6.2 Character of Springsbury farm</td>
<td>51</td>
</tr>
<tr>
<td>6.3 Clarke County, VA conservation practices (Clarke County, 2013)</td>
<td>52</td>
</tr>
<tr>
<td>6.4 Production distribution opportunities</td>
<td>53</td>
</tr>
<tr>
<td>6.5 Educational partnerships opportunities</td>
<td>54</td>
</tr>
<tr>
<td>6.6 Existing site</td>
<td>56</td>
</tr>
<tr>
<td>6.7 Conservation at Springsbury farm</td>
<td>57</td>
</tr>
<tr>
<td>6.8 Production at Springsbury farm</td>
<td>58</td>
</tr>
<tr>
<td>6.9 Education at Springsbury farm</td>
<td>59</td>
</tr>
<tr>
<td>6.10 Masterplan</td>
<td>60</td>
</tr>
</tbody>
</table>
List of Figures (Continued)

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.11 Springsbury farm circa 1936</td>
<td>61</td>
</tr>
<tr>
<td>6.12 Springsbury farm circa 2010</td>
<td>61</td>
</tr>
<tr>
<td>6.13 Springsbury farm circa 2020</td>
<td>62</td>
</tr>
<tr>
<td>6.14 Preserving the characteristic sense of place and agricultural knowledge</td>
<td>64</td>
</tr>
<tr>
<td>6.15 Enabling family farmers to thrive</td>
<td>65</td>
</tr>
<tr>
<td>6.16 Educating the public and future farmers through agritourism</td>
<td>66</td>
</tr>
<tr>
<td>A.1 Practices Results</td>
<td>69</td>
</tr>
<tr>
<td>A.2 Access Results</td>
<td>70</td>
</tr>
<tr>
<td>A.3 Engagement Results</td>
<td>71</td>
</tr>
<tr>
<td>A.4 Scale Results</td>
<td>72</td>
</tr>
<tr>
<td>A.5 Proximity Results</td>
<td>73</td>
</tr>
<tr>
<td>A.6 Relationship Results</td>
<td>74</td>
</tr>
</tbody>
</table>
CHAPTER ONE
INTRODUCTION

Background

Our ability to produce food in a sustainable, healthy and humane manner is threatened, both in the United States and on the global scale. This difficulty is exacerbated by expected population growth, creating a need for 60% more food worldwide by 2050 to feed a population of 9.3 billion (United Nations Chronicle, 2012). The American Public Health Association released the following policy statement in 2007 as a response to this perceived threat:

In the United States, obesity and diet-related chronic disease rates are escalating, while the public’s health is further threatened by rising antibiotic resistance; chemicals and pathogens contaminating our food, air, soil and water; depletion of natural resources; and climate change. These threats have enormous human, social, and economic costs that are growing, cumulative, and unequally distributed. These issues are all related to food—what we eat and how it is produced. The US industrial food system provides plentiful, relatively inexpensive food, but much of it is unhealthy, and the system is not sustainable. Although most US food consumption occurs within this industrial system, healthier and more sustainable alternatives are increasingly available (APHA, 2007 para. 1).

Industrial agriculture includes a system of farms that are “highly specialized, and run like factories with large inputs of fossil fuels, pesticides and other chemicals, and synthetic fertilizers derived from oil” (Union of Concerned Scientists, 2008 para. 1). One of the major difficulties in addressing these threats is that the US governmental policies and subsidies support industrial agriculture by “favoring deregulation and promoting unsustainable overproduction of grains such as corn and soy” (APHA, 2007 para. 30). The blatant policy favoritism for global food companies encourages industrial agriculture to flood food markets with artificially inexpensive grains that are used for livestock feed and sold to third world countries. These practices affect smaller scale farmers both domestically and abroad, particularly throughout the rural regions of the country. Rural communities are left powerless to confront industrial food production facilities,
because lobbyists for these global companies have “systematically introduced and passed state laws stripping local governments of their right to pass local ordinances designed to regulate large-scale animal factories and mitigate their public health and environmental impacts” (APHA, 2007 para. 31). The United States Department of Agriculture is making efforts to respond to these realities by encouraging farmers to work the land responsibly with funding and support that rewards the smaller-scale farms that promote “ecosystem services or landscape amenities” (Thorbeck, 2012).

The large-scale industrial agricultural production systems generate vertical economic relationships that create a detachment from the landscape and the local population, shown in Figure 1.1. This system creates less investment in the health of both the local landscape and economy, often resulting in damaged ecosystems (National Research Council, 2010). Large-scale or industrial agriculture uses huge amount of water, energy, and chemicals, which has long-lasting effects on the landscape. In addition to using more resources than are necessary, the toxic chemical pesticides and herbicides often accumulate into the local groundwater systems, where they disrupt ecosystems and kill microorganisms and fish. Water

Figure 1.1 The model of industrial agriculture
systems are also constantly moving, so negative effects of industrial agriculture can be far reaching when in proximity to rivers and streams. Though the exact economic damage of industrial agriculture systems is hard to measure for communities, the costs for repairing environmental damage can be a long-lasting burden for the government (Union for Concerned Scientists, 2008).

The result of these practices is a lack of biodiversity. Biodiversity, simply defined as variety in life forms, affects "ecosystem productivity and stability in many ways, including reducing future breeders’ options in selecting for traits based on the needs of their time, as well as future opportunities for using genetic material in pharmaceutical development" (APHA, 2007 para. 18). In terms of livestock alone, the United Nations has predicted that one in five farm animal breeds are on the verge of extinction (APHA, 2007 para. 18). Plants, on the other hand, are being genetically modified to create predictable performance for maximum profitability. The process of homogenization, coupled with government incentives of corn, soy, and wheat production further exacerbates the statistical lack of diversity on American farmlands. In the US, one in four acres of cropland is growing corn, with expectations to increase based on demand for ethanol (APHA, 2007 para. 18).

In addition to the lack of biological diversity, rural farmers are aging, creating a lack of cultural diversity. In 2007, the average age of the American farmer was 58 (USDA, 2011). As much of the nation urbanizes, rural regions across the country are losing population, as well. Currently, rural areas are inhabited by about 17% of the total US population (USDA, 2011). This is partially due to high unemployment rates and lower income. Rural Americans earned nearly twelve thousand dollars per capita less than people in metro areas in 2007, though the cost of living is often less in rural developments (USDA, 2011). While the population is urbanizing, unemployment is a major concern. Degradation of land from industrial farming practices can also lead to a “downward spiral” in terms of poverty in the United States, because the poor land compromises farm income and land value, aggravating poverty rates in rural areas (World Bank, 2012).
Rural or agrarian communities are also threatened with a loss of culture, particularly through the loss of the local (horizontal) economic and social networks or structures that create dialogue and interaction among residents for the benefit of each other. This loss of social capital, or the "resource potential of social relationships", can lead to isolation and a lack of desire to continuing to farm (Thornbeck, 2012 p. 126). If the social needs of rural citizens are not met, then the nation will continue to urbanize and there will not be individuals to continue farming practices, further threatening food production and security. Agricultural lands account for approximately 51% of the landmass of the United States. This includes crops, pastures, ranges, forests for grazing, and farmsteads. An acre of this American farmland is lost every minute, accounting for over half a million acres per year (Partnership for a Sustainable Community, 2011; USDA, 2012). This is particularly due to sprawling development around urban centers. Additionally, only one-fifth of US lands are of high enough quality for many crops. Since cities typically formed where land was richest, the lands that are lost to development each year are the productive areas that grow our domestic fruits and vegetables. 91% of our

Figure 1.2 Loss of American working and natural lands to development
fruit and 78% of our vegetables are grown in close proximity to urban areas (American Farmland Trust, 2010). The costs of continued loss of productive farmland to development is additionally damaging because land rarely transitions back to less-intensive agricultural uses once it is developed (USDA, 2012). Protecting working lands from destructive development becomes a key goal of this study. Working lands are “agricultural lands characterized by a long-standing balance between human and natural forces” or “the interplay of founding and preservation, of economic and cultural vitality” and “ecological stability and historical character” (Cannavo, 2007 p. 220). In addition to promoting sustainable agriculture practices, the USDA’s current strategic plan suggests that a more holistic approach to rural development can aid in long-term livability:

USDA is working to enhance the livability of rural communities. The department uses 21st century technology to rebuild infrastructure, ensure that rural residents have decent housing and homeownership opportunities, clean water, adequate systems for handling waste, reliable electricity and renewable energy systems, and critical community facilities including health-care centers, schools, and public safety departments. USDA also helps communities invest in strategic green infrastructure planning and protection of critical natural resources (Partnership for Sustainable Communities, 2011 p. 8).

Problem Statement

In response to these threats to the American rural landscape and community, this study is concerned with how family farms that practice sustainable agriculture approach self-sufficiency within their local communities. The goal of the study is to define design solutions for managing working lands through sustainable agriculture, so as to ensure the long-term health of local communities, economies, and ecosystems. This is not a study to prove the environmental benefits of sustainable agriculture, because the literature thoroughly defines these qualities. Instead, by understanding the sociocultural benefits of family farms, designers can better manage agricultural community development so that it is simultaneously environmentally responsible, culturally appropriate, and economically productive. The result
should help to create a relevant, diversified, and sustainable system of people, plants, and animals within the American working landscape while producing food for a growing population.

