

ABSTRACT

GREGORY, ANNELIESE MARGARET. *Alternative Possibilities: Gender and Agriculture in the United States*. (Under the direction of co-chairs Dr. Sarah Bowen and Dr. Brett Clark.)

Agriculture is a rigidly gendered field in which 85% of primary operators on family farms, those possessing the majority of farm decision-making power, are male (National Agriculture Statistics Service 2009). The division of labor between “farm” and “home” is strictly gendered, despite the necessity of female labor to sustain the farm as both a business and a household (Sachs 1983; Whatmore 1991; Meares 1997; Allen and Sachs 2007). Previous work in gender and agriculture suggests that gender beliefs and practices of farm operators is related to farm structure and agricultural practices, with civic and environmental implications for the community in which the farm operates (Peter et al. 2000; Hall and Mogyorodny 2007). Sustainable and civic agriculture are theoretically associated with non-traditional gender ideology and practice (Chiappe and Flora 1998; Trauger et al. 2010)., but the existence of this association has not been tested on a national sample This paper tests the association between female primary farm operators and sustainable and civic agricultural practices at the county level, using 2007 data from the USDA Census of Agriculture. Using ordinary least squares regression, I find that civic and alternative farm practices are significant predictors of female primary operatorship, even after controlling for metropolitan proximity, region, county demographics, farm subsidies, structure, and size. These findings support previous work in alternative agriculture and gender, and suggest new avenues for research into the mechanisms of alternative gender practices and an alternative agricultural paradigm in determining farm structure.

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Alternative Possibilities: Gender and Agriculture in the United States

by
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DEDICATION

For my mother, Rebecca, and her sisters, the indomitable Froehlichs: Your strength is my strength, and your love has carried me through so much.

For my sister, Jonna, who keeps me full of hope.

For Eric Gregory, without whom I would not have discovered my love of agriculture and rural places.

BIOGRAPHY

Anneliese Margaret Gregory grew up in Erie, Pennsylvania. She attended Emory & Henry College in Emory, Virginia for four years, where she became fascinated by the implications of growing national interest in sustainable agriculture. In 2009, she graduated with a Bachelor of Arts in Sociology. In 2010, Anneliese enrolled in the Sociology and Anthropology graduate program at North Carolina State University to further study the structure of agriculture in the United States and around the world. Her research interests include gender and alternative agriculture, value labeling in food products, and the global organic food network.

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INTRODUCTION

Every morning as I walk to my office I'm challenged by a neighbor's bumper sticker: "Who's your farmer?" The implication of this question--that consumers should know where their food comes from and what goes into it, as well as cultivate a personal relationship with the individual who grows their food--is a central tenet of the local food movement, spearheaded by activists such as Michael Pollan and Barbara Kingsolver.

Sociologists of agriculture and critics of the local food movement have identified a number of ideological contradictions, one of which is how the movement constructs or challenges unequal gender relations (Meares 1997; DeLind and Ferguson 1999; Dupuis and Goodman 2005; DeLind 2011). What strikes me about my neighbor's sticker is how the assumption of a single farmer subtly reinforces gender inequality within agriculture even as local and organic food movements supposedly challenge those dynamics (Meares 1997; DeLind and Ferguson 1999).

Contrary to the bumper sticker's assumption of a single farmer and (his) fields, 96% of American farms are classified as family farms (NASS 2009). The farm household is assumed to consist of a heterosexual couple (NASS 2009) in which the male is responsible for the majority of farm decisions and the female functions in a support or reproductive role (Sachs 1983; Rosenfeld and Tigges 1988). The majority of family farms follow this pattern: 85% of all farms are headed by a male (designated as the "principal operator") while women

are overrepresented in the “secondary operator” category (Hoppe et al. 2010). “Who’s your farmer?” glosses over how the labor of agricultural products is differentiated by gender.

