

2017

Women and agriculture education: A framework for inclusion

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Women and agriculture education: A framework for inclusion

by

Cori Jane Hyde

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Sociology

Program of Study Committee:
Carmen Bain, Major Professor
Ann Oberhauser
Betty Wells

The student author and the program of study committee are solely responsible for the content of this thesis. The Graduate College will ensure this thesis is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2017

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NOMENCLATURE

USDA	United States Department of Agriculture
CES	Cooperative Extension Services
FAST	Feminist Agrifood System Theory
RISE	Research Institute for Studies in Education
ISUEO	Iowa State University Extension and Outreach

ACKNOWLEDGMENTS

I would like to thank my committee chair, Dr. Carmen Bain, for pushing me to produce my best work and believing in me more than I believed in myself; and my committee members, Dr. Ann Oberhauser, and Dr. Betty Wells for their guidance and support throughout the course of this research.

In addition, I would also like to thank my family, friends, colleagues, the Sociology department faculty and staff, and the staff and students at the Research Institute for Studies in Education for making my time at Iowa State University a wonderful experience. I want to also offer my appreciation to Madeline Shultz with the Women in Agriculture extension office for connecting me with Annie's Project and those who were willing to participate in my interviews.

Finally, I would like to thank my husband, Bryce Taha, for his constant support and encouragement of my academic goals, and Cyanna Claiser for her edits and thorough proof reading.

ABSTRACT

The contributions of women have long been overlooked in agriculture, and women have been excluded from agriculture education. The primary purpose of this research project is to investigate why it is important to include women in agriculture education network programs. Recently, programs have been developed to meet the needs of farm women, and Annie's Project is one program that targets women interested in business risk management knowledge and skills.

This research examines how Annie's Project Level I course assists farm women and the outcomes of the course. Using a mixed methods approach of survey data and phone interviews, I examine the impact of Annie's Project Level I as well as the roles of the participants on their farms. Primarily, the participants are fulfilling the traditionally, reproductive roles on their farms including bookkeeping and financial management. The need for more business management training for women is apparent as the contributions of women on farms becomes more visible. Finally, this research investigates whether Annie's Project reinforces or challenges the ideal role of women in farming.

As farm women continue to occupy the reproductive sphere on family farms, the visibility of their work and the demand that they be taken seriously does challenge the ideal role of farm women. Programs such as Annie's Project offer space for women to engage with other women, gain confidence to discuss their farms, and be taken seriously as farmers.

CHAPTER I

INTRODUCTION

Introduction

Women face unique challenges in agriculture, and it is important that their needs are addressed (Sachs, Barbercheck, Brasier, Kiernan, & Terman, 2016). Agriculture education network programs are designed to meet the needs of farmers but have been slow to include women (Albright, 2006). Women have been excluded from agriculture education network programs, and their experiences have largely been ignored among the broader farming communities. In addition, women feel as though they are not respected as farmers (Charatsari, Papadaki-Klavdianou, Michailidis, & Partalidou, 2013). In local farm community settings, such as meetings or marketplaces, women feel uncomfortable and will avoid asking questions or engaging in conversations (Charatsari et al., 2013).

The ideal family farm in the United States mirrors traditional family structures (Beach, 2013). The man is the farmer and the head of the household; he is linked to the productive labor of the farm (Riley, 2009). The ideal farm woman is the bookkeeper, caretaker, and support for the farm; she is linked to what is referred to as the reproductive sphere on farms (Beach, 2013; Riley, 2009). Thomas Jefferson first idealized rural farm life in the 1700s, strongly believing that family farmers were needed to feed the country, and he continued to promote this agrarian ideology throughout his presidency (Beach, 2013). The agrarian ideology has persisted, primarily supported by white men, and has influenced the development of agriculture institutions, farm policies, and educational network programs (Beach, 2013). Recently efforts

have been made to target women in agriculture education network programs (Barbercheck, 2012; Sachs et al., 2016), but there is still room for improvement (Charatsari et al., 2013).

Annie's Project is one education program that offers courses designed specifically for farm women in the United States. The program was first developed as a combined effort from the United States Department of Agriculture (USDA) and the Risk Management Agency to provide business risk management education for women in agriculture through Iowa State University Extension and Outreach (ISUEO) (Shultz & Anderson, 2016). Since 2003, Annie's Project has grown to serve more than 12,000 women in over 38 states (Schultz & Anderson, 2016). The mission of the program is to "empower farm and ranch women to become better business partners through networks and organization of critical information" (Annie's Project, n.d.).

This thesis focuses on one primary research questions: why is it important to include women in agriculture education network programs? And three follow-up questions regarding the impact of Annie's Project Level I course: 1) How does Annie's Project Level I course assist farm women? 2) What are the outcomes of Annie's Project Level I course? and 3) Does Annie's Project Level I course challenge or reinforce the agrarian ideal of a woman's role on the farm? A review of literature and an independent case study of Annie's Project Level I help to address the questions. This introduction chapter highlights the purpose of this thesis as well as the significance for women in agriculture. I also briefly explain the theoretical framework and research design used for this research.

In Chapter Two, I examine the patriarchal nature of the agrarian ideology in farming and agriculture institutions in the US, and I investigate how women have been excluded in agriculture education. I identify three programs which exist in Iowa and how they assist farm

women: Women Food and Agriculture Network (WFAN), Iowa State University Extension and Outreach (ISUEO) Women in Agriculture, and Annie's Project. I briefly review the goals and purpose as well as some history of each program. The independent case study of Annie's Project is the focus of Chapter 4. I conduct an analysis of Annie's Project Level I course and discuss the outcomes.

Background

Farm women and their contributions are becoming more visible in agriculture (Sachs et al., 2016). In 2002, the United States Department of Agriculture (USDA) Census of Agriculture changed the data collection process to allow for multiple farm operators for the first time (Fenton, Braiser, Henning, 2010). The Census of Agriculture allows for up to three operators to be identified per farm (Fenton et al., 2010). One individual is indicated as the principle operator and the other two as second and third operators (Fenton et al., 2010). The principle operator dedicates 50% or more of their time to the farm operation, and the secondary or third operator runs the day-to-day management decisions of the farm (Fenton et al., 2010). Principle, secondary, and third operators can include owners, tenants, managers, or partners (Fenton et al., 2010). In 1978, the Census began identifying the gender of the principle operator (USDA, 2013). From 1978 until 2002, the number of women farm principle operators went from 5% to 11% (USDA, 2007).

Before 2002, only one individual was identified as the sole, principle operator of a farm (USDA, 2007). By allowing for multiple operators, it has become clear that women have contributed to farms as secondary or third operators (Braiser, Sachs, Kiernan, Trauger, & Barbercheck, 2014). Since 2002, there was a 19% increase in the number of women farm

operators to 30% in 2007 (USDA, 2012). In 2012, women remain 30% of all farmers and 14% of principle operators on 7% of the country's farmland (USDA, 2012). Nearly half of farm women operators are secondary or third operators whose primary role includes reproductive work such as maintaining the business management and financial well-being of the farm, taking care of the home, or working off the farm to contribute extra income or health benefits (Riley, 2009; Fenton et al., 2010). Some women also work as secondary or third operators of owned farmland that is rented out to other primary operators (Duffy & Johans, 2014).

United States' agriculture

Farming in the United States includes a variety of different forms of growing crops and raising livestock for food and materials (AllGov, 2016). The average farm size is 380 acres, and over half of US farms are animal operations such as livestock, dairy production, and poultry (USDA, ERS: Topics, 2016). Crop production is the other type of farming in the United States, and corn is the most widely produced grain in the United States, mostly providing livestock feed (USDA, ERS: Topics, 2016). Farms in the United States are defined as "any place from which \$1000 or more of agriculture products were produced and sold, or normally would have been sold, during the census years" (USDA, ERS: Glossary, 2016).

Family farms is a general concept in "which ownership and control of the farm business is held by a family of individuals related by blood, marriage, or adoption," and are most common in the United States (USDA, ERS: Glossary, 2016). Residence farms generate less than \$350,000 annually, and the principle operator has a primary occupation that is other than farmer. Intermediate farms also generate less than \$350,000 and have the principle operator's primary occupation is farming (USDA, ERS: Glossary, 2016).

Sustainable vs. conventional farming

There are two primary farming practices which impact natural, social, and economic resources differently: conventional and sustainable farming (Sachs et al., 2017). Historically, conventional farming practices are modeled after 20th century industrial production with low cost practices for high rewards (Earles, 2005). Application of chemicals to fight pests and stimulate growth, and the use of large machines dependent on oil to cover as much land as quick as possible made food abundant and cheap for the world (Earles, 2005). However, these practices later came to have negative impacts on the soil and water (Earles, 2005). While most family farms still use conventional farming practices for economic gains, there has been more emphasis on sustainable farming in the US (Sachs et al., 2016).

Sustainable farming, or alternative farming, has been growing in practice after the devastation of conventional farming practices began to be noticed in rural agriculture communities (Earles, 2005). The model of sustainable farming is based on production of food without depleting resources and follows the system of nature where crops and livestock are self-sustaining (Sachs et al., 2016). Sustainable agriculture also focuses on the social and economic impact of agriculture as farms need to be able to provide income to families (Earles, 2005). Sustainable farming operations tend to be smaller and often work directly with local markets and communities, stimulating the social aspect of farming and offering network opportunities for farmers (Sachs et al., 2016).

Agriculture institutions in the United States

United States Department of Agriculture

The USDA is a government agency which oversees the agriculture industry and is responsible for administering programs to help American farmers (AllGov, 2016). The subsidies are used to offer financial assistance to increase farm jobs and infrastructure in rural and agriculture communities in the US (AllGov, 2016). There have been decades worth of controversy over the financial subsidies as they have been unevenly distributed among farmers, including denial of loans and credit to women, African American, Native American, and Hispanic farmers (Jalonick, 2011).

Recently, the USDA responded and began to rectify itself. Under the Obama administration in 2011, the USDA offered \$1.3 billion to settle complaints of women and Hispanic farmers who could prove discrimination (Jalonick, 2011). Complaints were that the USDA denied loans and other assistance that was routinely offered to white, male farmers (Jalonick, 2011). In 2009, the USDA also settled a similar lawsuit with African American and Native American farmers (Jalonick, 2011).

Cooperative Extension Services

Cooperative Extension Services (CES) provide non-formal education to adult farmers and rural communities (USDA, n.d.). More than 100 land-grant colleges and universities bring vital services to farmers, business owners, families, and young people through CES (USDA, n.d.). CES contributes to the success of farms by educating farmers in business management and agriculture sciences and technologies (USDA, n.d.). CES has been partnered with the USDA for

more than 100 years, and has granted universities with funds for research and provided education in agriculture (USDA, n.d.).

CES initially focused on two primary education areas: agriculture sciences and family sciences (Sachs et al., 2016). This separated women from men, prioritizing men in agriculture (productive) and women in family (reproductive) (Sachs et al., 2016; Riley, 2009). While there have been some gains made by women in agriculture sciences, they still lag behind men as researchers and teachers, and their expertise and knowledge is largely ignored (Sachs et al., 2016). There has been little effort from CES or the USDA to include women in agriculture education programs (Trauger, Sachs, Barbercheck, Kiernan, Braiser, Findeis, 2008).

Iowa farm women

Iowa is a prime choice for studying women involved in agriculture. Agriculture is one of the dominate industries in Iowa with 90% of its land being used for farming (Duffy & Johanns, 2014). Many Iowa family farms are conventional agriculture operations (Carter, Wells, Hand, and Soulis, 2017), which uphold traditional agrarian values that ignore the work of women on farms (Charatsari et al., 2013). Iowa's agriculture industry provides food for the country (USDA, 2012), and is a bastion of rural life in the United States that was so idealized by Thomas Jefferson (Beach, 2013).

Agriculture education network programs in Iowa work to engage women in by offering courses and networking opportunities. In Iowa, women make up 25% of farmers and 8% of principle operators (USDA: Iowa, 2012). Although women own nearly half of Iowa's farmland, women farmers operate only 30% of the land (Iowa State University [ISU], 2014). Similar to

national trends, the numbers of women farmers and land owners has remained consistent in the last five years after drastic increases from 2002 to 2007 (USDA, 2012).

There are several active agriculture education network programs, specifically designed for women in Iowa. At Iowa State University Extension and Outreach (ISUEO) office has offered Annie's Project courses to farm women throughout the state of Iowa (ISU, 2015). In 2015, a dedicated Women in Agriculture office was established to offer more network programs for farm women (ISU, 2015). The ISUEO Women in Agriculture offices recognizes the need for agriculture education network programs for farm women in Iowa and the importance of the contributions of women to the success (ISU, 2015). The Women Food and Agriculture Network (WFAN) offers learning sessions for agriculture communities based on what farm women have expressed as important (Sachs et al., 2016).