Solution

The key to the future success of both the American landscape and the American people is to manage land with more consideration of long-term environmental and cultural health. At the 1992 United Nations Earth Summit, land management was defined as “the use of land resources, including soils, water, animals and plants for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions” (UN, 2012 para. 1). Since food is of primary importance to human needs, a holistic approach to agriculture is imperative on a global scale. Systems, or sustainable, agriculture is “an approach to agricultural research, technology development, or extension that views agriculture and its component farming systems in a holistic way. The approach treats components and processes within and across hierarchal levels and scale the appropriate context and gives major importance to interactions among them” (National Research Council, 2010 p. 83).

Champions of industrial agriculture systems discredit the ability of sustainable or organic agriculture to feed the growing world population. In response to this, we should ask ourselves, is the current food system successfully feeding the present world population? The answer is no, because household food insecurity is nearly 15% nationwide in America alone, with third world countries having proportionately more for a total of 925 million people suffering from hunger worldwide (United Nations Chronicle, 2012). Food security, as defined by the World Food summit of 1996, includes “both physical and economic access to food that meets people's dietary needs as well as their food preferences” (World Health Organization, 2012 para. 1). The especially troubling fact is that 75% of the people faced with
food insecurity or hunger live in rural areas, accounting for those individuals that participate in the food production industry (United Nations Chronicle, 2012). In an interview by the WorldWatch Institute with Gene Kahn, a long-time organic farmer who founded Cascadian Farms organic foods and is now vice president of sustainable development for General Mills, this dilemma was rationalized as follows:

‘The real question is, can we feed the world? Period. Can we fix the disparities in human nutrition?’ Kahn notes that the marginal difference in today’s organic yields and the yields of conventional agriculture wouldn’t matter if food surpluses were redistributed. But organic farming will yield other benefits that are too numerous to name. Studies have shown, for example, that the "external" costs of organic farming—erosion, chemical pollution to drinking water, death of birds and other wildlife—are just one-third those of conventional farming. Surveys from every continent show that organic farms support many more species of birds, wild plants, insects, and other wildlife than conventional farms. And tests by several governments have shown that organic foods carry just a tiny fraction of the pesticide residues of the nonorganic alternatives, while completely banning growth hormones, antibiotics, and many additives allowed in many conventional foods. WorldWatch Institute, 2012 para. 21).

This is not to discredit the fact that sustainable farming is more labor intensive and difficult than the industrial method that relies on chemical aids. Those who choose to farm sustainably likely have a strong series of principles or goals. Conservation of land and culture, stewardship of the land, and economic self-sufficiency become the anticipated guiding principles of the sustainable system, which will be tested based on interviews with practicing farmers in this study. The subsequent actions of any farmer should be tailored to the character and ecology of a given location in order to create an appropriate system of management and production that supports long-term self-sufficiency and resiliency of the rural landscape and community. The work does not fall solely on farmers’ shoulders. This study specifically addresses landscape architects’ role in the agricultural process. Landscape architecture, as defined by the American Society of Landscape Architects (ASLA), is “the science and art of design, planning, management and stewardship of the land. Landscape architecture involves natural and built elements, cultural and scientific knowledge, and concern for resource conservation to the end that the resulting environment serves a useful and enjoyable purpose. Successful landscape architecture maximizes use of the land, adds
value to a project and minimizes costs, all with minimum disruption to nature” (ASLA, 2013 para. 36). The mission of landscape architects is synonymous with the purpose of sustainable farmers, because each profession holistically address community, ecology, and landscape performance to best address the needs of people and places. This correlation led to the formation of the following research questions that direct this study. The questions will be addressed through interview-based case studies of family farms. The case studies serve as a means to verify the identified problems, while creating a dialogue with farmers to establish solutions for the problems.

Research Questions

How can landscape architects enable sustainable farms to thrive economically, environmentally, and culturally?

- How do family farms that practice sustainable agriculture approach economic self-sufficiency within their local communities?
  - What are common agricultural practices that promote ecological health on working lands?
  - What extent does access to government grants, subsidies, and/or tax credits affect a farm's self-sufficiency?
  - What is the typical scale of an environmentally responsive family farm, from the perspectives of age and acreage?
  - What is a family farm’s proximity to its distribution sources?
  - How does a farm’s relationship to adjacent land uses and/or development affect its long-term viability?
  - How do family farmers engage with the public and/or local community?
Significance

The results of this study will benefit working land management by ensuring that working lands have a viable method of preservation, both for ecological functions and for agriculture. Since the population continues to grow, we cannot continue to develop carelessly. The United States saw a 30% growth in population from 1982 to 2007, yet developed land increased by 57% (American Farmland Trust, 2010). As the population continues to grow, development must be managed to prevent the continued loss of productive farmlands through reckless development. Additionally, the national obesity epidemic, coupled with a rise in fuel prices and increasing concern for global warming creates enormous demand for local fresh food systems that can feed the growing US population in an efficient and responsible manner. Obesity is ranked as the number one health risk facing America according to the United States Centers for Disease Control, with “an estimated 400,000 deaths a year in the United States” and costs for the national government upwards of $122.90 billion annually (Obesity in America, 2012). Furthermore, the process can address an economic hardship brought on by the recession. As we know, unemployment rates are high, but recent college graduates are affected most severely. This leaves 53% of able-bodied recent graduates unemployed, and potentially ideal candidates for the growing organic farmer population (Weissmann, 2012).

Study Organization

In the following literature review and methodology chapters, further explanation of sustainable agriculture practices, family farms, and agricultural communities will give insight to the future of American working lands based on the established economic, environmental, and social characteristics of sustainable farming. Results of a case study of nine family farms within the southeastern United States will illustrate the key motivations for people who farm sustainably. Both the literature and the case studies will be analyzed based on the
issues addressed in the research questions: sustainable agriculture practices, access to government funding, the scale of a farm, proximity to its distribution sources, the farm’s relationship to adjacent land uses, and engagement with the public and local community.

Results of the study lead to design strategies that are applied to a 730-acre farm site in Clarke County, VA in the design application chapter.
CHAPTER TWO
LITERATURE REVIEW

This chapter addresses the existing literature from the perspectives of sustainable agriculture practices, access to government funding, the scale of a farm, proximity to its distribution sources, the farm’s relationship to adjacent land uses, and engagement with the public and local community. The literature from these six perspectives forms three distinct bodies of knowledge that address practice (sustainable agriculture), people (family farms), and place (agricultural communities).

Practices

Sustainable Agriculture

The legal definition of “sustainable agriculture,” according to U.S. Code Title 7, Section 3103 is “an integrated system of plant and animal production practices having a site-specific application that will over the long-term:

1. Satisfy human food and fiber needs.
2. Enhance environmental quality and the natural resource base upon which the agriculture economy depends.
3. Make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls.
4. Sustain the economic viability of farm operations.
5. Enhance the quality of life for farmers and society as a whole.
[This] definition is a central element of the legislation of the Sustainable Agriculture Research and Education (SARE) program of NIFA” (USDA, 2009 para. 1). This comprehensive definition not only alludes to the holistic approach of sustainable agriculture to address the problems established in the Introduction chapter, but it also forms the basis for evaluating future funding from the USDA through the SARE program.

**Systems**

Sustainable agriculture can be implemented through various types of farming systems. A farming system is “the mix of crops or animal components, or a combination thereof in a farm, their arrangement over space and time, the resources and technology they use, and the nature and effectiveness or hierarchal relationship to the farm and to each other” (National Research Council, 2010 p. 18). According to the National Research Council, the most commonly practiced ecologically based farming system, at least in the United States, is organic farming. Organic farming:

- emphasizes the use of renewable resources and the conservation of soil and water to enhance environmental quality for future generations. They typically rely on crop rotations, green manures, composts, naturally derived fertilizers and pesticides, biological pest controls, mechanical cultivation, and modern technology. Organic meat, poultry, eggs, and dairy products come from animals that are not given any antibiotics or growth hormones. Organic food is produced without the use of most conventional pesticides, fertilizers made with synthetic ingredients or sewage sludge, bioengineering, or ionizing radiation. Before a product can be labeled “organic” in the United States, a governmental-approval certifier inspects the farm where the food is grown to make sure that the farmer is following all the rules necessary to meet USDA organic standards (National Research Council, 2010 p. 21).

Expanding upon the organic farming system, biodynamic farming systems

- use the full range of organic production practices, but also use a series of eight soil, crop, and compost amendments, called preparations, made from cow manure, silica, and various plant substances. Biodynamic farming also places greater emphasis on (1) the integration of animals to create a closed nutrient cycle, (2) using an astronomical calendar to determine auspicious
planting, cultivating, and harvesting times, and (3) an awareness of spiritual forces in nature. Biodynamic farmers view the soil and the whole farm as an integrated, living organism and self-contained individuality. More than a production system, biodynamic agriculture is a practice of living and relating to nature in a way that focuses on the health of the bioregion, landscape, soil, and animal, plant, and human life, and it promotes the inner development of each practitioner. The Demeter Association has certification programs for food and feed produced by strict biodynamic farming methods in different countries (National Research Council, 2010 p. 21).