The gendered division of agricultural labor is attributed by Sachs (1983) and others to the increasing conventionalization and industrialization of U.S. agriculture (Rosenfeld and Tigges 1988; Brandth 1994; Saugeres 2002). The relationship between conventional agriculture and conventional gender relations is subsequently taken for granted and agricultural practices are constructed within sociology of agriculture literature as deterministic of on-farm gender relations (Peter et al. 2000; Hall and Mogyorody 2004). Problematic gender relations, which are implied to grow out of the ideology and practices of conventional agriculture (Beus and Dunlap 1990), assume a dichotomous relationship to equitable gender divisions of labor produced through, arguably, alternative agricultural forms ((Peter et al. 2000; Hall and Mogyorody 2004).

This assumption is implicit and pervasive in studies of alternative agriculture which question whether ideological orientations, which lead farmers to pursue alternative farming methods, might also support alternative gender relations on the farm (Meares 1997; DeLind and Ferguson 1999; Peter et al. 2000; Hall and Mogyorody 2004). A wealth of qualitative work suggests that a relationship exists between gender relations on farms and how farms are operated, but this assumption has yet to be empirically supported by a national analysis of farming within the United States. In my thesis, I provide an empirical assessment of this relationship.

Specifically, I predict that the practice of alternative (sustainable and civic) farming methods will be associated with nontraditional gender practice (which I define as women primary operators), in that counties with more alternative farms will also have more female principal farmers. This hypothesis does not ask whether female farmers are more or less likely than male farmers to utilize given alternative farming methods, or whether alternative forms of agriculture contribute to more equitable gender relations; instead, I ask whether the presence of alternative farming methods in a county predicts an environment in which farmers practicing alternative gender relations on farms—women as primary operators—are more likely to work. Previous qualitative findings suggest that organic agriculture in and of itself does not predict egalitarian gender relations, but that forms of organic agriculture which are less industrial may foster more equitable divisions of house and farm work between men and women (Hall and Mogyorody 2004). Using nonlinear OLS regression, I demonstrate that counties with more farms practicing alternative and civic methods of agriculture have higher numbers of female operators, controlling for all other factors.

Within this paper, I use the terms “sustainable” and “alternative” interchangeably to indicate farming methods that are pursued for their environmental benefits, such as the conservation of land and water. When discussing agriculture that is certified as follows the standards required by the National Organic Program (NASS 2009), I use the term “organic” to differentiate organic farms from those that use similar methods without certification. In order to distinguish between the environmental and social aspects of production which are assumed to be related to gender inequality in agriculture, I use Lyson’s (2005) definition of

civic agriculture as that which is embedded in a community and the relationships and values of that community. Certain elements of civic agriculture, specifically the focus on local markets, arguably fall within the alternative agriculture paradigm identified by Beus and Dunlap (1990). I choose to highlight whether or not farmers produce and sell at local markets, rather than the environmental implications of production for local markets--in that consumers can directly ask farmers about their production practices--and consider this a civic method of production.

LITERATURE REVIEW

Early theorists studying gender and agriculture found a relationship between the farm's gendered division of labor and the increasing industrialization of agriculture in the United States beginning in the late 1940s (Lobao and Meyer 2001). Sachs (1983) provides an excellent history and summary of studies in gender and agriculture through the early 1980s, concluding that "market-oriented, high-technology farming excludes women from decision making" (34). Subsequent research on gender and agriculture seized upon the interaction between farm methods and gender practice, arguing that the movement of women from the farm into the workforce alongside the growth in average size and scale of farms is evidence of the minimized role women play within agricultural production (Whatmore 1991; Meares 1997). Nowhere is this more evident than in the experiences of women who seek out agricultural knowledge from traditional sources such as land grant universities and extension

agents: long-held perceptions of women as “farmwives” prevent farming women from accessing the best available agricultural knowledge (Trauger et al. 2008).