Annie's Project offers regular courses with ISUEO for farm and ranch women, and the courses focus on empowering women through "networks and by managing and organizing critical information" (Annie's Project, n.d.). Survey data collected before and after each course offers an opportunity to evaluate the impact of Annie's Project courses. Annie's Project Level I course measures the knowledge of participants before and after the course, and the surveys measure the level of satisfaction with the course for meeting the needs of farm women.

Annie's Project was founded in 2002, funded by a USDA initiative to engage women, minorities, and beginning farmers (Sachs et al., 2016). The initiative was partnered with the North Central Risk Management Education Center in Lincoln, Nebraska and focused on providing business risk management assistance for farmers to own their own businesses (Annie's Project n.d.). Business risk management is increasingly important on farms. As farms are increasingly dependent on loans and subsidies from the USDA or other institutions, risk

management has become prioritized for farm business education in order to reduce the chances of financial hardships for farmers and communities (Hambleton Hiens, Beaulieu, & Altman., 2010). Annie's Project Level I course offers business risk management training in several areas: financial, human resource, marketing, production, and legal. All five areas are critical for successful business management on farms (Hambleton Hiens et al., 2010). Originally just one course, it has since grown to offer several different courses in over 25 states and provides network opportunities for more than 5,000 farm women (Annie's Project, n.d.).

Problem Statement

Patriarchal power structures in agriculture institutions reflect the patriarchal nature of the agrarian ideology (Riley, 2009, Beach 2013). The male head of the household on farms is represented as the farmer (Beach, 2013). Farming is closely linked with what it means to be a man, and masculinity is closely tied to farming practices, such as use of heavy machinery and domination over nature (Beach, 2013). In agriculture institutions, the knowledge and expertise of the ideal farmer and what it means to be a farmer are reinforced and disseminated through agriculture education network programs (Trauger et al., 2008).

Discrimination from the USDA, the historical exclusion of women from agriculture education in CES, and the prioritization of men in farming has led to a deeply entrenched patriarchal agrarian ideology (Beach, 2013). Men are more likely to be portrayed as the ideal farmer than women, and the contributions of farm women to agriculture, typically relegated to the home, have gone largely unnoticed (Beach, 2013). Men, especially white men, have much less trouble accessing resources or assistance such as credit or land (Jalonick, 2011). They have

dominated agriculture communities and education network programs, which create barriers for women attempting to gain access to those spaces (Sachs et al., 2016).

Purpose of the Study

The purpose of this research is to investigate why it is important to include women in agriculture education network programs and how they assist farm women in challenging or reinforcing the agrarian ideology. The case study of Annie's Project Level I offers measurable outcomes of the impact of the program. The course is an example of how women are developing their own agriculture education networks and programs for all women in agriculture. The literature review further examines the agrarian ideology, the history of agriculture education, and how women have been overlooked.

Research objective

This research begins with the examination of why agriculture education network programs are needed, and then offers an overview of three different programs for farm women in Iowa. I investigate how programs assist women in their roles in their operations and if the programs are challenging the roles of women within the agrarian ideology. The Annie's Project Level I case study examines one program and its participants. The research explores how Annie's Project Level I assists participants in challenges or reinforces the agrarian ideology.

Research Design

The mixed methods used for the research includes pre- and post-course survey data and interviews of Annie's Project Level I participants. The survey data contained responses from

Annie's Project Level I participants in 28 courses held in Iowa from the years 2013-2015. This data provides measurable outcomes for Annie's Project Level I to help determine the impact of the course on participants. Questions regarding business risk management knowledge in five target topics were identical on both pre- and post-course surveys. Course perception responses were included in the post-course survey to determine the level of satisfaction in Annie's Project Level I efforts to meet the needs of participants. Survey data was cleaned and matched by myself with the assistance of staff members at the Research Institute for Studies in Education (RISE).

In addition, phone interviews were conducted with five women who have participated in Annie's Project Level I in the year 2016. These participants were not selected from the survey data time frame due to their more recent involvement with the course and to ensure their course survey responses were not linked with their interviews. Each of the five women volunteered to participate in the interview process after a solicitation email was sent to all 60 Annie's Project Level I participants who provided an email address in Iowa during 2016.

Theoretical Framework

This research draws from two theories which frame the need for agriculture education network programs for farm women. First, the agrarian ideology frames the history of agriculture in the United States and how women have been systematically excluded from participating in farming communities (Beach, 2013). Agriculture institutions, such as the USDA or CES, have discriminated against women and minorities throughout history, which has contributed to a patriarchal agrarian ideal where farm women have been isolated and ignored in agriculture education (Sachs et al., 2016).

Second, the Feminist Agrifood Systems Theory (FAST) is a framework that examines the response of farm women in their efforts to be involved in agriculture (Sachs et al., 2016).

Women have always played a role on farms, but as gender roles are being called into question in the United States, so too, the agrarian ideology is being challenged by farm women (Beach, 2013).

The FAST framework highlights the barriers women face and how they are creating space for women farmers in sustainable agriculture communities and by developing agriculture education network programs for women farmers (Sachs et al., 2016). These two frameworks link the historical exclusion of farm women and the current efforts to target women in agriculture education network programs.

Agrarian ideology

The idealization of the family farm has established the patriarchal structure of agriculture in the US (Beach, 2013). The ideal farmer is strong, independent, powerful over nature, and male (Beach, 2013). The work of the farmer is in the productive sphere of the farm (Riley, 2009). Men belong in farming, and their knowledge and expertise is shared through agriculture education (Beach, 2013). The ideal farm woman is commonly referred to as the farm wife, and her work tends to remain in the reproductive sphere of the farm (Beach, 2013; Riley, 2009). The reproductive work includes bookkeeping, running errands, taking care of the home and family, and filling in when needed in the field (Beach, 2013). Women who are farmers transgress the ideal simply by being women (Braisner et al., 2014). Conventional farms and practices, domination over nature, high profits for low costs which reflect the patriarchal industrial models of business, and the male farmer uphold the agrarian ideology (Earles, 2005; Beach, 2013).

Farm women are faced with unique barriers which are reinforced by the persistence of the agrarian ideology, (Sachs et al., 2016), including access to agriculture education network programs. Women often feel unwelcomed in agriculture spaces and are not given the chance to ask questions or share their experiences with others because they are not, or do not feel as, respected as farmers (Albright, 2006). Agriculture education network programs designed for farm women help women to overcome barriers and to fully participate in their farm operation and have their contributions be acknowledged (Sachs et al., 2016).

Feminist Agrifood Systems Theory

The FAST explores the changes in agriculture, the rise of women participating in sustainable agriculture, and specifically how women are overcoming the challenges they face in agriculture communities (Sachs et al., 2016). The FAST highlights that women are finding and creating space in alternative or sustainable farming rather than the conventional farming, which is less welcoming of women farmers who challenge the agrarian ideal of a farmer (Sachs et al., 2016). The framework outlines six key principles to the FAST: “1) to create gender equality on farms, 2) assert the identity of farmer, 3) access to resources by pursuing innovative ways to access land, labor, and capital 4) shape new food and farming systems by integrating economic, environmental, and social values, 5) negotiate their roles in agricultural organizations and institutions, and 6) form new networking organizations for women farmers” (Sachs et al., 2016, p. 2).

The sixth principle highlighted in the FAST is the focus of this research project. Women want to participate in educational programs but have limited time, are not taken seriously, or are unwelcomed in the greater agriculture community (Albright, 2006). There is a need for network

organizations, including agriculture education for women involved in farming (Sachs et al., 2016). The framework will help to link this research to the agriculture community and determine if it is important to offer courses for women in agriculture.

Assumptions & Limitations

Some assumptions made in this project are that participants in Annie's Project Level I want to participate because they begin with limited knowledge of business risk management knowledge. The pre-course survey responses indicate that there is a low level of understanding in all content areas. It is also assumed that participants answer both the pre-course and post-course surveys honestly to demonstrate whether they did experience knowledge changes because of the course materials, presentations, and other curricula.

Limitations include possible bias due to my connection to Annie's Project as an external evaluator. While I am not directly compensated by Annie's Project, I am invested in the success of the program. I do not personally know any of the interview participants, and survey respondents were given randomly assigned codes before submitting completed surveys to ensure anonymity. I use a gatekeeper, an Annie's Project Level I facilitator and Iowa State Extension agent, to obtain email addresses of participants to solicit volunteers for interviews.

The scope of this project only examines Annie's Project Level I participants from Iowa, and the results of the case study are not generalizable and are applicable specifically to Annie's Project. The research can inform studies with the goal of examining why it is important to educate farm women. The information does contribute to the broader literature regarding the importance of agriculture education programs and gives an example of best practices for addressing the needs of women in agriculture. Also, Annie's Project Level I targets women

involved in agriculture as operators, farm supports, and land-owner/non-operators (Annie's Project, n.d.), meaning that the significance is not specific to women farmers or primary operators.

Conclusion

This introduction chapter provides an overview of the research for this thesis. I began by highlighting the history of the agrarian ideology and why the contributions of women have been overlooked in agriculture institutions. I highlighted the important aspects of the theoretical frameworks to be used as a lens for the research and the research design. I introduced Annie's Project Level I course, which will be the topic of the case study provided in Chapter 4. I discussed the limitations and assumptions of the research which may influence the outcomes of this study.

In the next chapter, I conduct an in-depth literature review. I start with an examination of the patriarchal agrarian ideology and how women are affected. I then go into more detail of the FAST framework and discussion of the history of agriculture education programs. I highlight how women have responded by developing their own networks and programs and how those programs assist farm women. Chapter 3 will focus on the methods used for this study. I use a mixed methods approach, and I explain the rationale and procedures implemented. Chapter 4 provides an analysis of the survey data and interviews as well as a discussion of the results. The discussion relates the results to the theoretical framework and relevant literature, and provides a critical perspective of agriculture education network programs for farm women. Finally, Chapter 5 concludes this thesis with a summary of the research and recommendations for policy and future research.

CHAPTER 2

LITERATURE REVIEW

Introduction

In this literature review, I discuss the patriarchal agrarian ideology that has influenced agriculture and is upheld in agriculture institutions, such as Cooperative Extension Services (CES) and the USDA, and the challenges that have presented barriers to women in agriculture. I examine in more depth how women have not been included in agriculture network programs and how women are responding. I give an overview of three different programs in Iowa and how they each address the needs of farm women through network programs. This chapter frames the primary research question introduced in Chapter 1: why is important to include women in agriculture education network programs?

Agrarian Ideology

In US agriculture, the agrarian ideolgoy values men and their contributions and largely ignores women (Beach, 2013). Within the agrarian ideology, the contribution of women is viewed as limited to reproductive sphere or off-farm work (Riley, 2009; Barbercheck et al., 2012). The farmer is strong, independent, powerful over nature, and male; he also primarily contributes to the productivity of the farm (Beach, 2013; Riley, 2009). There are several ways the agrarian ideology continues to reinforce the patriarchal structure of agriculture institutions.

There are four are primary issues that create barriers to women in agriculture that are persistent in conventional farming practices and reinforce the agrarian ideology: 1) the persistent legacy of patriarchy on family farms, 2) substantial financial barriers for entry into conventional

commercial agriculture, 3) increased use of capital-intensive technologies on commercial farms, and 4) the enduring sexism in agriculture institutions (Sachs et al., 2016). Each of these issues lead to the patriarchal agrarian ideology which promotes men as the ideal farmer, isolates women, ignores their contributions, and emphasizes domination over nature with conventional farming practices (Sachs et al., 2016; Beach, 2013). These barriers have kept women from being able to fully participate in agriculture and the educational network programs (Trauger et al., 2008).

First, the persistent legacy of patriarchy on family farms, the male head of the house as farmer, has led to patriarchal farm ideals and practices which reproduce and maintain barriers for women to enter and be heard in many agriculture spaces (Sachs et al., 2016), such as agriculture institutions and education network programs. Agriculture institutions continue to be male-dominated, and most of the men and many women involved adhere to patriarchal systems within agriculture (Sachs et al., 2016). Although some changes have and continue to occur, the dominance of men and masculinity on farms is a key feature of conventional agriculture in the US (Sachs et al., 2016).