In addition, the Institute for Agriculture and Trade Policy identified small farms and sustainable livestock production as two alternative systems for farmers to approach. Small farms are exactly as the name implies, a farm that relates to a family scale. Because small-scale family farmers have to be more efficient when using resources for economic reasons, they are likely to adopt less intensive agricultural practices that rely more the local landscape and resource management (Corsellus, 2001). Sustainable livestock systems rely on rotational grazing practices. Rotational grazing uses pastures to feed animals, with intensive use of particular pastures for short periods of time that are rotated among several sub-units of pasture called paddocks (Corsellus, 2001). This forces the livestock to graze a particular pasture uniformly, without showing preference to certain grasses. Once the animals are moved, the pasture is able to grow back to appropriate levels before re-grazing occurs. This creates a healthier overall pasture since the farmer is able to prevent any areas from being overgrazed. Added to these systems is the concept of Agroforestry. The USDA Center for Agroforestry defined this system and its components:

Agroforestry intentionally combines agriculture and forestry to create integrated and sustainable land-use systems. Agroforestry takes advantage of the interactive benefits from combining trees and shrubs with crops and/or livestock. Agroforestry practices include:
- Alley Cropping (an agricultural crop is grown simultaneously with a long-term tree crop to provide annual income while the tree crop matures)
- Forest Farming (the cultivation of high-value specialty crops under the protection of a forest canopy that has been modified to provide the correct shade level)
- Riparian Forest Buffers (natural or re-established streamside forests made up of tree, shrub, and grass plantings)
- Silvopasture (trees are managed for high-value sawlogs and, at the same time, provide shade and shelter for livestock and forage, reducing stress and sometimes increasing forage production)
- Windbreaks (linear plantings of trees and shrubs designed to enhance crop production, protect people and livestock, and benefit soil and water conservation) (USDA, 2012).

A sixth variation of sustainable agriculture is Permaculture, which is often associated with urban or suburban home gardens. The Permaculture Institute defines this system as “an ecological design system for sustainability in all aspects of human endeavor. It teaches us how build natural homes, grow our own food, restore diminished landscapes and ecosystems, catch rainwater, build communities and much more” (2012 para. 1). Peter Bane, the author of the Permaculture Handbook describes this system through a cyclical relationship represented in Figure 2.1. Permaculture includes the following twelve principles:

1. Observe and Interact (patterns)
2. Catch and Store Energy (energy cycling and recycling)
3. Get a Yield (redundancy)
4. Self-Regulate | Accept Feedback (ethics)
5. Use and Value Nature’s Gifts (biological systems)
6. Waste Not (energy cycling ethics)
7. Design from Pattern to Details (energy-efficient planning | relative locations)
8. Integrate (succession and stacking multifunction | relative locations)
9. Choose Small and Slow (A.T. scale)
10. Work Diversity
11. Push the Edge (diversity and edge)

Figure 2.1 The model of Permaculture (Bane, 2012 p. 56).
**Implementation Scale**

When implementing sustainable agriculture practices, the specific management goals include weed, pest, disease, and erosion control while creating high quality soils (Unions of Concerned Scientists, 2012). The Unions Of Concerned Scientists suggest that crop rotation, cover crops, soil enrichment, natural pest predators, and biointensive integrated pest management are the five key strategies to avoid chemical-based agriculture (2012). The National Research Council, in the book *Toward Sustainable Agriculture Systems in the 21\textsuperscript{ST} Century*, further expands the list of improved environmental performance practices to include reduced-tillage, precision farming, diversification of farm enterprises, buffer or filter strips, riparian area access management, manure handling, nutrient management handling, wildlife habitat enhancement, composting, irrigation water use efficiency, rotational grazing, and enhanced genetic resistance to climate extremes for crops and livestock (National Research Council, 2010; Corsellus, 2001). Crop rotation is simply “growing different crops in succession in the same field,” since different plants can naturally replenish soil nutrients while reducing pest pressure. Appropriate cover crops, or crops that are grown in the soil that is being rotated between other crops, help to suppress weeds and prevent soil erosion while enhancing soil quality (Unions of Concerned Scientists, 2012; Corsellus, 2001; Bane, 2012). An ecosystem approach to farm wildlife should encourage natural pest management by creating habitat that attract pest predators such as birds, insects, and spiders. Integrated pest management, or IPM, relies on “the reintroduction of natural, disease-fighting microbes into plants/soil, and release of beneficial organisms that prey on pests” (Unions of Concerned Scientists, 2012; Bane, 2012). Reduced-tillage practices are those in which “a crop is planted directly into a seedbed not tilled since harvest of the previous crop” so that “no-till farmers minimize soil disturbance and leave residues on the surfaces of their fields after harvest” (National Research Council, 2010 p. 21; Corsellus, 2001). Precision farming is an approach that combines “detailed spatial information about soil conditions and indicators of crop performance to target fertilization and
other crop management practices where they are most needed” (National Research Council, 2010 p. 21). These practices form the basis for evaluating farms in this study. Additionally, the farms will be analyzed based on the economic success of the agricultural ventures.

**Measuring Success**

Sustainable agriculture has environmental, social and economic dimensions – and all three must be considered together. Focusing on one or two in isolation will not give the desired results. Protecting and improving the natural environment are fundamental, and issues like climate change, energy, water scarcity, biodiversity and soil degradation need to be addressed. The social dimension covers labor rights and the health of communities, including access to and affordability of food, labor rights and community health. Food quality, safety and animal welfare are also important social aspects. On the economic side, sustainable agriculture is productive, efficient and competitive. The benefits should be seen in farm profitability, in thriving local economies, and throughout the whole value chain (SAI, 2009 p. 5).

In the paper, *Sustainable Agriculture: Making Money, Making Sense*, Kristen Corsellus, Susan Wisniewski, and Mark Ritchie of the Institute for Agriculture and Trade Policy analyzed available studies of the profitability of sustainable agriculture. “Available studies suggest that sustainable agriculture systems may be just as profitable as, if not more profitable than, their conventional counterparts on a per-animal and per-acre basis” (Corsellus, 2001 p. 9). It was further concluded that the profitability of sustainable agriculture is expanding over time, so that consideration of the long-term relationship between the agriculture system and profitability should be considered. Though economic success is crucial, social success is an equal player in the comprehensive sustainability system. In the article *Farmworkers in organic agriculture: Toward a broader notion of sustainability*, written for the Newsletter of the University of California Sustainable Agriculture Research and Education Program, Aimee Shreck critiques the current efforts toward sustainable agriculture for the lack of social justice standards. Organic agriculture, the most common and most structured national form of sustainable agriculture does not currently include any standards for workplace conditions, benefits, or wages. This does not discredit the fact the overall public
perception indicates that organic agriculture is more socially sustainable than conventional agriculture. Any future planning or policy for sustainable agriculture systems should include social components as well as the economic and environmental elements of success. Before making suggestions for future policy interventions regarding agriculture, it is necessary to understand agriculture within American history.

Access

**Agrarianism in the United States**

Agrarianism, or the concept of agricultural morality and ethics, is credited to Thomas Jefferson, the third president of the United States. This Agrarian system was composed of three main components:

1. Agriculture is the basic industry
2. The farmer is self-sufficient and therefore, independent
3. Farm life is natural and good (Dalecki, 1992 p. 49).

When the US was still forming into the superpower that it is today, Jefferson spoke of the value of farmers because he notes that it was the farmer, not the aristocrat that occupies the land. The farmer, as the permanent landowner, was thought to “make a stronger identification between self-interest and common goods” (Thompson, 1990 p. 4). Further arguing his point, Jefferson wrote the following words in 1785 in a letter to John Jay, “Cultivators of the earth are the most valuable citizens. They are the most vigorous, the most independent, the most virtuous & they are tied to their country & wedded to its liberty & interests by the most lasting bonds” (Thompson, 1990 p. 4). Farming, within the framework of Jefferson’s idealism, is valuable because it serves private and public interest, thereby serving
democracy by displaying independence and self-reliance within the confines of the common good (Thompson, 1990). A disregard for public interest is what led to the abundance of industrial agriculture practices in America.