These studies of the gendered division of labor on conventional farms led to questions about the gendered division of labor within the alternative farm family (Meares 1997; Peter et al. 2000; Hall and Mogorody 2009). The alternative agriculture movement attracted a great deal of interest from sociologists of agriculture and gender, who argued that the ideals of alternative agriculture constitute a paradigm distinct from that of conventional agriculture (Beus and Dunlap 1990). Would, then, those who participated in alternative agriculture demonstrate alternative gender ideologies and practices (Meares 1997; Peter et al. 2000; Hall and Mogorody 2009)?

Three distinct research areas in the sociology of agriculture are engaged by this question: Gender in agriculture, gender in alternative agriculture, and civic agriculture literature.

The growth of the sustainable/alternative agriculture movement throughout the 1980s, culminating in the Organic Foods Act of 1990 and in the National Organic Program of 2002 spurred further questions regarding agricultural practice and gender (NASS 2009). The sustainable/alternative agriculture movement is generally agreed to represent farmers and consumers whose values and practices focus on harmony with nature, diverse agricultural methods and crops, local consumption and investment in community (Beus and Dunlap 1990; Lyson 2005). The use of this political ideology to shape practice implies that practice influences structure. The belief that conventional farming methods are environmentally,

medically, and socially harmful is used to encourage farmers and consumers to change their behaviors in order to reap far-reaching benefits to the quality of food, economy, and community life (Appalachian Sustainable Development 2011). When questions of gender equality are considered within the ideological framework of sustainable agriculture, farmers, analysts, and consumers project the perceived benefits of alternative farming practices for individuals and communities onto gender relations as well (Peter et al. 2000; Bell 2004, Trauger et al. 2010).

The literature pertaining to gender and agriculture and gender and environment is broad and varied. Ecofeminists such as Ariel Salleh (2009) and Vandana Shiva (1989) argue that the exploitation of nature for profit, such as through unsustainable methods of agriculture, mirrors the oppression of women by men, and that those processes are often one and the same. Scholars in environmental sociology critique ecofeminists for gender essentialism, arguing that while men and women may relate to the environment in different ways, understanding the processes which socialize those beliefs and behaviors is essential to studying and hypothesizing differential outcomes for the environment (Banerjee and Bell 2007). A survey of literature on environmental risk by Davidson and Freudenburg (1996) suggests that differences in perception of environmental harm by men and women may be due to different levels of trust in institutions. Men and women with children, however, appear to have similar levels of concern regarding environmental risk.

Some evidence of interesting interactions between alternative farming ideology and practice and gender ideology and practice exist. Wheeler (2008) finds that among faculty in

agricultural education programs, gender-equitable beliefs are positively related to acceptance of sustainable agricultural practices. Peter et al. (2000) discuss the presence of a community-oriented dialogic masculinity exhibited by male farmers practicing alternative agricultural production methods. Hall and Mogyorodý's (2007) work on organic farms run by heterosexual couples reveals more equitable gendered distribution of farming, home labor and decision-making on organic farms with less mechanistic techniques and more explicit devotion to alternative agricultural ideals.

Other scholars focus on the networks and ideals held by female farmers, revealing civic orientations in addition to ideology favoring environmentally-friendly farming practices (Chiappe and Flora 1998). Civic agriculture is defined by the "embedding of local agricultural and food production in the community" (Lyson 2005), and involves practices such as direct marketing and community-supported agriculture as well as the reduction of potential environmental hazards on the farm. The goal of those who participate in civic agriculture, in opposition to conventional agricultural production, is to reap economic and social benefits for the local community in addition to supporting the farm family (DeLind and Ferguson 1999; Lyson 2005). Studies of civic agriculture find that measures derived from civil society are positively related to measures of agricultural sustainability (Lyson 1998).