Second, United States commercial agriculture is economically dominated by an emphasis on large-scale commodity production, which present substantial financial barriers to farming (Sachs et al., 2016). The industrial farming system of conventional farming increases commercialization, production, availability, and affordability of agriculture technologies (Sachs et al., 2016). Large-scale commodity production requires considerable capital investment for equipment, buildings, and high inputs of fertilizer, chemicals, and fuel (Earles, 2005). Many farmers, conventional and sustainable, obtain access to land and capital through family inheritance (Riley, 2009). For women, the barriers of obtaining land and capital are particularly

high as they are less likely to inherit the farm or must enter difficult negotiations with family members for land access (Sachs et al., 2016).

Third, increased use of machinery and advanced technologies on conventional farms increase the barriers women face (Sachs et al., 2016). Agriculture technology and masculinity are strongly linked, and the tractor stands as the symbol of male identity and farm masculinity (Beach, 2013). Farm machinery still demarcates men and women's work, and women are linked to the farm based on their relationship to the farmer as the farm wife, daughter, or mother (Beach, 2013). Many women lack training in using and repairing machinery which presents a barrier for others to see them as farmers as well as for them to see themselves as farmers (Sachs et al., 2016).

Finally, the enduring sexism in agriculture institutions, such as the USDA and CES, have been slow to include women in their programs. This results in a lack of recognitions of women as farmers, unwelcome attitudes towards women in male dominated spaces, and assistance that would meet their specific needs (Sachs et al., 2016). In Trauger's (2004) analysis of women in sustainable agriculture, she cited respondents feeling like they were not taken seriously. One respondent in Trauger's (2004) study commented how farmers let her know that she was transgressing into a space where she was not seen as an equal. This same respondent mentioned that other farmers expected her to be ignorant of legitimate farm business practices (Trauger, 2004).

However, many women do not identify as farmers or operators and primarily only contribute to the farm work during the busy times or when needed to fill in (Braisier et al., 2014). Women will often gain access to farming through marriage and will define their role as farm wife (Braisier et al., 2014). Women gain prestige and respectability within farming communities

from their roles as the farm wife especially in conventional farming communities (Braiser et al., 2014).

Feminist Agrifood Systems Theory

Women are creating new spaces for themselves in agriculture and taking advantage of sustainable farming communities to find a more welcoming environment than in conventional farming communities (Sachs et al., 2016). Carolyn Sachs and her colleagues from the University of Pennsylvania wrote the book “The Rise of Women Farmers and Sustainable Agriculture” (2016) and introduce the Feminist Agrifood Systems Theory (FAST). The framework was developed as a means for understanding why women face barriers in agriculture and how they are overcoming those barriers (Sachs et al., 2016). The framework focuses on the changing gender relations in the United States while simultaneously examining the rise of women’s participation in sustainable agriculture (Sachs et al., 2016).

The FAST has studied one group, farm women, which differs from the mainstream population of agriculture and has attempted to make themselves known and their contributions visible (Sachs et al., 2016). The FAST helps to explain the phenomenon as well as predict the outcome of the success of farm women (Sachs et al., 2016). Although not all farm women explicitly define themselves as feminist, or as sustainable farmers, many support principles such as mutual support and equal treatment of farm women (Sachs et al., 2016). The theory can help to offer a framework for other groups attempting to break into mainstream agriculture structures (Sachs et al., 2016).

The sixth principle of the FAST focuses on how women are developing agriculture education network programs to address the needs of farm women in the US. These differ from

other agriculture networks because of their direct emphasis on including the voices of women farmers to establish the networks' agendas, to promote gender equality in agriculture, and to gain recognition of their members as producers and operators (Sachs et al., 2016). These new networks offer knowledge and skill building opportunities and a network of women with ideas that have been tested on their own farms (Sachs et al., 2016). They also offer social support that can alleviate isolation, legitimate women's identities as farmers, and increase their capacity as farmers, ultimately enhancing the success of women's farm businesses (Sachs et al., 2016).

Agriculture Education

The Smith-Lever Act in 1914 established Agriculture and Home Economic Extension Services with the purpose of providing practical and scientific education to farmers and homemakers and were divided into two spheres – the farm and the home (USDA, n.d.). Men were targeted for the farm programs (productive) and farm women for the home programs (reproductive) (USDA, n.d.; Riley, 2009). The USDA recognized the importance of farm women to the farms but failed to recognize that farm women's work extended beyond the confines of the home (Sachs et al., 2016). Cooperative Extension Services (CES) and the USDA continue to divide their programs into agriculture and family and consumer science, and some level of separation of programs for men and women continues with a lack of adequate programs addressing the needs of women farmers (Sachs et al., 2016).

Women are cautious about entering agriculture education spaces due to their disadvantaged status within agriculture institutions, which neglect to take into consideration the barriers women farmers face who participate in off-farm work or other reproductive work in addition to their work for the farm (Charatsari et al., 2013). Women have been involved in the

development of their rural and farming communities for generations, but there is still a lack of understanding of the problems women face (Albright, 2006). CES or the USDA network programs require a level of expertise from instructors that has been unavailable to women in the past (Sachs et al., 2016). Women are not viewed as experts in the field regardless of their experience in farming, and the lack of attention to the challenges unique to women in operating a farm are not viewed as legitimate concerns to address in most CES and USDA education programs designed for farmers (Trauger et al., 2008).

In 2008, the US Congress passed a bill to assist women farmers, which offered \$75 million to develop education, training, outreach, and mentoring programs to new and beginning farmers, and some funds are specifically targeted to provide education for women farmers (USDA, n.d.). Direct competitive funding from these various agencies within the USDA has helped establish agricultural networks to provide education for women farmers (Sachs et al., 2016). Programs for women farmers developing across the United States are still frequently constructed and distributed by men (Sachs et al., 2016). Annie's Project is one program using funds from the Risk Management Agency of USDA, in conjunction with CES, to develop and offer business risk management training for farm women (Annie's Project, n.d.).

However, many agriculture institutions within the USDA and CES still remain largely intransigent to shifts toward gender equality and entrenched in patriarchal ideologies and practices (Sachs et al., 2016) despite the noted exception from the USDA to target more farm women. Agrarian ideals continue to be upheld by conventional farming, reinforcing established barriers for women to enter or be represented in agriculture (Sachs et al., 2016). The exclusion of women from agriculture education network programs has presented an opportunity for women

farmers to create their own education programs that are specifically tailored to meet the needs of farm women and address the challenges that women face (Sachs et al., 2016).

Women farmers & agriculture education program networks

Women are taking on more leadership roles and forming new programs and organizations (Albright, 2006). According to the FAST principle highlighted above, women are working together “to support their experiences as women, farmers, and entrepreneurs” (Sachs et al., 2016, p. 146). This section will examine three programs in Iowa targeting farm women. Agriculture education network programs such as Women Food and Agriculture Network (WFAN) and Annie’s Project have been developed and are passing on the knowledge specific to women farmers for other women farmers, addressing the unique needs and challenges of being a women farmer, and providing legitimacy and recognition to women farmers (Charatsari et al., 2013). The diffusion of knowledge is key for women to succeed in their roles as farmers; the programs can prepare them to take on a stronger leadership role on their farms (Charatsari et al., 2013). The use of women’s knowledge in the development of the programs is important for other women farmers to learn more of the challenges and experiences of other women (Charatsari et al., 2013).

Women Food & Agriculture Network

WFAN was founded in 1994 as an attempt to illuminate the voices of women in agriculture (Carter, Wells, Hand, & Soulis, 2017). The program focuses on serving women in sustainable agriculture while remaining situated in the state of Iowa where conventional agriculture practices still dominate (Carter et al., 2017). Initially, a pilot program focused on

bringing women together in conversations and peer-to-peer learning (Carter et al., 2017). These conversations launched what has become two of the most popular programs offered by WFAN: Women Caring for the Land (WCL) and Harvesting Our Potential (HOP) (Carter et al, 2017).

The programs exist to “elevate women and gender-focused programs to achieve systematic change” where the agrarian ideology reinforces power structures (Carter et al, 2017, p. 227). WCL and HOP are two very similar programs but target different audiences of women. WCL is focused on including women, non-operator land owners in the state of Iowa in discussions of land conservation. HOP matches experienced farm women with beginning farm women involved in non-conventional agriculture (Carter et al, 2017). Both programs focus on fostering a safe space for women and building confidence in local agriculture community settings (Carter et al, 2017).

By offering a space for women to voice their concerns, farm women are demanding respect and making decisions on their farms (Carter et al., 2017). Power structures are challenged when women take a stand and voice their own demands in the best interest of their farms (Sachs et al., 2016). WFAN has existed in Iowa for nearly 25 years, and women continue to support the program as participants, mentors, board members, and educators. As WFAN grows and the demands of farm women change or become clearer, the program continues to evolve to meet the needs of the community (Carter et al., 2017).

Iowa State University Extension and Outreach: Women in Agriculture

ISUEO Women in Agriculture was established in 2015 and is modeled after the success of Annie’s Project. The mission of the department is “to improve the quality of life in Iowa by providing research-based educational programs that expand agricultural enterprise, improve

natural resource management, and support the community of women in agriculture” (ISUEO, 2015). Women in Agriculture has expanded to offer multiple educational opportunities and connect farm women across the state of Iowa.

Local courses, including Annie’s Project, are offered through extension offices around the state (ISUEO, 2015). Peer groups and on-line learning also have been developed in order to best engage farm women, and program evaluation is consistently used to assist in the development of stronger and more effective curriculum as interests and needs of farm women emerge (ISUEO, 2015). ISUOE Women in Agriculture also has a heavy focus on communication and networking for farm women in Iowa. Online social networking and a new branding and marketing campaign has been rolled out to attract more farm women to their programs (ISUEO, 2015).

ISUEO Women in Agriculture, like WFAN, is situated in a part of the United States which is heavily influenced by conventional farming practices. While programming is used to emphasize financial, social, and ecological sustainability, often participants are involved in conventional farm operations (ISUEO, 2015). This does not directly challenge the agrarian ideology but offers a space for the voices of women within conventional agriculture communities – both locally and state wide (Sachs et al., 2016). This differs from WFAN in several ways, most notably that WFAN’s Harvesting Our Potential specifically targets women in sustainable agriculture, and emphasizes peer-to-peer mentoring of productive farm work (Carter et al., 2017; Riley, 2009). ISUEO Women in Agriculture extends programming to women in different kinds of farming operations; however, the agrarian ideology persists through the programs offered. Business and financial management and marketing courses reinforce the reproductive work that women participate in on their farms (ISUEO, 2015; Riley, 2009).

Annie's Project

In 2015, after nearly 15 years of being based out of Iowa State University, Annie's Project established itself as a non-profit organization. More courses were developed and offered in 38 states around the country, including Annie's Project Level I course (Annie's Project, n.d.). Like WFAN and ISUEO Women in Agriculture, Annie's Project provides access to agriculture education and a space for women to voice their concerns and share their experiences with other women (Hambleton Heines et al., 2010).

Annie's Project Level I course is focused on business risk management, initially funded by a grant from the Risk Management Agency and the USDA (Annie's Project, n.d.). While Annie's Project does not focus on physical farming work, business risk management is a topic relevant to all farmers in Iowa. Many farm women in Iowa continue to participate in reproductive farm work, which includes business management. Access to the knowledge provided by Annie's Project is important for the success of farms.

Another course offered by Annie's Project is called Managing for Today and Tomorrow (MTT), which focuses on transition planning and retirement. This course was initially developed as a follow-up to Annie's Project Level I to address more specific financial skills in regards to planning for the future of farms (Annie's Project, n.d.). Many families struggle with proper transition planning as farmers age, and MTT helps women gain the skills and confidence necessary to facilitate conversations with their partners and children about the succession of their farm land and operations (Schultz et al., 2015).

Conclusion

This literature review helped to uncover the challenges women farmers face in agriculture. Women are often not seen as farmers or taken seriously as farmers in the broader agriculture communities, and they have historically been excluded or overlooked in the development and implementation of agriculture education programs and networks. It is important to recognize these challenges in order to help support women farmers and address their specific needs within the farming community. Each of the programs discussed emphasize a peer-to-peer relationship and the sharing of expertise and knowledge (Sachs et al., 2016). It is important to farm women to have hands-on, interactive experiences in agriculture education as well as critical information for the success of farms on “production, business management, and social sustainability” in their programs (Barbercheck et al., 2007, p. 66). Programs developed for farm women emphasize the experience and labor of women on farms (Wells, 1998). The existence of these programs helps to dispel the traditionally silent role of women farmers (Shortall, 1994).