Federal Spending

The relationship between farmers and the government has evolved significantly since Jefferson’s era. The contemporary structure of governmental relationships with farmers is based on subsidy and incentive programs that seek to maintain a predetermined level of productivity so as to deter fluctuations in market prices (Thorbeck, 2012). Beginning with the New Deal and the Agricultural Adjustment Act of 1933, the government was given “the power to set minimum prices and included government stock acquisition, land idling, and schemes to cut supplies by destroying livestock” (Summer, 2008 para. 1). Economists criticize current subsidy practices because they typically transfer money from taxpayers and consumers to the wealthy farm owners, imposing net losses on society that have no clear social benefit. By interfering with commodity trade, the global economy also faces net losses (Summer, 2008). The crops that receive the most federal subsidies are grains, oilseeds, cotton, sugar, and dairy, which only account for about half of total production value. Government subsidy programs supply approximately 31% of the revenue for these crops through price supports, trade barriers, and transfer benefits (Summer, 2008). The remaining half of valuable production crops, such as beef, pork, poultry, hay, fruits, tree nuts, and vegetables receive minimal support (Summer, 2008). Our nations’ obesity and other food-related health challenges are further aggravated by the unequal subsidization of crops such as grains and sugars to the detriment of healthier foods such as fruits, nuts, and vegetables through manufactured low prices.
In other countries, such as Norway, subsidies can be used to preserve “traditional agricultural landscape for tourism,” so that there are long-term implications of the government funds that directly affect the local population, as opposed to national economic relationships (Thornbeck, 2012 p. 54). If subsidies are used correctly, they can “promote ecosystem services or landscape amenities” so that farmers are encouraged to work the land responsibly, as opposed to being rewarded for temporarily increased production of a few key crops. If the programs continue to fund American farms based on productivity, then they will continue to promote “large-scale mono-cultural farming that often raises environmental, economic, and food safety issues because of a lack of diversity” (Thornbeck, 2012 p. 55). Government can play a role to spark interest and educate potential farmers to encourage sustainable reinvestment.

**Education**

The Morrill Act of 1862 is an example of the influence government can have on agriculture. It founded the land-grant university system which sought to educate the “industrial class” in order to establish a “permanent” agriculture that would help create stable communities, in addition to teaching military tactics and mechanic arts (Kirschenmann, 2010; Association of Public and Land-Grant Universities, 2012). 30,000 acres of federal lands were given to each state for the establishment of these Universities (Rikoon, 2012). The Hatch Act of 1887 then allowed federal grant money to be spent for agricultural research stations in association with the land-grant institutions. In order to disseminate the information gained through the research, the Smith-Lever Act of 1914 formed the Cooperative Extension Services (Association of Public and Land-Grant Universities, 2012). In addition to being a resource for farmers, Cooperative Extension Agencies provide public services such as nutrition and food safety education, gardening classes, natural resource education, and youth development (Clemson, 2012). Over time, especially during times of recession, land-grant universities face a loss of public
funding, requiring them to seek private support. The University of Missouri, nicknamed Monsanto University, receives a portion of its funding from the corporation, Monsanto, which is at the forefront of the industrial agriculture system (Rikoon, 2012). How can we expect the research of our land-grant Universities to remain unbiased if they are forced to seek funds from the corporations that helped to create the system of agriculture that disregards civic and environmental wellbeing? The threat of continued loss of public funding, as well as the influence of the private market further increases the need for more public involvement in agriculture and agricultural education.

Scale

The Family Farm

Though various types of government programs or educational events can shape a farmer’s specific direction, this study addresses family farms as one scale of agricultural practice. A family farm is defined as a farm “in which the majority of the business is owned by the operator and individuals related to the operator by blood, marriage, or adoption, including relatives that do not live in the operator household” (USDA, 2012 para. 5). All family farms do not necessarily practice sustainable agriculture, however, a smaller farm is more likely to have a stronger connection to the land and to local markets. A small family farm’s income is less than $250,000 a year. The average size is 231 acres, and this category accounts for 88% of farms and 48% of total farmland acres. A large family farm’s income is more than $250,000, with an average size of 1,421 acres. This category accounts for 3.9% of farms and 12% of total farmland acreage. A very large family farm’s income is more than $500,000, with an average size of 2,086 acres. Very large family farms account for 4.6% of farms and 23% of acres (USDA, 2012; US Farmers and Ranchers Alliance, 2012).
Though small family farms are rising in quantity, the USDA suggests that most of small family farms’ income is primarily from off-farm sources, and not directly from the sale of agricultural products. Most off-farm income is made from wages from other jobs or from a spouse’s job, transfers, and nonfarm businesses (USDA, 2013). In 2011, 60% of family farms had a gross income of less than $10,000 (USDA, 2013). Even though farming income does not typically support small family farmers, monetary gain is not always the key motivation. “Smaller farms run by a family that lives on the land generally use other factors in their decision-making as well: They are not as likely to choose a way of farming that makes their own lives unpleasant or unhealthy, for example, and they are more likely to consider how decisions of today affect their ability to pass on the farm to the next generation in good condition” (Marttila-Losure, 2012 para. 16). A family farmer’s connection to family or legacy, in addition to working on a manageable agricultural scale, creates the opportunity for the farmer to be more invested in the long-term implications of farming practices. This could include ensuring that the farm is secure, both financially and ecologically, for future generations.

Proximity

*Distribution*

In addition to production practices, the distribution system of sustainable agriculture, and family farms, must also respond to the constraints of the local environment and of the global fuel supply. The goal is to produce and distribute foods locally. The definition of “local” is an imprecise subject of contention, because 30 miles may be local for a person in southern California, while regional locality may be more plausible for consumers in less fertile states. The benefits of the local food system is that consumers are more closely tied to their food sources, while reducing unnecessary processing, packaging, and transportation for the farmer, thereby cutting cost and reducing
waste. Processing can occur on the farm, rather than in a factory, and the product can be distributed to consumers in one of two ways: the “direct-to-consumer market” or the “direct-to-retail, foodservice, and institution market” (Grace, 2012). Direct-to-consumer accounts for farmers’ markets, CSAs, and pick-your-own farms; while, direct-to-retail cuts out middlemen and allow farms to work closely with retailers. Figure 2.2 is an online resource for consumers to find farms, markets, CSAs, and other sustainable food producers, accounting for approximately 19,000 farms, 6,000 markets, 5,400 CSAs, and 875 Co-ops, nationwide. The concentration of farms in California and on the east coast in Figure 2.2 further imply that the definition of local evolves throughout each region of the country. Understanding the breadth of the local food options within a given area can help to transition consumers from relying on conventional agricultural products to relying on local farmers for their food. While a farmer’s physical and social relationship to other farmers and distribution sources is key for the success of farming activity, the relationship between a farm and its surrounding landscape is similarly key to overall farming communities.

Figure 2.2 Online farm finder (Local Harvest, 2012)
Relationship

Land Use

The Bureau of Land Management (BLM) is the organization that is responsible for managing a majority of public lands in the United States. Tasked with balancing resource use and developing strategies for recreation, habitat, and energy production, the organization collaborates with local, state, and tribal governments as well as with public and stakeholder groups (BLM, 2012). Within their control are 245 million acres of “surface land” and 700 million acres of “subsurface mineral estate” (BLM, 2012). Of the 245 million acres, 157 million are used for public livestock grazing. This public-private partnership is mutually beneficial, because it aids in rural economic development while managing open spaces for human and wildlife use. The 700 million acres of subsurface lands also provide renewable energy sources for the US government, helping to ease the transition from foreign fuel sources, while simultaneously creating private sector job growth.

The Role of the Farmer

In terms of the specific benefit of sustainable farmers, “sustainable farms and ranches provide obvious and not so obvious benefits to communities and society at large. They supply food and fiber; they are stewards of soil, water and wildlife habitat; and they provide the social and economic backbone of many rural communities.” (USDA National Agriculture Library, 2013 para. 1). Jorgen Primdahl and Lone Soderkvist Kristensen, in the article The Farmer as Land Manager: Management Roles and Changing Patterns in the Danish Region, suggest that rural landscapes are primarily maintained and changed through the actions of farmers. It is the farmers as a whole that have primary control of local landscapes. This is not to discredit public policy or municipal intervention; however, governments
and farmers can share an interest in sustainability, biodiversity, heritage, and rural development. Farmers serve three specific roles within landscape management: producer, owner, and citizen. As a producer, the farmer is affecting the land through land-use, which affects the ecology and aesthetics of the landscape, while influencing the local economy. As an owner of property, the farmstead site organization can become a predominant and iconic aesthetic for local character. As a citizen, the farmer is involved in community life and can influence public policy and community mentalities. All three roles have direct and different effects on land management practices through individual decision-making (Primdahl, 2011).

**Sociocultural Perspectives**

Beyond the relationship with ecological functions, the rural landscape is inextricably linked with the characteristic sense of place of the local environment. Daniel Williams and Susan Stewart, in the article *Sense of Place: An Elusive Concept that is Finding a Home in Ecosystem Management*, suggest that the social and cultural perspective of a place can play a major part in landscape management, and that people should have a rightful place in ecosystems. With this system, landscape managers can “anticipate, identify, and respond to the bonds people form with places” (Williams, 1998 p. 18). This is especially important when considering the “social and historical processes by which place meanings are constructed,” because tailoring management strategies to historically accepted practices could create more acceptance and possible participation with local populations (Williams, 1998 p. 20). “The shift to ecosystem management has brought a corresponding shift away from economic definitions of human-environment relationships toward more holistic perspectives often embodied in the term sense of place” (Williams, 1998 p. 21). When considering the concept of “sense of place,” human resources become as
important as the natural resources, at least in the public involvement process. After all, the human element is both responsible for the impact of agriculture in communities and ecosystems as well as benefiting from the results of the agricultural process.