Trauger et al. (2010) find evidence of a strong community orientation among female farmers, which is consistent with theories on civic agriculture, as well as theories that argue that women are socialized into a relational nexus (Hartsock 1983). Chiappe and Flora (1998)

argue that community is a significant feature of alternative agricultural practice for female alternative farmers

By establishing the presence of statistically significant relationships between where alternative farming practices are conducted and their impact on the presence of female primary operators, I seek to continue the work of Allen and Sachs (2007) by furthering issues of women and food in the material realm, as well as illuminating county-level structures that influence the participation of women in agriculture as full farmers.

HYPOTHESES

This study seeks to make strong empirical associations between non-traditional gender practice (as measured by number of female primary operators per county) and sustainable and civic agricultural methods. To this end, I ask whether the assumptions made throughout studies of sustainable agriculture and gender are supported empirically—that alternative methods of production will be significantly statistically significant and positively related to alternative practice of gender. A second hypothesis considers civic agriculture and gender practice. Does evidence exist which supports the assumption that community-oriented practices are related to the number of female primary operators?

Sustainable agriculture hypothesis (H1): Organic acres and number of farms utilizing conservation methods will be significant and positive predictors of the number of female

farmers on average per county. Chemicals used per farm will be significant and negative in predicting number of female farmers on average per county.

Civic Agriculture hypothesis (H2): Number of community supported agriculture programs (CSAs) and direct sales of produce for human consumption will be significant and positively associated with number of female farmers per county.

DATA AND METHODS

Data for this study are taken from the 2000 United States Census and USDA National Agriculture Statistics Service 2007 Census of Agriculture. The use of data from different points in time within one cross-sectional analysis was constrained by data availability and justified by allowing for a larger sample size. Additionally, previous studies face similar temporal incongruities in demographic data (e.g., Lyson et al. 1998). This requires caution in interpreting the coefficients of control variables drawn from the 2000 Census as necessarily predictive of current county patterns.

Of 3,147 total counties in the United States, 2,407 were analyzed after listwise deletion of missing data resulting from data withheld by the USDA for confidentiality reasons in counties with very small farm counts. These missing cases exclude the most rural counties from the analysis, making it difficult to generalize these findings to very rural areas. It also suggests that the coefficient for the urban influence (urbanicity) code should be interpreted with caution: While it suggests that numbers of female farmers decline as

counties become more rural, this relationship could be exaggerated by the loss of rural county data.

The dependent variable, female primary operators per county, was transformed using the natural log to get closer to normal distribution and satisfy the assumption of OLS regression.

Independent variables used in this analysis are direct sales value, number of CSAs per county, organic farms per county, acres farmed using conservation methods, government payments received for conservation, and count farms using commercial chemicals.

Control variables were determined through a review of relevant literature. Farm size and scale (measured by expenditures and sales) have been found to predict farms using environmentally sustainable methods with increasing size and scale negatively related to the economic and environmental sustainability of farms per county (Lyson and Barham 1998). To establish a statistical relationship between sustainable and civic methods of production and female primary operatorship the relationship between methods and scale must be controlled.

Metropolitan proximity (Albrecht 1997) is also found to be associated with small farm sustainability, and in this study, the USDA urban proximity scale (USDA 2003) is controlled to account for this association. In other words, because metropolitan proximity has been found to be related to small farm sustainability, controlling for metropolitan proximity ensures any relationship found between this study's measures of sustainability and female primary operators is not due to the spurious effects of county metropolitan proximity.

Previous descriptive data notes that female primary operators are more likely to run farms that are smaller, less profitable, and more likely to specialize in livestock (Korb 2005) and controlling for size, expenses, and products raised is necessary to establish a relationship between civic and sustainable practices and female primary operators. Government subsidies and unemployment are key variables in Goetz and Derbertin's (2001) analysis of farm persistence, and are included as controls for methodological consistency with previous farm studies.

I also include as controls the percentage of the population which is African American, the percentage of county population which is Hispanic, the percentage of adults in the county with a high school diploma or higher education, region dummy variables (with West as the reference category), total agricultural sales per county, the percentage of farms per county raising vegetable and fruit crops (Korb 2005; Greene et al. 2009), and the percentage of farms per county raising field crops (Lyson and Barham 1998; Lyson 2001), and the average number of acres per farm (Albrecht 1997).