Participation in farm programs has helped women farmers become more confident in their work and production (Sachs et al., 2016). Women have historically been more willing to participate in education programs than men, and this is evident in their desire to become more visible and to be taken seriously (Albright, 2006). WFAN’s Women Caring for the Land brings women together to empower them to make decisions about their farm land. While many of the women are not operators on their farms, they have been recognized as the primary decision makers for the land they own through the listening sessions offered by WCL (Carter et al., 2017). Many of the participants share similar experiences of being ignored or even taken advantage of by men who operate their land, and the listening sessions emphasize these shared experiences

and develop techniques for women to overcome the challenges they face (Carter et al., 2017; Sachs et al., 2016).

Agriculture education programs can increase the efficiency of farms, and women are motivated to participate in programs designed to meet their unique needs as women (Hambleton Heins et al., 2010). Annie's Project provides the necessary information for the success of farm businesses. As business risk management becomes increasingly important in the success of farming operations, and women tend to already be involved with the business management of their farms (Hambleton Heins et al., 2010; Braiser, 2008). Targeting women for the course helps to support farm women but reinforces the ascribed reproductive role of women on farms (Hambleton Heins et al., 2010; Riley, 2009).

Women farmers develop networks to intentionally focus on accessing the resources they need to successfully overcome the challenges that all farmers face as well as those they face as women (Sachs et al., 2016). These networks provide access to new ideas from other women farmers and social support that can alleviate isolation, legitimate women's identities as farmers, increase their capacity as farmers, and, as a result, enhance their farm businesses (Sachs et al., 2016). ISUEO Women in Agriculture provides these important networking opportunities for farm women around the state of Iowa, and through different programming initiatives, women are able to connect to each other and to reinforce their position and be taken seriously in their communities (ISUEO, 2015). The ISUEO Women in Agriculture networks support women in many different aspects of farming (ISUEO, 2015). The traditionally silent role of women is challenged as women come together and become more visible in their communities; however, there are still few programs offered which help support women in the productive work on farms (ISUEO, 2015; Riley, 2009).

The next chapter will discuss the methods used to investigate an agriculture education program for women in Iowa. It is a case study of Annie's Project Level I course. It also addresses the follow-up research questions: 1) How does Annie's Project assist farm women? 2) What are the outcomes of Annie's Project? and, 3) Does Annie's Project challenge or reinforce the agrarian ideal of a woman's role on the farm? The case study is an example of how one program is including farm women in agriculture education network programming. The research examines the need for programming, the impact, and the importance for participants to be included in agriculture education network programs designed specifically for farm women.

CHAPTER 3

METHODS

Introduction

This research design originated from a desire to understand why it is important for farm women to participate in agriculture education network programs. The case study of Annie's Project investigates why programs should be designed to meet the needs of farm women. A mixed methods approach is used to examine the impact of Annie's Project Level I course on farm women participants. Quantitative survey data and qualitative interviews were combined to give a more holistic understanding to the importance of Annie's Project Level I course.

I begin a brief literature review and justification for the mixed methods design and follow with a discussion on the validity, reliability, and generalization. I break down the methods used into two parts. I first focus on the quantitative data from the Annie's Project Level I surveys from 2013-2015. Then, I discuss the qualitative data derived from interviews conducted with Annie's Project Level I participants in 2016. I include information on the participants as well as the rationale behind their selection, the materials used, and the procedures of each method. I conclude this chapter with a discussion on the potential bias and ethical issues to consider.

Research Design

A mixed methods approach is used, which combines qualitative and quantitative components, to gain a more holistic understanding of the data from collection and analysis. Mixed methods offer an alternative paradigm to qualitative and quantitative paradigms (Johnson,

2007), and by combining surveys and interviews for the research design, the methods are complementary (seeking elaboration, enhancement, or clarification), developmental (using the results from one method to inform the other), and expansive (expanding the range by using different methods for different inquiries) (Greene, Caracelli, & Graham, 1989).

The objective of the research design was to understand the need for including women in agriculture education network programs by examining the knowledge changes of Annie's Project Level I participants and why a program designed to meet the needs of farm women was important. Survey data provides a measurement for the changes in knowledge because of participation in Annie's Project Level I. The interviews were used to elaborate on the experiences of the participants. They were developed based on the survey responses to help understand the roles of women on their farm operations, the challenges of being a woman in agriculture, and how participation in Annie's Project Level I helped to address those challenges. Finally, both methods expand the scope of the project to determine the value of Annie's Project Level I in contribution to the broader research (Greene, Caracelli, & Graham, 1989). The interviews offered input from individual participants on specific experiences in agriculture and with Annie's Project that was not available in the survey data alone.

The combination of both surveys and interviews did not limit this study to only one source of information, but rather, the quantitative data helped to inform the development of the interview protocol (Appendix C). The qualitative data filled in gaps that could focus on the challenges, how they are addressed, and the lasting impact of Annie's Project Level I. The interviews provided validity to the survey, corroborating the survey data that the program was valuable and addressing some of the challenges women face in agriculture education network programs (Johnson, 2007). At the analysis stage, the quantitative data is helpful in generalizing

the qualitative findings or finding new insights that could help to improve future assessment (Johnson, 2007).

Validity and reliability

Validity in this project refers to the credibility of the data used (Trochim, 2006). Annie's Project uses an external evaluator for each course which increases the validity of the survey data (Trochim, 2006). The survey instrument was developed to measure the impact of the course and is used for each course offered by Annie's Project. The interviews helped to bolster the validity of the survey as the participants confirmed the impact and importance of the course (Johnson, 2007). The reliability of the project was evident in the ability for this research to be replicated for other courses offered by Annie's Project or similar programs. The procedures and the analysis used are provided in detail. The survey instrument was developed for analyzing the impact of all Annie's Project courses and can be used as a framework for development of tools for use in the future (Leung, 2015).

Annie's Project Level I

Annie's Project Level I is one course offered by Annie's Project that will be the case study of this research. The course takes place in six, three-hour sessions over the span of six weeks (Annie's Project, n.d.). Each week covers one of five business risk management areas: financial, human resource, legal, marketing, and production. The first week is dedicated to exploring network resources online and building communication skills. The business risk management topics included in Annie's Project Level I course were identified as important after review of the needs of women in agriculture by the founders of Annie's Project (Hableton

Heines et al., 2010). All areas focus on successful business risk management of farm operations. As the contributions of women become more visible, the need for educational programming in business risk management is apparent (Schultz, Anderson, Eggers, Hambleton, & Leibold et al., 2016). Business management is one of the roles which fall in the reproductive sphere of farming and quality educational programs can help to support women in agriculture (Riley, 2009; Hambleton Heins et al., 2010).

Annie's Project Level I facilitators are experienced farmers, both men and women, who are involved in the CES offices in each state. They have experience with the challenges and needs of women farmers (Schultz et al., 2016). Guest speakers from the local community are invited to share about resources available to farmers throughout the course (Schultz & Anderson, 2015). The participants also are given time during the class for hands-on work for developing business plans, search markets, and explore organizations, such as the Farm Service Agency and the Natural Resource Service Council (Hambleton Heins et al., 2010).

Annie's Project Level I course focuses primarily on the business risk management skills necessary for a successful farm operation (Hambleton Heins et al., 2010). The course creates an atmosphere based on several core values: "teach agriculture business risk management in each of the key areas of finance, human resources, legal, marketing, and production; invite local women service providers to serve as guest speakers, allocate half of class time for discussion and hands-on activities, provide unbiased research, and create a collaborative learning environment" (Schultz et al., 2016, p. 17).

Quantitative methods

The goal of Annie's Project was to empower women in agriculture (Annie's Project, n.d.) and the survey is an evaluative instrument (Appendix A & B) to determine the effectiveness of the course. The pre- and post-course surveys were used by all Annie's Project courses to assess knowledge and practice changes in business risk management, gain feedback from participants, and measure how successful Annie's Project courses meet the needs of participants. In this study, it was used to measure the knowledge of participants in business risk management and the effectiveness in meeting the needs of participants.

Annie's Project Level I facilitators distributed a standard pre- and post-course survey to all 28 courses in 2013 until 2015 in Iowa. Each facilitator was encouraged to use the standard survey to best compare and aggregate data from across the state. Each course ranged from six to 30 participants. A total of 451 participants responded to the pre-course survey, and 412 completed the post-course survey, which is a 91% course completion rate. Surveys were administered during the first and last sessions of the course. Surveys that were unable to be matched or contained missing data were dismissed from the sample to ensure accurate analysis matching data sets. A total of 354 pre- and post-course surveys were matched based on randomly assigned alpha numeric codes given to each participant.

The 2013-2015 data set was chosen for this project to maintain consistency of the outcomes in content knowledge and satisfaction as well as to offer the most recent and broadest scope of the impact. Prior to 2013, a different survey instrument was used, and in 2016 a new survey was developed, neither of which could be aggregated with the 2013-2015. My role as a graduate research assistant for RISE allowed me to work with Annie's Project as an external

evaluator, providing reports and analysis as well as presentations using the pre- and post-course data. I worked to aggregate, clean, and analyze the 2013-2015 pre- and post-course data.

Participants

Annie's Project Level I targeted women who are involved in agriculture and who have an interest in the business management of their farm operation (Annie's Project, n.d.). Annie's Project refers to its participants as farm or ranch women, including all women involved in any type of farming operation. A review of demographic data revealed that all participants are women involved in farming enterprises in Iowa from 2013-2015. Table 1 shows the breakdown of land owned, operated, and rented by participants. Nearly 70% of participants own and operate their own land, 32% percent cash rent land to another farmer, and 15% share rent land, meaning they share in the profits of the operation but do not operate the land themselves. Another 15% rent land from another owner and operate the land themselves. Participants could be involved in any combination of the above-mentioned operations as some owned land could be operated by the owner and some rented out.

Table 1. Percentage of Land Owned & Operated

Own & Operate Land	n=354	70% (248)
Cash Rent to Another Farmer	n=354	32% (113)
Share Rent	n=354	15% (53)
Rent	n=354	15% (53)

More than half are on farms of 180 acres or larger with the majority farming on 180-499 acres of land, and more than half are working on family or individual farms. Table 2 shows the breakdown of the number of acres participants farm. Women ranging from 25-95 years of age participated. Less than half were under the age of 45, and 25% were between 45 and 55. Many

women were participating in their farming operation for less than ten years. Table 3 shows the breakdown of the ages of participants.

Table 2. Acres owned and operated by participants

1-9 Acres	n=354	15 (4.2%) (15)
10-49 Acres	n=354	12 (3.4%)
50-179 Acres	n=354	46 (13%)
180-499 Acres	n=354	94 (26.6%)
500-999 Acres	n=354	85 (24%)
1000-1999 Acres	n=354	64 (18%)
2000 or more Acres	n=354	27 (7.6%)
Not applicable	n=354	11 (3.1%)

Table 3. Ages of participants

Under 25	n=354	22 (6.1%)
25-34	n=354	66 (18.5%)
35-44	n=354	64 (18.2%)
45-54	n=354	83 (23.4%)
55-64	n=354	86 (24.6%)
65-74	n=354	26 (7.2%)
75 and older	n=354	7 (2.0%)

Surveys

The pre- and post-course surveys are used to best determine the changes in knowledge that participants experience in Annie's Project. For this research, they are used in order to examine if there is a need to include women in agriculture education network programs. The survey data explores the existing knowledge of participants and compares the results to their knowledge after the six-week course. I also use the survey data to determine the level of agreement with how participants perceive the values of the course, such as providing a safe and comfortable atmosphere.

Survey data is collected and managed by RISE, and pre- and post-course reports are generated for each Annie's Project course offered. The data is used to help facilitators determine the impact of their course, the needs of their participants, and what changes might need to be

made in the future. Facilitators for each course were provided with a link to a Qualtrics (2017) online survey distributed by RISE staff. Each facilitator had the option to print paper surveys or have the participants complete both pre- and post-course surveys on a computer. Paper surveys were mailed back to RISE to ensure consistency in the data entry and to maintain participant confidentiality. Post-course surveys were distributed to participants after the completion of the six weeks in the same format as the pre-course surveys.

The surveys focus primarily on business risk management knowledge and practices of the participants. There was a variety of questions for each topic area (financial, human resource, marketing, legal, and production) that were identical on both the pre- and post-course surveys. Knowledge responses are based on a Likert scale of 1-4: one stating “I know little or nothing about this” and four stating “I am completely familiar about this.” Both pre- and post-course surveys ask a total of 26 questions in the five business risk management topics covered in Annie’s Project Level I: financial (nine questions), human resources (five questions), legal (three questions), marketing (four questions), and production (seven questions). Questions were aggregated by topic, and means were determined for each question (See Appendix D for individual topic questions).