**Agricultural Structure**

Through intense human activity, agriculture has transformed the world landscape based on the concept of agricultural regimes. An agricultural regime is “a unique configuration of factors—crops, livestock, humans, and management technologies—applied to a landscape for the purpose of achieving a return on their investment” (Redman, 2008 p. 92). In the book *Agrarian Landscapes in Transition*, Ted Gragson, Paul Bolstad, and Meredith Welch-Devine, use the concept of agricultural regime to qualitatively “facilitate the recognition of patterns in the data” (Redman, 2008 p. 92). This organizational tool is used because agricultural practices draw on “a common pool of resources,” such as soil, climate, technology, and labor (Redman, 2008 p. 92). The interaction of numerous agricultural regimes must include of three main characteristics:

1. Resources—the spatial variability and temporal unpredictability of biophysical factors along with the adaptive dynamics and environmental tolerances of crop types.
2. Groups—the sociospatial incentives and disincentives affecting the capacity of individuals to coordinate land use and to create cohesion at the level of the landscape (e.g., size, levels of wealth, and income)
3. Relationships—the network and hierarchy relations between resources systems and locally situated groups vis-à-vis circumstances beyond their immediate control (i.e., uneven development, governmental policy, consumer tastes, extralocal factors)” (Redman, 2008 p. 92).
Both the potential and difficulty of agricultural regimes is the reliance on the interconnected capacity of resources, groups, and relationships. This is often either out of a farmer’s control or is neglected by the farmer’s practices. The authors cite that the “rugged individualism” of some of the American people often creates difficulties because they ignore “the fact that agriculture is a common pool resources system that depends on participants (voluntarily) adopting policies and interacting to foster credible commitments and to facilitate recurrent transactions among themselves” (Redman, 2008 p. 92). When approaching this study, an understanding of the interconnectedness of resources, groups, and relationships suggests that comprehensive agricultural planning may benefit farmers as a whole, however specific farmers may not engage in the process if it does not serve a private interest. Though the threat of rugged individualism has historically existed, community-based agriculture and civic agriculture ventures have and can continue to replace individual-centric schemes.

Engagement

Civic agriculture

Since our existence is primarily dependent on farming, we cannot entrust this essential activity solely to the farming population--just 2% of Americans. As farming becomes more and more remote from the life of the average person, it becomes less and less able to provide us with clean, healthy, lifegiving food or a clean, healthy, lifegiving environment. A small minority of farmers, laden with debt and overburdened with responsibility, cannot possibly meet the needs of all the people. More and more people are coming to recognize this, and they are becoming ready to share agricultural responsibilities with the active farmers (Trauger, 1990 p. 6).

Civic Agriculture is “a community food system in which food production, processing, distribution and consumption are integrated to enhance the environmental, economic, social and nutritional health of a particular place” (USDA, 2012 para. 1). This food system is becoming increasingly popular with “the rise of local food marketing outlets such as farmers’ markets, CSAs (community supported
agriculture), or direct sales to local restaurants” which has been “linked to social and economic vitality in local communities” (National Research Council, 2010 p. 205). A CSA is a mutually beneficial commercial system where people pledge support to a farm in advance in exchange for a share of the farm’s produce, taking part in both the excitement of growth and the risk of loss on a farm (DeMuth, 1993). “Several studies have estimated that farmers’ markets and CSAs can generate state level economic impacts on the order of tens of millions of dollars and hundreds of jobs” (National Research Council, 2010 p. 205). Though the exact economic significance is not absolute, the importance of direct marketing of agricultural products is growing (National Research Council, 2010 p. 205). Civic agriculture distinguishes itself from conventional agriculture, because it serves both public and private interest through volunteerism. This interactive activity leads to the potential of agricultural programming that encourages active engagement with the agricultural process.

**Agritourism**

Agritourism serves as one means of promoting civic interaction in agriculture. The University of Georgia’s Center for Agribusiness and Economic Development and North Carolina State Cooperative Extension Service’s Business Side of Agritourism Program Series defines agritourism as "an activity, enterprise or business that combines primary elements and characteristics of agriculture and tourism and provides an experience for visitors that stimulates economic activity and impacts both farm and community income" (2013 p. 3). Agritourism can include a number of different types of engagement programming, including fee hunting and fishing; agriculture related festivals and fairs; farm tours; U-pick vegetables and fruit; horseback riding; farmers markets; farm vacations; on-farm retail markets; on-farm vacations; on-farm bed and breakfasts; wineries; on-farm petting zoos; on-farm bird watching; on-farm picnic areas; biking trails; hiking trails; on-farm educational programs; etc. (UGA, 2013). Though this list is not comprehensive, it begins to suggest a design...
component of agricultural systems. Landscape architects already participate in the creation of festivals, trails, and outdoor educational activities. Agritourism can potentially lead a designer’s role in the landscape on multiple scales, from regional networks of farm tourism to on-site educational programs.

Analytical Framework

The concepts that overlap between sustainable agricultural practices, family farms, and agricultural communities result in the importance of working lands, local economies, and social capital in order to achieve self-sufficiency. “Conserving working and natural lands is a key strategy for protecting quality of life and the long term economic viability of farming, forestry, tourism, and other resource-based activities” (Partnership for Sustainable Communities, 2011 p. 6). Wendell Berry suggests “the consumer economies of local towns and cities to preserve the livelihoods of local farm families and farm communities.” “So far as [he] can see, the idea of a local economy rests upon only two principles: neighborhood and subsistence” (Berry, 2001). “In a viable neighborhood, neighbors ask themselves what they can do or provide for one another, and they find answers that they and their place can afford. This, and nothing else, is the practice of neighborhood. This practice must be, in part, charitable, but it must also be economic, and the economic part must be equitable; there is a significant charity in just prices” (Berry, 2001 para. 8). Social capital, as a result or a means of charity, is the “resource potential of social relationships” (Thornbeck, 2012 p. 126).

Just as agritourism forms a potential starting point for landscape architects in the engagement process, conservation practices and rural community design can similarly provide a starting ground for designers to enable family farms to thrive. The comprehensive literature review suggests that a relationship between farmers, government, and citizens forms the potential success or failure of
sustainable agriculture systems. Landscape architects can potentially mediate some of these relationships by promoting shared uses of landscapes and capitalizing on unique qualities of individual places. While the opportunity for designers exists, the role of the farmer and government remains crucial for shaping each individual place. Any future design would likely benefit from engagement between each of these groups. The process of analyzing the following case studies, which involves interviews with nine family farmers, begins to form a holistic approach to addressing participatory agricultural design.

**Figure 2.3 Analytical Framework**
CHAPTER THREE

METHODOLOGY

In order to address the strategies for self-sufficiency and long-term viability of family farms, case studies of nine southeastern farms were conducted. Case studies serve as the best method for this research, because they are holistic in that they define relationships, while capturing pertinent details. Furthermore, direct contact with farmers can potentially begin a dialogue among the farmers surveyed concerning future studies, research, and education opportunities based on the results of their peers. Family farms from four southeastern states were studied, including Maryland, Virginia, North Carolina, and South Carolina (Figure 3.1). These farms were chosen based on their geographic location, the diversity of services offered, and their proactive public interaction and communication. Each farm describes itself by the act of practicing sustainable agriculture through a website for marketing and/or public education. The participant access varied for each farm based on the size of the operation or eagerness to participate. The point of contact for each was actively involved in the economic management, social relationships, and physical labor processes, including owners, managers, and/or senior laborers. On-site farm visits and interviews were ideal, however, alternative collection methods were acceptable for geographically dispersed locations.

Figure 3.1 Case study participants
The case studies seek to determine how the issues of practices, access, scale, proximity, relationship, and engagement affect the farms’ economic self-sufficiency. The case study methodology consists of two primary elements: interviews with the farmers and mapping of elements of each farm. A questionnaire (Figure 3.2) was sent in advance to each farmer, followed by either a site visit or a phone interview. Mapping data was collected from the interviews, as well as each farm’s website, and USGS files. Primary objectives of the questionnaire were to determine the sustainable practices of the farms, their access to government funding, and how they engage with the public. All of these elements directly affect the profitability of the farm. Mapping supplements the interviews by visualizing patterns in the landscape that could suggest a correlation between scale, proximity, and relationship in regards to profitability.

For each farm to be categorized as sustainable according to the operational definitions of the study, it must have implemented at

Figure 3.2 Questionnaire to be distributed to case study sites.
least three of the common sustainable agriculture practices defined by the literature (see Figure 3.3). For the access category, it was first determined whether the farm described itself as profitable, as breaking even financially, or as not profitable. The farms could then be analyzed based on whether the practices affected the farms profitability. Shown in Figure 3.4, green represents a farm that is considered profitable, brown represents a farm that typically breaks even, and red shows the farms that do not yet make a profit (see Figure 4.1).