A total of twenty variables were introduced into the regression. The Civic Model adds the civic agriculture independent variables (value of direct sales and number of CSAs) to the Sustainable Model.

RESULTS

Table 2 contains the results of the nested models. Net of the effects of demographic variables, farm size and scale, farm production (livestock, fruits and vegetables, and field crops), and government payments, the value of direct sales and CSAs as a percentage of farms per county are both significant predictors of female primary operator.

The control variables perform as expected in this model; it is interesting to note that the region dummy variable indicates that a change in region from the West to the Midwest is associated with approximately 20% lower female primary operators per county, a result which is likely to have been influenced by the exclusion of the most rural counties in the United States from this study. The majority of the most rural counties in the United States are found in the Midwest (USDA 2003). While cautious about extrapolating from this finding, it suggests that metropolitan distance is negatively associated with the number of female farmers per county; controlling for all other factors, the more rural an area is by the UIC, female primary operators by county decrease by 2%.

The relationship between direct sales and female principal operators is positive; exponentiated in Table 2 under the Sustainable Model, for every \$1000 increase in direct sales per county, we predict the number of female principal operators is predicted to increase by approximately 10%. This finding is in line with the hypothesis for civic agriculture. The CSA variable, however, is not statistically significant, a finding that bears more discussion.

The Sustainable Model (Table 2) introduces four sustainable agriculture variables: organic farms, government conservation payments, acres farmed using conservation methods, and number of farms using chemical fertilizers, defoliates, nematode and insect treatments, and herbicides. Net of control variables, this model demonstrates that the civic and sustainable agriculture variables identified in this analysis are significant predictors of female principal operatorship across the United States, in line with both hypotheses. For every additional organic farm per county, we predict number of female primary operators per county will increase by approximately .5% (Table 2). The number of farms receiving conservation payments is also positively associated with an increase in female principal operators, as is acres farmed using conservation methods. Finally, the variable for chemical usage indicates that in counties where more farms use more commercial chemicals, the number of female principal operators decreases. The region dummy variable for Midwestern counties as well as urban proximity remain interesting control variables. Similar to the pattern seen in the Sustainable Model, movement from a county in the West to a county in the Midwest is predicted to be associated with a decrease of 22% in the number of female farmers per county. Counties coded more rural by the urban influence code are also associated with a decrease in the percentage of female primary operators, approximately 4% with each code.

Standardized regression coefficients for the Sustainable Model indicate that farm production—livestock, fruits and vegetables, and field crop production—remain among the most predictive variables in this regression model. However, of the civic and sustainable

agriculture variables, farm conservation payments and value of direct sales per county are also good predictors of female primary operatorship (see Table 2).

DISCUSSION

Previous qualitative studies on gender ideology and female farmers demonstrate that sustainable and civic agriculture have the potential to create space for alternative gender ideology and practice (DeLind and Ferguson 1999). Hall and Mogyorody (2007) find that alternative gender ideology and division of labor vary by the degree of conventionalization present on alternative farms, connecting more sustainable practices with more equitable division of house and farm labor by gender. Interviews with female primary operators reveal ideological motivations toward civic and sustainable agriculture (Trauger et al. 2010). The results of this analysis indicate that, at the county level, alternative and civic methods of farming such as organic farming and direct sales are associated with higher numbers of women working as the primary operators of farms.

Significantly, while previous research has described in detail the values and actions of female farmers, and recorded the ideological beliefs that drive their interaction with agriculture, this study is the first to offer substantial statistical evidence to support the argument that alternative farming methods are related to alternative gender practice—making space for female farmers as individuals in charge of laboring and making decisions on farms. More simply put, the data suggest that net of other structural and county-level factors,

measures of sustainable and civic agriculture predict a positive relationship between alternative methods of agricultural production and number of farms run by female primary operators.