Another section of the survey focused on the level of agreement of participants that the course met their needs. This was labeled in the survey as “Perception of Course Values.” This section included questions regarding the purpose of Annie’s Project, such as “the course provided a safe a nurturing environment for learning” and “the course offered enough time for discussion and interaction with other participants.” The survey data from the “Perception of Course Values” questions evaluates whether Annie’s Project supports the needs of farm women.

Information gained will help determine whether there is a need for farm programs for women and if women are benefiting from those programs.

Procedures

The procedures used in this study focused on analyzing the knowledge responses of the Annie's Project Level I survey and course perception questions to determine the impact of the course. Survey data for courses held in Iowa from 2013-2015 was downloaded from Qualtrics Survey Software into IBM SPSS (Version 24) by staff at RISE. All data were de-identified using the assigned code for each participant, and no personal information of any participants was stored in SPSS. Once in SPSS, pre- and post-course data were matched using pre-assigned ID codes. Surveys were not used if they did not have matching pre- and post-course ID codes because they could not be used to demonstrate changes in knowledge.

Topic, or construct, means were then determined based on the means of each question per topic (financial, human resource, legal, marketing, and production). Constructs were created based on each topic area, and construct means were used to compare pre- and post-course knowledge changes in each topic (DeVellis, 2017). A total of 353 surveys were matched for financial, human resource, and legal construct means; 351 were matched for the marketing construct mean, and 352 were matched for the production construct mean. Individual topic questions that did not include all responses for each pre- or post-course survey were not calculated into the individual question means in order to ensure an accurate calculation of construct means. Construct means were created to compare pre- and post-course knowledge changes based on each topic area rather than each individual question. The individual questions underline each topic construct and are used to measure the overall topics, such as financial

knowledge, or the unobservable construct variable (DeVellis, 2017). The questions allow for each construct to be assessed using the pre- and post-course means of each topic construct to gauge changes in knowledge through the length of the course (DeVellis, 2017).

Analysis

The analysis of the survey data for this research was done using SPSS. Construct means and standard deviations of knowledge were compared using a matched t-test to determine statistical significance in the changes in farm knowledge by participants (Howell, 2013). This analysis offers an examination of the impact of Annie's Project on the knowledge of participants. Using pre- and post-course survey data, comparisons can be made between the initial levels of knowledge of participants before the course and the changes, or gains, in knowledge as a result of participation in the course. The changes in knowledge determine the effectiveness of the course. Means and standard deviations were calculated to determine the level of agreement of participants on their satisfaction with the course. Missing variables were not calculated into the individual question means.

Qualitative methods

Greater understanding of the importance of Annie's Project Level 1 is gained through discussion as well as the individual experiences and challenges of the interview participants (Ritchie & Ormston, 2013). The survey data alone could not offer insights into the experiences of farm women in their farming operations. Phone interviews were conducted to understand the experiences and challenges of farm women. Interviews allowed for others to understand the experience of participants (Yeo, Legard, Keegan, Ward, McNaughton Nicholls, & Lewis, 2013).

Interviews were chosen in order to determine if the roles, challenges, and experiences of Annie's Project participants reflected the experiences of farm women in the literature. Participants were asked about their roles and responsibilities on their farming operations, what challenges they face as a woman in agriculture, and the importance of participating in Annie's Project Level I.

Interview participants

An email was sent to all 2016 Iowa participants in Annie's Project Level I, requesting volunteers to respond to a phone interview. Five women responded with interest, and phone interview times were set up individually. There were no conditions other than having been an Annie's Project participant in 2016. This was done to limit the research project to a case study of only Annie's Project and the participants. All five women were involved in single or family farming. The decision to use participants from 2016 was made so that the women interviewed would be more likely to remember their experience with Annie's Project, and participants would not be linked to their survey responses. Four out of five were partnered operators with their husbands, and one stated she was the primary operator. Selection of participants was done on a voluntary basis.

Phone interviews

Each interview was scheduled via email with the respondent. They lasted anywhere from 15 to 30 minutes depending on how much each respondent wanted to share. The interviews were broken into four parts. Part One began with some general information regarding the type of farm operation, the individual's primary role on the farm, and at what point and how they came to be involved in their operation. Part Two included questions regarding their experiences on their

farm, particularly how they felt about their roles. Participants were asked if they felt like women experience challenges in agriculture and to share any experiences they might have had. In Part Three, participants were asked about their time in Annie's Project Level I course. They were asked why participating in a course designed for women in agriculture was significant. They also were asked if Annie's Project Level I addressed the challenges they felt women experience in agriculture. Finally, Part Four encouraged participants to share any final thoughts or suggestions for farm programs for women in the future.

More exploration on the roles and experiences of farm women was needed to investigate why women need to be included in agriculture education network programs. The interview questions were developed to examine the roles of women on farms and if those roles reflect the roles of other farm women in Iowa and the US. Questions regarding the challenges women face in farming were asked to see if they are similar to those addressed in research, such as feeling disrespected as a farmer or not being taken seriously as a farmer. Overall, the interviews were able to provide additional feedback for whether it is important to include women in agriculture education network programs.

Procedures and analysis

The procedures and coding process used for the qualitative analysis had multiple steps. Recruitment was facilitated by a gatekeeper, an individual with whom participants were connected (Webster, Lewis, & Brown, 2013), from Iowa State University's Women in Agriculture Extension office. This individual ensured that all contact information was included, and no one participant was left out of the pool of interview candidates. A recruitment email was sent to all 60, 2016 Annie's Project participants requesting a response if any were interested in

participating in a 30-minute interview. The solicitation email included a copy of a letter of informed consent with adequate information regarding the study. Before each interview, a review of the consent form was done as well as a request to record the conversation. All names and personal information were removed and coded anonymously to maintain confidentiality of the participants for the final report (Webster et al., 2013). De-identified interview recordings were transcribed using a transcription service used by RISE called Rev Recoding Services. Transcripts were uploaded into QSR International NVivo 11 qualitative data analysis software (2017).

The transcripts were categorized into four parts used on the interview protocol. The first part referred to the type of farm operation including production type and size and the primary role of the participant. The roles were coded as primary operator, secondary operator, and non-operator. Further codes were included for primary work as farming or other than farming. Women were asked how they came to be involved in their operation and were coded as married to a farmer, raised on the farm, and bought farmland to start farming as an adult. The length of time farming was coded as less than five years or more than 10 years. There were no other time frames included. Table 4 shows the questions asked for Part 1 and codes used for responses.

Table 4. Interview Questions Coded from Part 1

Questions Asked	Codes				
<i>What is your primary role on your operation?</i>	Primary Operator		Secondary Operator		Non-operator
	Primary role is farm work	Primary role is non-farm work	Primary farm work	Primary non-farm work	
<i>How did you become involved in your farm operation?</i>	Married a farmer		Raised on a farm		Began farming as an adult
<i>How long have you been farming?</i>	5 years		More than 10 years		

The second part categorized the experiences of women in agriculture. The section was coded into two parts: how they felt overall in their role and challenges they faced in farming. Feelings were coded as satisfied. Satisfied responses included: happy, proud, and excited to learn more. There were no responses that were not satisfied overall with their role on the farm. Further coding of satisfied responses was not necessary for this research. Challenges were further coded as one-on-one interactions, group or meeting interactions, market interactions, and physical demands of farming. Table 5 shows the questions asked for part 2 and the codes used for each response.

Table 5. Interview Questions Coded for Part 2

Question Asked	Codes		
<i>How do you feel about your role on your farm operation?</i>	Satisfied		Not satisfied
<i>What challenges have you faced in farming?</i>	Interactions w/ other farmers		Physical Demands
	One-on-one	Groups or meetings	

The third part focused on experiences in Annie's Project Level I and were coded in two ways: how meaningful the experience in the course was and how Annie's Project Level I addressed the challenges they faced. Codes were made for what made their experience meaningful: feeling respected as a farmer, confidence to share experiences with others, and comfortable to ask questions. Codes for how Annie's Project Level I met their needs were made: given time to ask questions, share experiences with other women, and being treated like a farmer. Table 6 shows the questions for part 3 and the codes used for each response.

Table 6. Interview Questions Coded for Part 3

Questions Asked	Codes		
<i>Was participation in Annie's Project significant for you?</i>	Feeling respected	Confidence to share my experience w/ other women	Comfortable to ask questions
<i>How did Annie's Project address your needs?</i>	Given time to ask questions	Time to share experiences with other women	Treated like a farmer

The final section included suggestions for improving Annie's Project Level I or what other programs they would like to be offered. Improvement suggestions were coded: facilitator improvements, content improvements, and including men in the course. This question was asked

to examine what gaps may exist in the Annie's Project Level I content or delivery procedures.

Table 7 shows the questions for Part 4 of the interview and codes for each response.

Table 7. Interview Questions Coded for Part 4

Question Asked	Codes		
<i>What more would you like to be included in Annie's Project?</i>	Improvements to facilitators or guest speakers	Improvements to content	Including men in the course

Ethics

I want to address the ethical considerations for this project. I have worked with Annie's Project as an external evaluator using the survey data for the past two years. Possible bias might arise from the limited number of interview respondents. Each woman was available during the work day to participate, and each was informed that the interview was not part of Annie's Project evaluation. The project was approved by the Institutional Review Board at Iowa State University before any survey data was analyzed and before any interview data was collected (See Appendix E).

Conclusion

In this chapter, I have discussed the methods used to gain insights into how Annie's Project Level I has worked to include women farmers in the agriculture education network program. Annie's Project works to support farm women as they overcome barriers in agriculture by offering essential knowledge of business risk management in a course specifically designed to meet the needs of farm women. The combination of survey data and interviews complement and expand on the purpose of each. The next chapter will be an overview of the results of the

research project. I demonstrate how effective Annie's Project has been in supporting women farmers and how women farmers are responding to the challenges they face in agriculture.

CHAPTER 4

RESULTS & DISCUSSION

Introduction

The Annie's Project Level I course case study addresses how agriculture education network programs assist farm women. The data from the interviews and surveys identify the outcomes of Annie's Project initiatives and contribute to the primary research question: why is important to include women in agriculture education network programs? The case study of Annie's Project Level I more specifically addresses the follow-up research questions: 1) How does Annie's Project Level I course assists farm women? 2) What are the outcomes of Annie's Project Level I course? and 3) Does the course help to challenge or reinforce the traditional roles of farm women?

In this chapter I review and discuss the results from the research of Annie's Project Level I. I begin by examining the results of the Annie's Project Level I course survey and interview data. The survey data highlights the measurable outcomes of the program initiatives. The qualitative data gathered from the phone interviews provide outcomes for the individual experience as well as insights into how the women view their roles on the farm. Overall, the major findings from this research suggest that it is important to involve women in agriculture education network programs as their roles on farms become more visible and vital to the success of the farm business. Annie's Project Level I course offers critical business risk management knowledge and a comfortable space for women to engage with each other. Finally, the roles which women assume on their farms remain primarily in the reproductive sphere, but agriculture

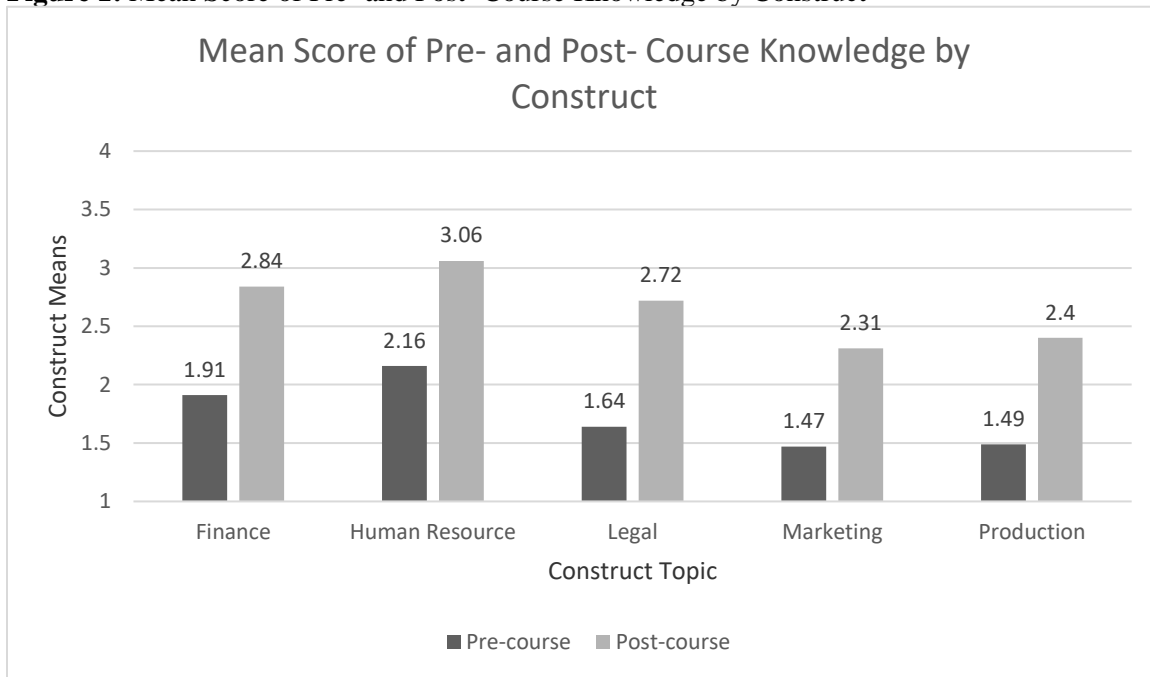
education helps to challenge the ‘supportive’ context and places value of their roles as equal to the productive work on the farm.