Engagement practices were analyzed based on whether each farm allowed the public on their farm, taught classes, hosted events, had on-site distribution, or offered internships (see Figure 3.5). These five types of engagement were also documented in terms of whether the farms accepted payment for the activities, which could be used for future programming consideration. Scale was documented in terms of both the age and acreage of the farm, which is also analyzed in relation to the farm’s self-described profitability (see Figure 3.6). Proximity to distribution was evaluated based on a 60-mile radius and whether the farms distributed through direct-to-consumer, CSAs, restaurants, grocery stores, or farmers markets (see Figure 3.7). The relationship to the surrounding landscape was analyzed for each farm based on the surrounding land uses within a 2 miles radius from the farm and in terms of the farm's level of profitability (see Figure 3.8).

**Operational Definitions & Analysis**

**Practices**

At least three of the onsite management and production processes that characterize a farm as sustainable according to literature, particularly the USDA (such as crop rotation, cover crops, soil enrichment, natural pest predators, integrated pest management, reduced-tillage, precision farming, diversification of farm enterprises, buffer or filter strips, riparian area access management, manure handling,
nutrient management handling, wildlife habitat enhancement, composting, irrigation water use efficiency, rotational grazing, and/or enhanced genetic resistance to climate extremes for crops and livestock) (2012).

**Access**

Funding programs that are available to family farmers for infrastructure, education, and/or tax credits

**Engagement**

Typical approaches to public interaction, including but not limited to tours, education, on-site markets

**Scale**

The acreage and age of the farm

**Proximity**

The quantity of miles that a farm is from its furthest distribution center, mapped based on a 60-mile radius

**Relationship**

The land uses directly adjacent a farm, within a 2-mile radius
Figure 3.3 Key for the visualization of common sustainable agriculture practices

Figure 3.4 Key for the visualization of access to government funding
Figure 3.5 Key for the visualization of the public engagement practices

**age**

- **profitable**
- **break even**
- **not profitable**

**size**

- = one year
- = one acre

Figure 3.6 Key for the visualization of the scale of the case study farms
Figure 3.7 Key for the visualization of the types and proximity of the case study farms’ distribution practices

Figure 3.8 Key for the visualization of the relationship of the case study farms’ surrounding land use
CHAPTER FOUR
RESULTS & FINDINGS

Results of the study indicate that there is a need to holistically address agriculture from the perspectives of government, farmers, and citizens. The case studies compared sustainable agriculture practices, access to government funding, the scale of a farm, proximity to its distribution sources, the farm’s relationship to adjacent land uses, and engagement with the public and local community with the profitability of the farm. Visual analysis of characteristics and trends for each farm are found in the comprehensive case study matrix (Figure 4.1). For each of the six categories, reference Appendix A for more detailed graphic analysis of the farmer’s responses as well as quotes from the interviews. Trends from each of the six categories are summarized as follows:

Practices

The farmers interviewed gave two predominant reasons for practicing sustainable agriculture: economic necessity and environmental purpose. The trends suggest that diversification of farm practices is a key strategy for sustainability, because it allows for one farm practice to supplement another. Cover cropping, best management practices for water, soil conservation, natural pest predators and composting are similarly important because it limits the need for importing goods and chemicals onto the farm, creating less environmental damage and financial investment in practices.
<table>
<thead>
<tr>
<th>Farm</th>
<th>Location</th>
<th>Market</th>
<th>Infrastructure</th>
<th>Future Farmers</th>
<th>Land Use</th>
<th>Education</th>
<th>Needs More Land</th>
<th>Infrastructure Needs</th>
<th>Funding Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Whitmore Farm</td>
<td>70% urban markets</td>
<td>Not needed</td>
<td>Educate farmers</td>
<td>Needs more land</td>
<td>Support family nutrition</td>
<td>Farm is in transition</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
</tr>
<tr>
<td>b</td>
<td>The Farm at Sunnydale</td>
<td>Urban market demand</td>
<td>Not needed</td>
<td>Educate future farmers</td>
<td>Needs to scale up 5-20%</td>
<td>Supports family nutrition</td>
<td>Reached peak production</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
</tr>
<tr>
<td>c</td>
<td>Polyface Farm</td>
<td>Urban market demand</td>
<td>Expects funding</td>
<td>Educate customers</td>
<td>Supports family nutrition</td>
<td>Reached peak production</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>Woodnose Farm</td>
<td>Urban market demand</td>
<td>Wants funding</td>
<td>Community dependent</td>
<td>Supports family nutrition</td>
<td>Supports multiple families</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>Split Creek Farm</td>
<td>Urban market demand</td>
<td>Wants funding</td>
<td>Education</td>
<td>Expands food culture</td>
<td>Supports multiple families</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>Twelve Aprils Dairy</td>
<td>Urban market demand</td>
<td>For infrastructure</td>
<td>Expansion of food culture</td>
<td>Dairy sales</td>
<td>Supports multiple families</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>Patient Wall Farm</td>
<td>Urban market demand</td>
<td>For infrastructure</td>
<td>Education</td>
<td>Anticipates profit</td>
<td>Supports family nutrition</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
<td></td>
</tr>
<tr>
<td>h</td>
<td>Walker Century Farm</td>
<td>Urban market demand</td>
<td>For infrastructure</td>
<td>Education</td>
<td>Anticipates profit</td>
<td>Supports family nutrition</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>Thicketly Mountain Farm</td>
<td>Urban market demand</td>
<td>For infrastructure</td>
<td>Education</td>
<td>Anticipates profit</td>
<td>Supports family nutrition</td>
<td>For infrastructure not needed</td>
<td>Requires funding</td>
<td></td>
</tr>
</tbody>
</table>

*Figure 4.1 Case studies results matrix*
**Access**

If the farm had renewable energy, such as solar tubes, wind power, or solar panels, it was very likely that the farmer applied for a government infrastructure grant for the start-up investment. For farm F, a continued relationship with the SARE program from the USDA has provided the extra boost for investment in farm infrastructure. The less profitable farms have also used funding for soil stabilization and hoop houses, to prevent erosion and to increase production.

**Engagement**

Education is the predominant theme of most of the farm interviews. At some point, an educational act, from college to reading a book, sparked the farmer’s initial interest to farm. Additionally, the farms as a whole see the need to educate the public about their practices and about food in general to keep the customers engaged in the process and coming back for more purchases. When asked about threats to the future of the farm, about half of the farmers interviewed cited their age or health as a detriment to the future, creating a more intense need to train future farmers to take over their practice and to begin new farms. All of the farmers cite the importance of education of both the public and future farmers for long-term stability. If sustainable food production ever has a chance to fully replace conventional or industrial farming, then there must be enough high-quality options for consumers. That means more farmers and more consumers.
**Scale**

It seems somewhat obvious that larger and older farms are likely to be more self-sufficient and likely even profitable, though profit isn’t always a motive. Most of the farms are considered small family farms, and the predominant national trend is that small farms are steadily increasing in quantity, but don’t typically provide enough income to support the entire family. They rely on off-farm income. For the farms that were not yet profitable it was mostly because they did not have enough products to sell, not necessarily that they did not have the market. Either they needed more land, infrastructure, or resources to achieve an “economy of scale,” which balances input costs and actual income for each unit produced.

**Proximity**

With the exception of one farm, arguably the most economically successful farm, the farms interviewed relied on people within 30 to 60 miles from their farm for the sale of their products, including CSAs, markets, restaurants, and other stores. No matter how far the distribution sources are, there has to be diversifications of customers, as well as enough produce to support a wide range of clients. Farm C defines local as within a 4-hour drive, so their definition expands their capacity to reach markets and thrive.

**Relationship**

Generally, the farms that are not yet profitable are surrounded by more development, whereas preserved land, other working lands, and open space surround the farms that are more profitable. The two most successful farmers lease land, not included in their actual farm acreage, to supplement on-farm practices. Availability of adjacent lands makes this possible. The farmer from Farm F
indicated that he would not be able to continue at his current rate of production, if he cannot continue to lease those lands. One farmer also talked a great deal about the threats of surrounding development on his ability to continue to farm. Farm A is surrounded by development, which is likely increasing due to its relationship to Baltimore and DC. He needs more land to compete, and cannot get more land due to the inflation of land values. He is, however, already at the brink of comfortable distribution proximity, where he does not want to drive further than an hour because it is not practical.