The non-significance of the CSA variable is surprising, especially in light of the predictive power of the value of direct sales on female primary operatorship. Previous research (DeLind and Ferguson 1999) suggests that women do the majority of work in community-supported agriculture, but perhaps not as farm primary operators themselves.

The results of standardized regression coefficients for government subsidies for conservation and number of organic farms per county are also interesting aspects that suggest more research is needed into these patterns. If, as many authors now argue, the expansion of organic agriculture is happening through processes quite similar to the industrialization of agriculture experienced throughout the 20th century (Lobao and Meyer 2001; Guthman 2004), it stands to reason that the potential benefits of organic agriculture will not last for female participation in agriculture as primary operators, or for the construction of gender within agriculture at large. Indeed, this process has already been observed on organic farms by Hall and Mogyorody (2004).

This finding, in conjunction with literature on the conventionalization of organic agriculture, suggests that theorists and researchers interested in the intersections of gender and agricultural methods must better articulate how the interactions between ideology (gendered and agricultural) and practice produce different effects for different farms, if they do so at all. The relationship between agricultural methods and gender relations cannot be

assumed, then, to be uni-direction and causal, but instead prodded more creatively to understand why this relationship persists both statistically and theoretically.

The relative weight, then, of government subsidies for conservation and the number of farms utilizing conservation methods per county to the weight of number of organic farms per county in predicting female primary operators may be indicative of better potential avenues for supporting female primary operators and nontraditional gender relations in agriculture. The proliferation of organic agriculture (and thus its benefits to gender relations) depends upon the market for organic products and the participation of business elites in purchasing, at fair prices, organic products from farmers in the United States. Alternately, public support via government funds for environmentally beneficial methods of farming are accessible (in theory) to all farmers and do not exclusively depend on the organic market, or market access, for support. Structural changes, rather than market-based prescriptions, have more weight in this analysis, and may thus have more weight for challenging the status quo of gender relations within agriculture.

The results of this analysis point the way towards research that moves beyond studying individual farmers and ideology to theorizing how structural and institutional power shapes trends in farming methods. If, as previous research has argued, concentration, conventionalization, and increased scale in agriculture decreases the power and decision-making ability of women involved in farming, will farming change with growing numbers of women participating in agriculture? If organic agriculture is undergoing industrialization

(Guthman 2004), will replications of this study in the future continue to find a positive relationship between number of organic farms and number of female farmers per county?

CONCLUSION

Through this analysis of farming methods and gender of primary operator, I challenged the assumption of the popular local food movement that “Who’s your farmer?” is the right question to transform the U.S. food system. That question obscures the labor of the family farm and in doing so supports gendered assumptions of who does farm (productive) work and who does house (reproductive) work on U.S. farms. By buying locally and knowing who our farmers are, goes this logic, consumers can hold farmers accountable for the agricultural methods they employ. Within sociology of agriculture literature, agricultural methods are associated with agricultural ideology and gender practice, such that practitioners of conventional agriculture represent conventional ideology (Beus and Dunlap 1990), which leads to the perpetuation of traditional, unequal gender relations (Sachs 1983). An extension of this assumption, then, is that alternative agricultural methods will be associated with alternative, non-traditional gender relations. I tested this assumption empirically by looking at farmers who embody non-traditional gender practice—female primary operators, an overwhelming minority within agriculture—and whether or not their presence could be predicted by measures of alternative, sustainable, organic, and civic agriculture.

While “Who’s your farmer” might be the wrong question, it is not a useless question, and the results of this study establish that methods of production do, indeed, influence gender relations, in that more female farmers can be found where more alternative methods of production are practiced. This study demonstrates that (with the important exception of number of CSAs per county) sustainable, organic, and civic methods of agriculture are found to be predictive of higher numbers of female farmers per county.