Quantitative Analysis

The purpose of analyzing the changes in knowledge and course perception helped to determine the impact of Annie’s Project Level I on course participants. The data revealed how Annie’s Project Level I assisted farm women by providing critical business risk management knowledge and providing a space to meet the educational needs of farm women. There were positive knowledge gains among participants in the business topics covered during the 18 hour course. Participants reported strong levels of agreement of the values that Annie’s Project Level I worked to maintain throughout the course.

Knowledge changes

Annie’s Project Level I impacted the knowledge of business risk management skills of participants. Participants reported their level of knowledge before and after the course for each of the five course topics (financial, human resource, marketing, legal, and production). Compared construct means for each topic showed that there were increases in the knowledge of farm business risk management practices. Graph 1 highlights the compared pre-and post-course means of each construct, and Table 8 shows the statistical information for each pre-and post-course construct.

Figure 1: Mean Score of Pre- and Post- Course Knowledge by Construct**Table 8:** Paired Sample Statistics of Pre- and Post- Course Knowledge Constructs

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post_Finance	2.84	353	0.562	0.030
	Pre_Finance	1.91	353	0.592	0.032
Pair 2	Post_HumanResource	3.06	353	0.565	0.030
	Pre_HumanResrouce	2.16	353	0.568	0.030
Pair 3	Post_Legal	2.72	353	0.648	0.035
	Pre_Legal	1.64	353	0.597	0.032
Pair 4	Post_Marketing	2.31	351	0.700	0.037
	Pre_Marketing	1.47	351	0.587	0.031
Pair 5	Post_Production	2.40	352	0.632	0.034
	Pre_Production	1.49	352	0.492	0.026

The pre-course response means indicated that participants “know little or nothing” about most topics. “Human Resource” had the highest construct mean of 2.16 during the pre-course survey, which participants, on average, “know some about this topic.” There were positive knowledge changes in each topic area where participants “know some” or “know quite a bit” of

each topic in the post course survey. “Human Resource” was the highest construct mean of 3.06. “Marketing” topics had the least amount of increase of knowledge and had the lowest construct mean in the post-course survey. On average, participants “know some” of the topic at the end of the course.

A matched means t-test was used to determine the level of significance in the knowledge changes of Annie’s Project participants based on the construct means. The matched sample t-test showed the difference between the means of each construct before and after participation in Annie’s Project Level I (Howell, 2013). In Table 9, the mean score was the difference between the pre- and post-course construct mean, and each topic showed an increase ranging from .84 to 1.08. This data represented the degree of knowledge gain between the first and last week of the program.

Table 9: Paired Sample T-Test

	Mean	Std. Deviation	Std. Error Mean	t	df	p value
Pair 1 Post_Finance - Pre_Finance	0.93	0.575	0.031	30.262	352	.000*
Pair 2 Post_HumanResource - Pre_HumanResrouce	0.90	0.618	0.033	27.328	352	.000*
Pair 3 Post_Legal - Pre_Legal	1.08	0.679	0.036	29.955	352	.000*
Pair 4 Post_Marketing - Pre_Marketing	0.84	0.633	0.034	24.987	350	.000*
Pair 5 Post_Production - Pre_Production	0.91	0.578	0.031	29.602	351	.000*

* $p < .001$

This analysis showed that there were statistically significant gains (where $p < .001$) in each topic construct of the knowledge of business risk management skills by participants of Annie’s Project Level I. “Legal” topics had the greatest increase of knowledge, with the mean increasing

from 1.64 in the pre-course survey, to 2.72 in the post-course survey. “Finance” and “Production” also had greater increases from pre-to post- course surveys.

Perception of course values

Participants were asked a series of questions regarding their perception of how Annie’s Project Level I addressed their needs. Table 3 shows the means and standard deviation for each question. The following analysis demonstrated the level of agreement of participants with each of the seven statements using 1=strongly disagree, 2=somewhat disagree, 3=somewhat agree, 4=strongly agree, or N/A=not applicable. These questions were asked on the post- course survey, and shown in Table 10, overall the participants ‘somewhat agreed’ to ‘strongly agreed’ with each statement.

Table 10: Mean of Perception of Course Values

	N	Mean	Std. Deviation
This course provided a safe and nurturing environment for learning.	334	3.69	.731
I felt encouraged to learn from other participants as well as the facilitator and speakers.	334	3.65	.747
The methods used in this course were compatible with my learning style.	333	3.52	.786
This course allowed enough time for discussion and interaction with other participants.	333	3.38	.823
Local professionals provided valuable information and/or resources.	331	3.60	.785
I feel comfortable contacting local professionals for additional information or assistance.	331	3.61	.757
I feel comfortable contacting one or more classmates for guidance or support.	325	3.46	.787

The average response of the comment “this course provided a safe and nurturing environment for learning” was 3.69/4, which was the highest rated comment. Other important values for participants were that they “felt encouraged to learn from other participants as well as

the facilitator and speakers” and “comfortable contacting local professionals for additional information” (3.65/4 and 3.61/4 respectively).

Qualitative Analysis

Five interviews were conducted to offer a more in-depth perspective of the experiences of Annie’s Project Level I participants. The qualitative data helped to address the primary research question: why is there a need for agriculture education network programs. This analysis also highlighted how Annie’s Project assists farm women. The analysis began by providing some context of the women interviewed and how they were involved in their farming operations. This information was important to determining why these women chose to participate in agriculture education network programs and the impact of the program. The qualitative interviews contributed to the survey data by providing stories to the participants.

The interviews described the roles of women on their farming operations to gain a better understanding of their contribution. The ideal farm woman primarily fulfills reproductive roles such as bookkeeping or business management (Riley, 2009). The interviews also provide insights into ways Annie’s Project participants challenged or reinforced the agrarian ideology. The barriers the interview participants face reflect those highlighted in the FAST, such as feeling unwelcomed or having limited time to spend in agriculture education courses. The interview data showed how they overcame those barriers and how Annie’s Project assisted.

Part 1: Women's role on farm operations

What is your primary role on your farming operation?

The information from these questions helped to clarify the primary contributions of the women on their farms. This allowed for some context for why the women decided to participate in agriculture education. The roles of the participants varied somewhat, but each woman stated their primary role on the farm included business and financial management and off-farm work. Other work included taking care of children, and running errands for the farmer. Although, two women said they would like to be more involved with the physical aspects of farming.

One woman, Tina, was the principle operator of her 24-acre farm, which ran a cow-calf operation, raising cows for show and for selling. Two other women, Dee and Ruby, were secondary operators alongside their husbands on their family farms. Another woman, Megan, was returning to her family farm where her father and uncle were looking to her to take over as primary operator in the future, but was not currently an operator on her farm. The final woman, Cora, had moved to a farm for the first time after marrying her husband, and is not currently an operator. She stated that she hopes to be the principle operator on her own farm.

"I'm not so much [into] the physical labor as I am paper work. I run reports. I do pay all the bills, or most of the bills, keep track of all the checking accounts in the black of course...I'm the goffer. If they need a part in town, I work off the farm as well. When I'm in town I stop and get parts for the boys...That's more what I am, so more of a support role and a paperwork role versus the day to day chore role" (Dee, personal communication, December 2, 2016)

How did you become involved in your farm operation?

This question examined the different ways women became involved in farming. Frequently, as discussed in the agrarian ideal and supported within the interviews, women became involved because their father or husband farms (Beach, 2013). However there were

instances when women decide to begin farming on their own. This information helped to understand that women have different levels of expertise and needs.

The women involved in this research came into farming in three different ways. Three women, Megan, Dee, and Ruby, married men who were already farming. Each had moved to their farm for the first time after getting married. Megan grew up farming, moved away, but returned to her family farm to help her father with the business. Alternately, Tina decided to begin farming after her children expressed interest in wanting to farm. Table 11 shows the comparison of how women came into their farming operation and how long they have been farming.

How long have you been farming?

The amount of time farming also brought different levels of expertise and needs to agriculture education network programs. Often newer farmers required more assistance from network programs than established farmers, and women on established farms sometimes wanted to become more involved in the farm (Annie's Project, n.d.). The women interviewed all wanted to become more involved and knowledgeable in the business management of their farms when they decided to enroll in Annie's Project Level I.

Cora and Megan had been involved on their current operations for less than 5 years. Neither of these women were operators on their farms, but both hoped to become more involved nor eventually take on more productive farming roles. The other three had been on their operations for more than 10 years. Tina bought her farm when her children were young because they wanted to farm, but she had grown to love farming and wanted to continue when they were grown.

Table 11. Cross tabulation of “How did you come into your farming operation?” & “How long have you been farming?”

How did you come into your farming operation?	How long have you been farming?	
	<i>Less than Five Years</i>	<i>More than 10 years</i>
<i>Married A Farmer</i>	Cora	Dee & Ruby
<i>Returned to Family Farm</i>	Megan	
<i>Bought a Farm Independently</i>		Tina

Part 2: Experiences as women in farmingHow do you feel about your role in your farm operation?

All five respondents stated they were happy and enjoyed the work they were doing on their operations. Dee specifically stated she did not think she would enjoy the physical work of farming as much, and that she was better as a support person on the farm. Megan and Cora, who were new to farming, stated they would like to be more involved with the physical work, using machinery or helping with animals. Tina, the primary operator of her farm, stated that at first it was a hobby for her children, but over the years she has grown to love her farm and the animals she raises.

What challenges have you faced in farming?

Several of the women described experiences they had in their farming community where being a woman influenced their interactions. Dee described going to the feed market where other farmers would ask about her husband, but not about her or her children. Others reported feeling they were not respected or taken as seriously as a farmer. At a community meeting, Megan was not given a chance to give input on a question, but was passed over during responses

to the men sitting next to her. Tina stated she would go into the feed store and ask for a specific feed for her cows and was told she did not want to use that kind of feed. She had to explain why she wanted a specific feed for her operation before making the purchase. Cora stated that she did not feel as confident in her abilities because she was a woman, and that influenced her experience in her operation.

“When I’ve been going to these meetings for different stuff, in the back of my mind I’m like okay do they take me seriously or do a lot of people in the community think that maybe she’s getting a paycheck because she’s a part of the family and they’re giving her a break on stuff” (Megan, personal communication, December 2, 2016).

“Sometimes I go to show up at the [co-op] and I go to get parts and I have no clue what it’s for. The boys call it in and say, “Go get it.” I go in and say, “I don’t know what I’m getting. Just give it to me.” They do... Sometimes I go in and I wish I knew more about what I’m picking up, so I could go in a sound like I know what I’m talking about versus just being the currier. That’s kind of tricky” (Ruby, personal communication, December 6, 2016).

Some other challenges that were mentioned involved caring for children, which prevented many of the women from being able to participate in the broader farming community. Another challenge mentioned by Cora was that she felt her husband learned so much from talking with other farmers, and that no one really talked to her about farming when she was around because others do not think she cared about farming. Tina mentioned that she felt like she had to prove herself as a farmer and show that she knew what she was doing on her operation before she was taken seriously. She also stated she felt intimidated when she had to talk to all men because she was making different decisions than a man would make in regards to her cow-calf operation.

Part 3: Experience with Annie's Project Level I course

Was participation in Annie's Project significant for you?

All women responded that the program designed for farm women was important, and they valued their participation. Several stated that they felt more comfortable being able to interact with other women farmers who have similar lifestyles. They stated they felt respected and able to take time to ask questions they would not feel comfortable asking, or that questions were posed that they would not have thought of asking before.