**Conclusion**

Though each farmer implemented different sustainable agriculture practices, the agricultural approach was tailored to the needs of the land and to the specific types of production. These practices were implemented to reduce inputs (costs and resources), while increasing production in a responsible manner. Comprehensive analysis indicates that there is a need for more public engagement, farming land, and government funding. Simultaneously, most interviewed farms are threatened by regulation to production practices that create more economic strain on the farm. This begins to imply the need for more communication, not only between the farmers and citizens, but also collaboratively with policy makers. The farms would benefit from regulations that accommodate for a variety of farm scales.
CHAPTER FIVE
DESIGN IMPLICATIONS

Looking at these six issues holistically from the literature and the case studies suggest an agricultural system (Figure 5.1) that is an alternative to the current conventional agriculture model. In addition to the proven environmental benefits, there is great potential for increased economic and social vitality. Instead of the vertical economic relationships of conventional farming, where corporations acquire most of the farm profit, the surrounding economy benefits from a horizontal structure where resources are spent by farmers in their local communities. “Farms with a gross income of $100,000 made nearly 95% of their expenditures locally,” according to the Pew Commission report. On the other hand, farms with gross incomes higher than $900,000 spent less than 20% locally” (Marttila-Losure, 2012 para. 20). When comparing these two figures, it is likely that there would be numerous small farms for every larger grossing farm in a given geographic area. Added to the economic benefit of more local spending is a social and environmental investment in the local community and ecosystem. “When money is spent locally, it has a multiplier effect—a dollar spent at the local elevator or hardware store is more likely to be spent again at the grocery store or restaurant. In vertically integrated farming systems, those dollars go to shareholders who likely do not reside in the rural farming communities. The money leaves and does not return” (Marttila-Losure, 2012 para. 21). This allows the success of one farm to create opportunities to enhance the availability of services for other farmers. The more farmers, the more shared services and social capital that is available. The government can play a key role in this process. By creating a reciprocal relationship between taxation and funding, as well as with conservation plans, the government and farm can mutually benefit each other. Investment in sustainable practices can prevent damage to the landscape, which the government is already responsible for paying to correct.
Figure 5.1 Implications of sustainable family farms compared to the conventional model
Through the holistic approach outlined by the literature in combination with the results for the case studies, three key elements for approaching the management of existing working lands emerged: conservation, production, and education. This includes conservation of working lands, community character, and ecological habitat; production of food, fiber, and energy for economic stability; and education of the public and future farmers. The application of these elements can occur on multiple scales, from planning for more working land conservation to creating on-farm opportunities for community engagement.

Figure 5.2 Three key elements of sustainable working lands
Figure 5.3 Application model for future family farms
Key Elements & Approach

Conservation

Through the case studies, as well as supplemental literature review, medium sized farms were determined to be the an ideal type of farm to supply enough produce for the population, while fully supporting a family’s income (Figure 5.3). Since farm size is determined by a combination of factors, the actual acreage of a medium farm could vary from 250 to 1,000 acres. A system of diverse farm scales, however, is likely to support a healthy agricultural community. Having enough land to achieve an adequate economy of scale can help to fuel the transition away from conventional agriculture by providing enough income to support an entire family. Medium farms are also the most threatened type of farm, today (Marttila-Losure, 2012). Conservation through these design recommendations can occur via multiple methods or programs, including: zoning regulations, conservation easements, land acquisition, incentives, protected lands, conservation agriculture, land retirement, riparian buffers and wetland management, in addition to creating wildlife habitat. A conservation easement “is a legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values. It allows landowners to continue to own and use their land, and they can also sell it or pass it on to heirs” (Land Trust Alliance, 2013 para. 1). Land retirement involves “paying farmers to remove environmentally sensitive land from crop production for a specific time period” (National Sustainable Agriculture Coalition, 2012 para. 1). Though land retirement has been the primary national conservation tool, there is a statistical shift towards more conservation easement programs. “The shift to working-lands conservation recognizes the multiple benefits of agriculture – that agriculture can provide food and fiber, as well as help provide healthy soils, clean water, habitat for native wildlife, renewable energy, and other conservation benefits” (National Sustainable Agriculture Coalition, 2012). Any conservation effort must balance the ability to produce crops with the needed land conservation.
**Production**

In terms of the definition of sustainability, this research would then suggest that sustainable farming should begin with observation of the land, followed by a agricultural approach that weighs the capacity of the land to produce with the environmental impact of production, so that production can continue indefinitely. Farm F has reached its maximum capacity of cows, for example. He has 90 cows, because that is how many cows he can actively observe every day. This alludes to David Orr’s concept of “eyes to acres” ratio, which suggests that the scale of a farm should respond to the capacity of the farmer to observe the farm operations (Martílla-Losure, 2012).

![evolution of a farm](image)

**Figure 5.4 Evolution of a family farm’s business**

Any new farm, as with any new business, is going to have a period of income loss, before the business begins to make a profit. This is the point where the government can be most beneficial, aiding in both educating the farmer and helping with initial land and infrastructure acquisition (Figure 5.4). In theory, that will make the farm self-sufficient sooner, with profit being achieved as the farm
reaches its production capacity. Even if the interviewed farmers did not admit to sharing tools or labor with other farmers, they often sold other farmers’ products at their on-farm markets and they would likely benefit from new or shared tools. There is likely design opportunities for shared infrastructure that can help multiple farmers achieve efficiency or profitability. Specific production practices should respond to the capacity of the land, the local demand, and the farmer’s enthusiasm or interest. Reliance on literature associated with sustainable agriculture practices can direct farming decisions.

Education

To say that education is important for the future of agriculture is an understatement. This includes the public as well as future farmers. “Food and agriculture are universal common denominators – all must eat. Our inherent relationship to agriculture and food as well as our common agriculture ancestries provide direct and comprehensible conduit to inform and educate people about ecosystems, ecology, and sustainability” (Mullinix, 2008 p. 6). Agritourism is one potential framework for regional education systems, identified in the literature. Potential programming could include: fee hunting and fishing; agriculture related festivals and fairs; farm tours; U-pick vegetables and fruit; horseback riding; farmers markets; farm vacations; on-farm retail markets; on-farm vacations; on-farm bed and breakfasts; wineries; on-farm petting zoos; on-farm bird watching; on-farm educational programs; etc. (UGA, 2013).

Recommendations

For each key element of this design approach, the following specific programming, practices, and/or strategies could begin to lead the design process.
Conservation

- Regional scale: zoning regulations; conservation easement programs; land retirement programs; land acquisition; tax incentives, protected lands; urban growth boundaries; etc.
- On-farm: conservation agriculture; conservation easements; land retirement; riparian buffers; wetland management; creating wildlife habitat; setbacks; windbreaks; native plantings; rotational grazing; cover cropping; etc.

Production

- Practices: organic farming; permaculture farming; biodynamic farming; agroforestry; precision farming; soil factories; orchards; tree farms; breweries; wineries; distilleries; etc.
- Products: vegetables; fruits; livestock; dairy; feed; raw materials; specialty products; lumber; soil; trees; flowers; herbs; beer; wine; spirits; etc.

Education

- Future farmers: internships; co-ops; mentoring; classes; workshops; residencies; seasonal jobs; school tours; etc.
- Public: CSA; fee hunting and fishing; agriculture related festivals and fairs; farm tours; U-pick vegetables and fruit; horseback riding; farmers markets; farm vacations; camping; on-farm retail markets; on-farm vacations; on-farm bed and breakfasts; wineries; on-farm petting zoos; on-farm bird watching; on-farm picnic areas; biking trails; hiking trails; Christmas tree farms; pumpkin patches; corn mazes; etc.
CHAPTER SIX
DESIGN APPLICATION

To evaluate the proposed design recommendations, the strategies were applied to a transitional farm site that was in need of intervention. Springsbury farm is a 730 acre farm site in Clarke County, Virginia, just 70 miles from Washington DC and 90 miles from Baltimore. It was donated to Casey Trees of Washington DC in order to prevent any reckless development and to retain the property for agriculture purposes. Since the land was in transition from one owner to another, it serves as an appropriate time for design intervention. Clarke County, VA prides itself on its agrarian past, using the Comprehensive Plan and Zoning Ordinances to preserve the agricultural and rural character of the County, shown in Figure 6.2. Their plans manage economic growth, focus residential development in specific areas, and protect agricultural and other rural land uses (Clarke County, 2013).

Figure 6.1 Design application site
Clarke County’s “Conservation Easement Program is designed to provide an option for landowners to protect family farms in Clarke County and their unique natural and cultural resources. It represents an opportunity for landowners to voluntarily donate or sell a conservation easement to a public authority to be held in trust for perpetuity. In turn, the landowner will receive monetary compensation either though direct payment from the Authority or by selling the tax credits generated by the easement donation. The amount of compensation is based on the difference between the value of the property prior to the easement and the value of the property after the easement. The difference in value reflects the land’s value as protected open space (such as farmland, forest land or rural use) versus the “highest and best” use (often residential development)” (Clarke County, 2013 para. 1). Though only 3.7% of the county is currently protected in this process, adding Springsbury farm would result in 4.3% of the county protected.
With its relatively close proximity to DC and Baltimore, and the numerous sprawling suburbs, there will be many opportunities to connect with farmers markets. Shown in Figure 6.4 are just a fraction of the distribution locations, because it does not include other farm’s on-farm stores. A CSA, or community-supported agriculture, is also a great way to distribute organic produce, and it often encourages customers to visit the farm and see the production. The net edibles, or the food produced that is not used at the farm, could be sent to both DC and Baltimore to potentially serve farmers markets and restaurants.