Theoretically, this study uncovers an important assumption about agricultural methods and gender relations, one which is implicit throughout the majority of gender and agriculture literature. Though this study contributes to substantiating and supporting this assumption—that agricultural methods contribute to the shape of agricultural gender relations--the study also suggests that more work remains to be done in elaborating on the mechanisms of these relationships. In addition, this study suggests that how methods construct gender relations is a question of structures and institutions rather than individual action. Addressing gender inequality within agriculture, and how inequality is constructed through agricultural methods, also requires an examination of how institutions such as land-grant universities and the USDA contribute to these constructions. That this study finds significant effects at the county rather than individual-level is further evidence of larger, less understood processes at work.

The limitations of this study suggest directions for interesting future work. Previously discussed issues include the temporal misalignment of demographic and agricultural data from 2000 and 2007 as well as the lack of available data on the most rural counties in the

United States. The future availability of 2010 US Census data as well as the 2012 USDA Census of Agriculture, however, present exciting opportunities for expanding this cross-sectional project into a longitudinal study of changing patterns in alternative, sustainable, and civic methods and their relation to female primary operators. A longitudinal study would also clarify the direction of this relationship: while this study and others (Hall and Mogyorody 2004) imply a causal relationship between agricultural methods employed as predictive of how gender is practiced, a longitudinal study would make explicit the direction in which the relationship functions. Specifically, a longitudinal study would demonstrate when counties gain additional female primary operators or farms utilizing sustainable and civic methods. Rarely is the mechanism by which ideology, gender, and labor become associated explored within gender and alternative literature, and a longitudinal study would provide grounds for assessing how those relationships develop. Most significantly, while this data suggest the number of female principal operators increases where sustainable and civic methods of agriculture are utilized, it does not explicitly connect female farmers with these practices. With the availability of individual-level data, a multilevel modeling approach could be utilized to understand whether different processes function at the individual and county-level in determining the distribution of female primary farm operators.

Interviews based upon these findings would illustrate how female farmers interact with institutions and their communities, how they negotiate economic and social barriers, and whether their civic and community ideals and practices better enable their farms to survive in a challenging economic atmosphere. How and where female farmers distribute their

agricultural products is also an important research question, as this project demonstrates that female farmers are more likely to operate in more metropolitan counties. What aspects of metropolitan counties make female farming more likely, or, vice-versa? Do the arguments made by these results hold for the most rural counties? What are the characteristics of businesses female farmers are more likely to work with—are they more likely to be locally owned, female-owned, small, or large, or are female farmers more likely to market their own products than male farmers? The completion and improvement of this project points to fascinating questions regarding the interaction between gender, institutions, and ideology in agriculture.

Focusing on county-level patterns rather than individual-level data allows for a broader understanding of the spatial and structural factors inherent in how agriculture is gendered and racialized. Recent revelations of discrimination against female and Hispanic farmers in distribution of USDA farm loans suggests that institutional factors interact with individual farmer characteristics to shape who participates in agriculture as a principal operator and where they are capable of operating in the United States (USDA 2011).

These results also point toward important future work with serious implications for farm policy, such as allocation of subsidies and loans. This study suggests potential avenues for augmenting diversity, such as investment in venues for direct agriculture sales and alternatives to commercial chemical applications. Substantiating the theorized links between gender diversity, community-oriented farming, and ecologically sound agricultural practices

on a county-level lends validity to previous theoretical work on gender differences in farm organization and practices.

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Table 1 Descriptive Statistics