"I really appreciated it. I learned a lot, I'd like to do some more because it was just like, a lot of it was new and so I didn't know the questions to ask. So I definitely want to take it again, or take something else, or learn more and so I can actually learn more about the farming stuff" (Cora, personal communication, December 2, 2016).

Tina described her learning experience similar to going to a woman doctor, a woman doctor would understand better than a man would. She said she felt more at ease and that others had gone through similar experiences. She stated she did not feel silly asking questions. She had made a friend in the program who she was able to talk through challenging situations with, and they felt like they could ask questions together so they were not feeling like the only person who did not understand something.

How did Annie's Project address your needs?

Participants stated that Annie's Project Level I worked to meet their needs. Interview responses claimed they were also given a chance to listen to questions they had not thought to ask before the course. In this case, several women pointed out that they were able to go home and discuss with their husbands things they did not think to discuss prior to Annie's Project Level I.

“I think just seeing more educated and more informed and lots of conversations with other women in Ag really help to make you feel like you're a part of it. You're not just a farm wife or you're not just a go to person that if you need something they can go run for you or paperwork and pays bills and writes the checks out, that kind of stuff” (Dee, personal communication, December 2, 1016).

Part 4: Improvements or suggestions

What more would you like to see offered from Annie’s Project?

A few women had suggestions to improve upon their experience at Annie’s Project Level I. Megan stated she wished there were more opportunities to learn about more about the physical farm work, but that she did learn a lot from the course. She stated she did not receive any training on how to use basic tools, so she would like to learn more about how to fix simpler problems that arise on her farm rather than having to hire someone. Cora felt like the topics could have been taught to both men and women, and that she wished her husband could have taken the course as well. One final suggestions was that the program should offer more diverse specialists and trainers. Tina commented that nearly all of their guest speakers were middle aged, white men and that they did not always seem to appreciate the exchanging of ideas between participants that the course promoted.

Discussion of Findings

In this research, I have investigated the importance of including women in agriculture education network programs and specifically the impact of Annie’s Project Level I course. Women traditionally contribute to farm operations in reproductive roles, including bookkeeping, business management, and caretaking. This work is critical to the success of farm operations, and the increased visibility of the contributions of women on farms would demonstrate that there

is a need to include them in agriculture education network programs. Providing vital technical, business, and financial education to farmers helps to increase the success of any growing farm business (Sachs et al., 2016), and including women would contribute to that success (Hambleton Heins et al., 2010). Annie's Project Level I course assists farm women by providing business risk management knowledge and skills pertinent to the success of farm businesses. The lack of knowledge of the topics covered in the pre-course survey, suggests that women participate in Annie's Project Level I course with limited skills and wanting to learn more. Interview participants also state they want to be more involved in their farm operation and to understand better how the business is run.

Willingness to participate in agriculture education network programs is not a new phenomenon for farm women. Charatsari et al. (2013) discuss how women have always been involved with their farm communities. In male dominated settings, farm women often feel unwelcomed. Historically, agriculture education network programs have worked under a gender bias which has ignored the specific needs of women, such as time constraints (Charatsari et al., 2013). Targeting women for agriculture education network programs gives women a space to engage in the agriculture community as farmers and farm wives. Annie's Project courses are attentive to the needs of farm women, and the focus on women is a significant part of why the participants are interested in attending the course.

Annie's Project Level I course provides a comfortable space for women to network with each other and share their experiences and expertise. Women prefer a flexible and interactive program curricula which meets their needs (Sachs et al., 2016). Participants share that having the opportunity to interact with other women was important because they can better relate to

each other as women. Data from the surveys, and discussion from the interviews suggest that women do appreciate space to relate to other women.

The development of Annie's Project courses reflects the FAST principle that women are creating new network organizations for farm women (Sachs et al., 2016). It is important to recognize that women have unique needs when entering agriculture education spaces, which have historically been dominated by men (Charatsari et al., 2013). Addressing those needs includes offering hands-on experiences that women can take back to their farm and share with others. Overall, women do not want to feel intimidated or unwelcomed in agriculture education settings (Sachs et al., 2016). Annie's Project Level I course works to meet those needs of its participants by offering comfortable, peer-to-peer learning experiences.

Over the six week course, outcomes of the survey data showed gains in knowledge of the topic areas covered in the course. This knowledge contributes to the successful planning of a farm business. Risk management topics on farms are critical information, and access to the knowledge helps women to better understand how their farm is operating (Schultz et al., 2015). The gains in knowledge also give participants the confidence to discuss their farm operations with their partners or others in their local farm communities. They have gained the knowledge to be the experts of their own farm operation. When the women in Annie's Project Level I course participate in community meetings, markets, or other agriculture settings, they would have the ability to be taken seriously as experts.

The results indicate that women, especially those in conventional agriculture, continue to primarily assume the reproductive roles on the farm. Riley (2009) discusses how the contributions of women have remained within the reproductive sphere and that women rarely venture into the field unless they are called upon by the farmer. Often women consciously refer

back to the reproductive roles, rather than being pushed into those roles by men, and they recognize that the domestic and the business management duties are central to the farm operation (Riley, 2009). The participants in Annie's Project Level I also adhere to this tradition on their farm operations. In the interviews, each farm women primarily engages in the financial and business management of their farms, and they are satisfied in those roles. They also view their roles as vital to the success of the farm.

Both Ruby and Dee see themselves as farmers as well as farm wives. Women who continue to assume the ideal farm wife role in farming are not directly challenging the patriarchal nature of the ideal family farm. Some women do not perceive this as a problem. However, they do reframe the understanding of the woman's role as more than only supportive when also claiming the title of farmer (Riley, 2009). Annie's Project Level I participants are not directly challenging the structure of the traditional family farm, but neither are they oppressed nor subordinate to men on their farm (Riley, 2009). The participants view their contributions as equal to the contributions of their partners, and they want to be taken seriously. Participation in a course, such as Annie's Project Level I, validates women's contributions on their farms and within the community (Charatsari et al., 2013).

By targeting women for their business risk management training, Annie's Project Level I reinforces the assumption that women contribute as business partners or managers. Annie's Project Level I course provides women a space in agriculture institutions, however, the program is careful not to challenge or threaten the patriarchal structure of the family farm (Sachs et al., 2016). According to Sachs et al. (2016), this program would not fall into the FAST framework entirely, because it does not directly challenge the agrarian ideology. I argue that challenging the agrarian ideology does not only happen in sustainable agriculture, which is implied by Sachs et

al. (2016) and the FAST. Women are making spaces for themselves in conventional agriculture communities and challenging the agrarian ideology by recognizing that their work is just as important as the productive work of the farmer.

I would also argue that continuing to separate men and women in agriculture education in both sustainable and conventional farming spaces, maintains barriers to achieve gender equality on farms and in agriculture institutions and communities. Cora wanted her husband to participate in the course and did not think it was only up to her to understand the business management aspects of her operation. While it is important to give women space to share with each other and have access to skills and knowledge of other farm women, the knowledge should not be exclusively for women. Annie's Project is one step in creating gender equality on farms in Iowa.

Conclusion

Women have not been taken seriously as farmers, and they have not been treated with respect or as experts in the field. Their knowledge and experience should be shared with other farm women and men in order to know what needs should be met in agriculture education network programs. The Annie's Project Level I case study shows that the roles of participants are similar to the roles of farm women within the agrarian ideology. However, their desire to have their contributions recognized and to be more involved in the farm business challenges the agrarian ideology.

In this research, I have examined why there is a need for agriculture education network programs for women, and how those programs assist farm women. Efforts to develop agriculture education network programs in order to include women have been made by men and women in

agriculture institutions, but more work is needed. I have discussed how Annie's Project is one program working to overcome barriers and support the visibility of women in agriculture.

This chapter has reviewed and interpreted the findings of the Annie's Project Level I case study. Overall, the results answered the research question: it is important to include women in agriculture education network programs? As well as the follow up questions: 1) How does Annie's Project Level I assist farm women? 2) What are the outcomes of Annie's Project? and 3) Does the course challenge or reinforce the traditional roles of farm women? Understanding the history of agriculture institutions, and how women have been overlooked is important to the development of agriculture education network programs. The concluding chapter will discuss recommendations for future research and program development. I also review the limitations of the study. Finally, I discuss the implications of the research and recommendations for policy and institutional changes in order to include more farm women in agriculture education network programming.

CHAPTER 5

CONCLUSION

Summary

This project has focused on the importance of including women in agriculture education network programs. Historically, women and their contributions have been overlooked in agriculture institutions. Women have been discriminated by from the USDA, and their contributions to the farm were relegated to the home (Sachs et al., 2016). CES neglected to consider how the contributions of farm women extend to the whole farm, and programs for farmers were not developed to meet the specific needs of farm women (Sachs et al., 2016).

The agrarian ideology has persisted in farming in the United States (Beach, 2013), which is primarily based in conventional farming practices which use advanced technology, machinery, and chemical application that reflects a domination over nature and is closely tied to masculinity (Beach, 2013; Earles, 2005). This has led to deeply entrenched patriarchal farm structures and a denial of farming resources for farm women (Beach, 2013). Women have been faced with barriers in order to fully engage in agriculture institutions such as education network programs (Sachs et al., 2016).

In this project, I have examined how women have been historically marginalized and excluded from agriculture education network programs and how women are developing and participating in agriculture education programs that are specifically designed for women. Annie's Project is one program that has been designed for women and was the focus of the research. Through pre- and post-course survey data, I determined that participation in Annie's Project is important and that women experience changes in their knowledge of farm business

practices. I also have concluded that Annie's Project participants have positive experiences where they feel safe to ask questions and discuss challenges they have with other women. Phone interviews with Annie's Project participants revealed that their participation in Annie's Project reflected the survey responses, and their participation was important to them. They reported that their time with Annie's Project allowed them space to ask questions and engage with other women. They felt that they were comfortable and respected as farmers.

Implications

Implications can be drawn from this research by relating the results from Annie's Project Level I case study to the principle of the Feminist Agrifood System Theory. There is a need to include women in agriculture education network programs, and the development of programs need to make efforts to meet the needs of farm women. By focusing on the needs of farm women, Annie's Project Level I offers a safe and comfortable environment for women to learn from each other and share their experiences. Participants not only gained critical knowledge for running a successful farm business but were respected and taken seriously as farmers.

Although not all participants may identify as feminist, or are involved in sustainable agriculture, the values of Annie's Project reflect those of the FAST. Annie's Project encourages sustainable farming practices in each course offered. Participants of Annie's Project work for gender equality on farms by making their contributions visible through participation in agriculture education network programs, community meetings, and interactions with other farmers. The results imply that farm women do not have to be feminist or sustainable farmers to challenge the agrarian ideology by participating in agriculture education network programs.

For future programs, the development for agriculture education network programs can focus on a variety of skills for farm women rather than only the reproductive roles. The first step would be to determine what programs exist for farm women in the US, where they are located, and what topics are targeted in each program. From this information, gaps in topics, locations, and farming styles can begin to be identified. With the knowledge of what specific needs should be met for farm women (such as consideration of time and providing a comfortable space) from this research and others, educators, both men and women, can begin to develop or change programs to meet the growing demand for agriculture education network programs for farm women.

While in recent years the USDA has made some efforts to target beginning farmers and specifically women, most of the efforts are focused on business management. There is a distinct lack of efforts being made to target women in conservation, safety, or production in conventional farming practices (Wells & Eells, 2011). While women have made their presence known in sustainable agriculture, attempts to support farm women in conventional practices continue to be upheld by the agrarian ideal. The USDA can continue to prioritize the funding of programs for farm women to become successful farmers through CES and other agencies.

Relevance to Other Studies

Highlighted in the FAST framework are other programs that have been developed for women in agriculture, such as the Vermont Women's Agriculture Network (WAgN), which targets women who identified as farmers (Sachs et al., 2016). The Vermont WAgN reached out to conventional and sustainable networks but found those who participate in conventional farming tend to consider themselves as farm wives rather than farmers (Sachs et al., 2016). This

finding is similar to participants of Annie's Project Level I and the women who are currently or hoping to become principle operators and tend to focus more on small scale, sustainable practices.

Maine Women's Agriculture Network serves thousands of women around the Northeast. This program focuses on exposing farm women to other women's farm operations through farm tours and workshops (Sachs et al., 2016). Like Annie's Project courses, the Maine WAgN highlights the need for women to engage with other women. Both Vermont and Main WAgN programs focus on meeting the needs of women farmers, such as providing a comfortable space, being respected as a farmer, and providing opportunities to engage and discuss with other women in agriculture. The results from the course perception of Annie's Project Level I reflect the values.