The farm’s programming also has the potential to connect people to their countryside and to nature. Within a 90-mile radius (Figure 6.5), there are over 30 Universities or Colleges that could benefit from agricultural education. In addition, within a 30-mile radius, there are over 70 public schools that could benefit form farm field trips for students ranging from Pre-K to high school. The site is also in close proximity to the Appalachian Trail, a great national recreation attraction. Springsbury farm could target the long-term hikers to visit the farm to stay a few extra days to work on the farm.
Figure 6.4 Production distribution opportunities
Figure 6.5 Educational partnerships opportunities
Springsbury farm is currently a financial burden for Casey Trees, primarily because the site is not generating revenue for the organization. Additionally, since the site has been uninhabited since 1987, many of the structures need tremendous repair. Since Casey Trees acquired the property in 2008, they have begun to retrofit the smaller houses for tenant farmers, and for Casey Trees educational and professional programming. The visual structure of the site is largely formed through the strong vegetation edges and the rolling hills. Figure 6.6 shows the abundance of pastureland that forms the characteristic sense of place for Clarke County. Figure 6.7 introduces potential on-farm conservation practices and/or goals. Preserving the character of the site and protecting ecological habitat are the foundation of the design application process. This allows the production and education programming to be inserted into the landscape in appropriate locations with consideration of the cultural and ecological ramifications.

Figure 6.8 suggests a diversified farm enterprise that capitalizes on the existing farm infrastructure to create multiple types of businesses that simultaneously generate revenue for families and for the organization, while managing the landscape ecology. Being under the ownership of a non-profit is a unique advantage. This takes some of the future financial weight off of one family farmer and potentially creates an opportunity for multiple families to live on the larger acreage and to produce with shared equipment and labor. In the case studies, even if the interviewed farmers did not admit to sharing tools or labor with other farmers, they often sold other farmers’ products at their on-farm markets and they would likely benefit from new or shared tools. The existing housing on the site offers the opportunity for multiple families to live and work at Springsbury farm. Integrating a wide range of educational activities on the farm, as depicted in Figure 6.9, can attract visitors to the farm, creating more loyal customers and generating revenue in the process. The master plan (Figure 6.10) illustrates how the holistic system will be integrated into the site, creating opportunities for the landscape to perform and produce.
Figure 6.6 Existing site
Figure 6.7 Conservation at Springsbury farm
Figure 6.8 Production at Springsbury farm
Figure 6.9 Education at Springsbury farm
Analyzing how the proposed design fits into the historic evolution of the site begins with the view of the core farmstead from 1936 that is shown in Figure 6.11.

Historically the estate had a heavy equestrian focus. The main stables served as a central activity zone since it housed prized horses. As an estate, the land was used primarily for pleasure, however some of the landscape was dedicated to family food production. More recently, the farm is in transition, due to nearly 21 years of limited human activity. The smaller existing structures, shown in Figure 6.12, have begun to be retrofitted and rental agreements with tenant farmers help to manage much of the pasture and cropland. The proposed plan, Figure 6.13, responds to the existing environmental fabric by framing iconic specimen trees, connecting new agricultural tree production to riparian zones, creating new wildlife habitat, and managing storm water in efficient and productive means,
Figure 6.13 Springsbury farm circa 2020
while increasing the opportunity for production and education. Preserving the rural character of the farm can promote both cultural and ecological tourism on the site while continuing a legacy of active use of the landscape. Figures 6.14-6.16 illustrate the visual and social impact of the design resolution at Springsbury farm.

Analysis

Though a complete analysis of the success of these recommendations could not occur until years after implementation, the structure of the approach could create a framework for the responsible management of working lands. By beginning with conservation as the foundation for any design and development, it ensures that the appropriate lands are protected and/or restored. This systematic approach allows for the designer/planner/farmer to balance production with its ecological effects. Production also requires a consideration of the landscape, which is why it is the second step in the design approach. Specific production practices need specific soils, slopes, etc. Once available lands are determined through conservation, production can be inserted in suitable locations for maximum efficiency. Educational opportunities are diverse and flexible. As the third layer of design, this element can be applied throughout a site to programmatically weave the conserved lands with the agricultural lands in order to capitalize on both. While the specific implementation practices for of all three elements can vary for every site, the process of design development can remain the same.
Figure 6.14 Preserving the characteristic sense of place and agricultural knowledge
Figure 6.15 Enabling family farmers to thrive
Figure 6.16 Educating the public and future farmers through agritourism
The goal of the study was to define design solutions for managing working lands through sustainable agriculture, so as to ensure the long-term health of local communities, economies, and ecosystems. Results of the study indicate that there is a need to holistically address agriculture from the perspectives of government, farmers, and citizens through conservation, production, and education. This holistic approach should include the planning perspective, integrating farmers and citizens into the agricultural planning process. Moving forward, this research implies a need to expedite the discussion on food production and working lands management, so that America can begin to prevent the loss of productive lands, knowledge, and of able farmers.

Further studies on national or regional conservation planning would likely provide a framework for policy makers to move forward with appropriate interventions in land management on the necessary scale. Additional analysis of the metrics of sustainable farming systems and of regionally appropriate food production would provide a basis for future approaches to policy intervention. Current metrics do not weigh environmental and social impacts of farming to specific production capabilities, so these metrics cannot be accurately used to argue for or against conventional or sustainable agriculture:

Moreover, by focusing on yield, [it would] presume that maximizing production should be the chief goal for ag policymakers. But as the eminent agriculture development expert Hans Herren, president of the Millennium Institute [said that] the globe's farms are already producing 4,600 calories per day—enough in gross terms to support a population twice as large as the current one. "We don't need to grow more food, we need to shift what we grow, where we grow it, and who grows it," Herren told me. He said that in places like Africa, East Asia, and South America, crop yields could be doubled "almost overnight" if farmers had the training and infrastructure to proper organic and/or low-input farming. Their crops yields might still lag behind, say, those of industrial-scale corn farmers in Iowa. "But they wouldn't need all of those inputs [like fertilizer and pesticides], and they'd produce more than
enough food," he said. As for the United States and Europe, "they would do well to grow less food and focus more on things like improving quality and building soil" (Philpott, 2012 para. 12).

Family farmers were the backbone of American agriculture until the industrial method prevailed. Expanding opportunities for new farmers to gain knowledge and land will repopulate working lands, while increasing the local food supply. Kathleen Marrigan, the U.S. Deputy Secretary of Agriculture, said the following while visiting Albuquerque, NM: “If we do not repopulate our working lands, I don't know where to begin to talk about the woes” (Marttila-Losure, 2012 para. 35). Matthew Polly, of Slate Magazine, suggests that an education is the modern equivalent 40 acres and a mule, and therefore the best tool to assist in cultivating a new generation of farmers (2004 para. 18). All of the farmers interviewed felt a duty to educate the public and future farmers. Wendell Berry would suggest, however, that the work and effort of sustainable farming does not fall solely on farmers' shoulders. Added to farmers’ efforts is a corresponding shift is consumer habits, which we have begun to see. “Many times, after [Wendell Berry finishes] a lecture on the decline of American farming and rural life, someone in the audience [asks], ‘What can city people do?’ ‘Eat responsibly,’ [he] usually answers… Eating is an agricultural act” (Berry, 1989 p.145).
What are common agricultural practices that promote ecological health?

“If you respect animals and nature, how can you not?” -farmer a

“We have always intended our farm to be sustainable because we believe that is the only long term solution for preserving rural life.” -farmer d

“The farm breaks even most years. Profit is not a major goal - preserving farm lifestyle and community is more important.” -farmer d
What extent does access to government funding affect a farm’s self-sufficiency?

“The most accessible government subsidies are for environmental preservation, fenced streams, buffers, manure storage, etc. There are no programs for land acquisition or infrastructure expansion, yet.” –farmer a

Figure A-2 Access Results
How do family farmers engage with the public and/or local community?

“We have an open door policy for visitors because we want to have a farming environment that encourages people to come out and connect with their food source and ask questions of their farmer.” –farmer c

“Long term viability depends on finding replacements for us. We rely on our local community for customers and help.” –farmer d

Figure A-3 Engagement Results
What is the typical scale, acreage and age, for an environmentally responsible family farm?

“If I can’t expand, it will be difficult to be economically viable without damaging the environment. e.g. CAFO” - Farmer A

“We will never be large enough for wholesale, so we rely on direct-to-consumer sales. In order to be profitable, we need to scale up production 5-10% and trim expenses.” - Farmer B

<table>
<thead>
<tr>
<th>Farm</th>
<th>Needs more land</th>
<th>Needs to scale up 5-10%</th>
<th>Supports multiple families</th>
<th>Supports family nutrition</th>
<th>Needs new market</th>
<th>Reached peak production</th>
<th>Anticipates profit</th>
<th>Anticipates profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure A-4 Scale Results
What is a family farm’s typical proximity to its distribution sources?

"We do rely heavily on our local community - we do not deliver our products for sale anywhere beyond a four hour’s drive from the farm. This is to encourage people to seek out local farms in their community and to encourage people to start farms as well." -farmer c

"People buy our stuff from word of mouth. As long as the product is good, no issues." -farmer i

Figure A-5 Proximity Results
How does the relationship to adjacent land uses affect a farm?

“I won’t be the first one to sell, but I will be the second.” –farmer g

“[There is] tremendous pressure to convert land to houses. Affects my ability to expand which is needed for [an] economy of scale” –farmer a

Figure A-6 Relationship Results
REFERENCES


79