	<u>Mean</u>	<u>Variance</u>	<u>Standard Deviation</u>
N: 2407			
Black (%)	8.196	191.604	13.842
Hispanic (%)	4.879	95.957	9.797
Education	78.031	67.964	8.220
Urbanicity	5.318	11.431	3.381
Midwest	.396	.239	.489
South	.402	.240	.490
Northeast	.070	.065	.256
Average Farm Expenses (\$)	116422	23866470318	154488
Average Farm Size (acres)	507.583	901655	949.555
Average Subsidy (\$)	8695.730	7172989	8468.352
Total sales (\$)	108122	37845339580	194539
Livestock farms (%)	369.367	96385	310.459
Fruit and Vegetable farms (%)	38.489	30623	174.993
Field crop farms (%)	533.684	130860	361.745
Value of Direct Sales (\$)	4.372	1044009	1021.767
CSAs (farms)	424.67	26.33183	159.386
Organic farms	7.101	248.88329	45.776
Government payments for conservation (\$)	131.841	25404	159.386
Conservation methods (acres)	13725	826902514	28756
Chemical useage (farms)	822.012	617587	785.866
Female Operators (log)	403725	.59705	.773

**Table 2 OLS Regression Coefficients Estimating Female Primary Operators:
Sustainable and Civic Agriculture**

	<u>Model 1</u>	<u>Sustainable</u> <u>Model</u>	<u>Civic Model</u>
Black (%)	.00321**	.00265*	.00239**
Hispanic (%)	.00943***	.00921***	.00857***
Education	.001617***	.01562***	.01360***
Urbanicity	-.03108***	-0.02761***	-.04070***
Midwest	-.24631	-.21728***	-.25477***
South	-0.25008***	-.21357***	-0.09744*
Northeast	.05607	-0.02443	0.02113
Average Farm Expenses (1000\$)	-.00068***	-0.00062***	-0.00042***
Average Farm Size (acres)	-0.00013***	-0.00012***	-0.00012***
Average Subsidy (1000\$)	0.00078	-0.00324	-0.00415**
Total sales (1000\$)	0.000345**	.000195	-.000135**
Livestock farms (%)	0.00125***	.00124***	.00128***
Fruit and Vegetable farms (%)	0.00040***	.00021*	.00066***
Field crop farms (%)	.00119**	.00011***	.00006*
Value of Direct Sales (1000\$)		.09271***	.1054***
CSAs (farms)		.00281	.00017554
Organic farms			.00478***
Government payments for conservation (1000\$)			1.180***
Conservation methods (acres)			.0000035***
Chemical useage (farms)			-.00012**
DF:	2407	2407	2407
Model F	178.58***	163.67***	181.42***
R-Square	.5414	.5742	.6225
Constant	2.925***	2.90749***	3.01232***

N: 2407

*p>.05 **p>.01 ***p>.001

Table includes unstandardized regression coefficients.

Table 3 OLS Standardized Regression Coefficients Predicting Female Primary Operators

	<u>Control</u>	<u>Sustainable</u>	<u>Civic</u>
Black (%)	.054282**	.04747**	.04273**
Hispanic (%)	.1196***	.11672***	.10861***
Education	.17248***	.1665***	.14512***
Urbanicity	-.13601***	-.12083***	-.17809***
Midwest	-.15594***	-.13757***	-.16130***
South	-.15875***	-.13557***	-.06186**
Northeast	.01859	-.00810	.00701
Average Farm Expenses (\$)	-.13586***	-.12467***	-.07402**
Average Farm Size (acres)	-.15385***	-.15122***	-.14319***
Average Subsidy (\$)	.00858	.01332	-.04553**
Total sales (\$)	.08699**	.04911*	-.03401
Livestock farms (%)	.50035***	.49762***	.51491***
Fruit and Vegetable farms (%)	.09133***	.04246*	.14836***
Field crop farms (%)	.05578**	.05190**	.02963
Value of Direct Sales (\$)		.12266***	.139365***
CSAs (farms)		.01867	.00117
Organic farms			.09763***
Government payments for conservation (\$)			.24375***
Conservation methods (acres)			.12883***
Chemical useage (farms)			-.12510**
<u>Model F</u>	178.58***	181.35***	198.02***
<u>R-Square</u>	.5414	.5488	.6225
<u>Constant</u>	2.925***	2.84072***	2.93501***

N: 2407

*p>.05 **p>.01 ***p>.001

Table includes standardized regression coefficients.