Recommendations

Moving forward, more projects should be developed specifically to address the needs of women farmers. While business risk management is important for women in all levels of farming, more programs should offer hands-on farm skills such as production, animal and crop care, and safety. Programs also should continue to focus on prioritizing the expertise and needs of women farmers as agriculture continues to expose the contributions of women. This research demonstrates the importance of women in agriculture and the need for agriculture education that includes women. I hope that the data can offer suggestions for educators to meet the needs of women farmers. The interviews offer insights of the challenges women face in agriculture and that women want to participate in programs for women.

The agrarian ideology has influenced the traditionally silent and over-looked role of farm women and excluded women from the dissemination of knowledge. As programs are being developed, the evidence of how women can be specifically addressed to break down the barriers created by the agrarian ideology can be addressed in future projects. More research should be done to widen the scope of the importance of educating women farmers and to examine what other programs focus on and what women want from agriculture education programs. More specific research should focus on the alternative farming techniques women farmers use in their operations.

Limitations

Annie's Project targets farm women who are interested in the business risk management. Many of the women fulfil the reproductive roles of farm wife that have dominated the agrarian ideology in US agriculture. Participants of Annie's Project may use conventional farming practices where the agrarian ideology is still dominate in the family farm structure. It is more likely that women in conventional farming are considered only as the farm wife regardless if they are also an operator. This research shows that while some of the women valued their status as a farm wife they also considered themselves farmers or operators.

While the principles of Annie's Project reflect those of the FAST, Annie's Project may not work to directly challenge the dominating agrarian ideology by creating new space for women in agriculture. The content of Annie's Project Level I course focuses on business management work that many women are already contributing to in many conventional and sustainable farms. The mission of Annie's Project is to "empower farm and ranch women to become better business partners," which assumes that the participants are working alongside

another farmer, usually a husband. This deviates from the FAST framework because the participants may not be consciously trying to dismantle the patriarchal agrarian ideology.

However, the desire to be treated equally on farms and be respected as farmers are still reflected in both Annie's Project participants and the FAST. Participants of Annie's Project are wanting to be more involved in the farming business and understand how the farm works. Some are hoping to one day own or operate their own farms. The FAST offers a framework for looking at how a non-majority population is breaking into farming (Sachs et al., 2016), and even though the target audience of Annie's Project does not necessarily reflect those that the FAST examines, the framework can be applied to examine how women are overcoming barriers they face in sustainable and conventional farming.

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APPENDIX A

ANNIE'S PROJECT PRE-COURSE SURVEY

WELCOME TO THE ANNIES PROJECT.

Please help us to better prepare and continue to improve the program by completing this brief pre-course survey. Use the navigator buttons at the bottom of the page to move between pages.

Please enter the ID Code printed on your folder in the space below. This is used for matching pre- and post- responses only.

This field is required.

A. Level of Knowledge

Please indicate your current level of knowledge of the following terms or concepts. It's OK if you do not know about many of these yet. You will have a chance to learn about them throughout the program.

Using the scale below, click to choose the one answer in each row that best describes your knowledge now.

Financial Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
Calculating costs of production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calculating family living expenses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How my/our family expenses compare to state and national benchmarks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Components of a balance sheet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial ratios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How a lender evaluates a borrower	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Where to find information on cash rental rates in my state	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Human Resources Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
Personal communication styles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preferred communication style	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My/Our insurance needs (life, health, disability, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Differences in insurance needs for farm and non-farm families	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The difference between income-based and debt-based insurance needs



Legal Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
Forms of property ownership	○	○	○	○
Legal options for substitute decision making	○	○	○	○
Estate plans	○	○	○	○

Marketing Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
Price bid sheets	○	○	○	○
Price basis	○	○	○	○
Grain contracts	○	○	○	○
Livestock contracts	○	○	○	○

Production Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
How production insurance works	○	○	○	○
How revenue insurance works	○	○	○	○
Determining how much crop insurance I/we need	○	○	○	○
Determining how much livestock insurance I/we need	○	○	○	○
Programs offered by the National Resources Conservation Service (NRCS)	○	○	○	○
The various types of soils on my/our land	○	○	○	○
Which soils on my/our land are most productive	○	○	○	○

APPENDIX B

ANNIE'S PROJECT POST-COURSE SURVEY

Thank you for participating in Annie's Project.

Please help us to understand your experience and continue to improve the program by completing this brief post-course survey. Use the navigator buttons at the bottom of the page to move between pages.

Please enter the ID Code printed on your folder in the space below. This is used for matching pre- and post- responses only.

This field is required.

A. Level of Knowledge

Please indicate your current level of knowledge of the following terms or concepts.

Using the scale below, click to choose the one answer in each row that best describes how much you know about that term or concept now.

Financial Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
Calculating costs of production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calculating family living expenses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How my/our family expenses compare to state and national benchmarks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Components of a balance sheet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial ratios	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How a lender evaluates a borrower	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Where to find information on cash rental rates in my state	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Human Resources Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
Personal communication styles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My preferred communication style	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My/Our insurance needs (life, health, disability, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Differences in insurance needs for farm and non-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

farm families

The difference between income-based and debt-based insurance needs

**Legal Knowledge**

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
Forms of property ownership	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Legal options for substitute decision making	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estate plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Marketing Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
Price bid sheets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price basis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grain contracts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Livestock contracts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Production Knowledge

	I know little or nothing about this	I know some about this	I know quite a bit about this	I am completely familiar with this
How production insurance works	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How revenue insurance works	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determining how much crop insurance I/we need	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determining how much livestock insurance I/we need	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Programs offered by the National Resources Conservation Service (NRCS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The various types of soils on my/our land	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Which soils on my/our land are most productive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX C

INTERVIEW PROTOCOL

1. Introduction:
 - a. Establish rapport - friendly, engaging, positive
2. Research intro -
 - a. looking into the experiences of women involved in farming operations, and how the experience in a women's agriculture education program (Annie's Project) has influenced participation on farms.
 - b. Purpose of the interview - to establish insights from women in farming
 - c. Participation is completely voluntary, all information will be kept confidential,
 - d. No right or wrong answers, interested in hearing about experiences.
 - e. Will be used for Master's thesis, hopefully research will be able to help educators in extension and other agriculture programs identify the needs and challenges of women in farming operations
 - f. Connection to Annie's Project, have been working as external evaluator for the program for few years, interested in the experiences of women in farming
 - g. In no way endorsed by Annie's Project, hopeful this research will help Annie's Project and other programs better assists participants
3. Beginning Interview
 - a. Contextual, just to begin
 - i. Tell me a little about yourself and your farm operation - how large, what types of production
 - ii. How did you come into your farming operation? (i.e. marriage, inheritance, purchase, etc)
 - iii. What is your primary role? What does your daily routine typically look like?
 - iv. How long have you been involved in farming? In this particular operation?
4. Interview
 - a. How do you feel about your role on your operation?
 - b. Do you feel like being a woman in farming influences your experience as a farmer?
 - i. How so? Or why not?
 - ii. Can you give me an example?
 - c. Do you consider yourself a farmer?
 - i. Is it important that you identify as a farmer? Why?

- d. Do you feel that women experience unique challenges in farming operations?
How so?
 - i. Give examples? What challenges have you faced as a woman in farming?
 - e. Annie's Project
 - i. Can you tell me about your experiences with Agriculture Education programs?
 - 1. Why kind of programs have you participated in?
 - ii. Annie's Project is a program designed by women for women farmers specifically, was that meaningful to you? Did it impact your experience?
 - iii. Do you think it is important for women to have their own agriculture education programs in addition to general agriculture education programs?
 - 1. Why?
 - iv. Do you think Annie's Project addresses some of the challenges women face in farming (mentioned earlier)? How so?
5. Ending the Interview
- a. To finish up...
 - b. What suggestions would you have for other women farmers?
 - i. Who are new, experienced
 - c. Anything in particular you would like to see implemented in agriculture education programs for women?
6. After
- a. Thank you so much for your participation and insights
 - b. I'll be using this interview to see if there are any trends among women in farming such as how they identify and their experiences with agriculture education programs
 - c. Also be using it to hopefully offer suggestions to educators to address the needs of women farmers.
 - d. Not an evaluation of Annie's Project, simply looking into why women's ag ed programs are important and how they can further address the needs of women in farming
7. Closing
- a. Back to everyday topics
 - b. Any questions, feel free to email or call back, reach out to Madeline
 - i. Questions on IRB or confidentiality feel free to contact my adviser

APPENDIX D

INDIVIDUAL KNOWLEDGE QUESTION STATISTICS

Table 1. Financial Knowledge Questions Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre- Calculating costs of production	1.76	352	.767	.041
	Post- Calculating costs of production	2.57	352	.688	.037
Pair 2	Pre- Calculating family living expenses	2.61	349	.856	.046
	Post- Calculating family living expenses	3.11	349	.721	.039
Pair 3	Pre- How my/our family expenses compare to state and national benchmarks	1.37	350	.614	.033
	Post- How my/our family expenses compare to state and national benchmarks	2.43	350	.815	.044
Pair 4	Pre- Components of a balance sheet	2.16	351	.907	.048
	Post- Components of a balance sheet	3.04	351	.720	.038
Pair 5	Pre- Financial ratios	1.61	346	.762	.041
	Post- Financial ratios	2.64	346	.769	.041
Pair 6	Pre- How a lender evaluates a borrower	1.88	348	.839	.045
	Post- How a lender evaluates a borrower	2.90	348	.760	.041
Pair	Pre- Where to find information on cash rental rates in my state	1.98	351	.972	.052
	Post- Where to find information on cash rental rates in my state	3.18	351	.737	.039

Table 2. Human Resource Knowledge Question Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre- Personal communication styles	2.37	350	.814	.044
	Post- Personal communication styles	3.20	350	.699	.037
Pair 2	Pre- My preferred communication style	2.45	348	.879	.047
	Post- My preferred communication style	3.34	348	.670	.036
Pair 3	Pre- My/Our insurance needs (life, health, disability, etc.)	2.51	345	.796	.043
	Post- My/Our insurance needs (life, health, disability, etc.)	3.15	345	.672	.036
Pair 4	Pre- Differences in insurance needs for farm and non-farm families	1.98	350	.856	.046
	Post- Differences in insurance needs for farm and non-farm families	3.00	350	.720	.038
Pair 5	Pre- The difference between income-based and debt-based insurance needs	1.52	351	.732	.039
	Post- The difference between income-based and debt-based insurance needs	2.63	351	.858	.046

Table 3. Legal Knowledge Question Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre- Forms of property ownership	1.82	353	.725	.039
	Post- Forms of property ownership	2.82	353	.701	.037
Pair 2	Pre- Legal options for substitute decision making	1.48	350	.697	.037
	Post- options for substitute decision making	2.65	350	.786	.042
Pair 3	Pre- Estate plans	1.61	352	.667	.036
	Post- Estate plans	2.68	352	.720	.038

Table 4. Marketing Knowledge Question Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre- Price bid sheets	1.36	343	.637	.034
	Post- I can determine whether the basis of a bid sheet differs month by month.	1.91	343	.671	.036
Pair 2	Pre- Price basis	1.44	351	.681	.036
	Post- Price basis	2.43	351	.786	.042
Pair 3	Pre- Grain contracts	1.68	350	.780	.042
	Post- Grain contracts	2.42	350	.785	.042
Pair 4	Pre- Livestock contracts	1.40	345	.631	.034
	Post- Livestock contracts	2.09	345	.809	.044

Table 5. Production Knowledge Question Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre- How production insurance works	1.42	350	.623	.033
	Post- How production insurance works	2.34	350	.784	.042
Pair 2	Pre- How revenue insurance works	1.36	347	.623	.033
	Post- How revenue insurance works	2.30	347	.820	.044
Pair 3	Pre- Determining how much crop insurance I/we need	1.47	347	.664	.036
	Post- Determining how much crop insurance I/we need	2.43	347	.810	.043
Pair 4	Pre- Determining how much livestock insurance I/we need	1.30	340	.551	.030
	Post- Determining how much livestock insurance I/we need	2.13	340	.881	.048
Pair 5	Pre- The various types of soils on my/our land	1.69	350	.746	.040
	Post- The various types of soils on my/our land	2.54	350	.796	.043
Pair 6	Pre- Which soils on my/our land are most productive	1.71	347	.772	.041
	Post- Which soils on my/our land are most productive	2.49	347	.813	.044

APPENDIX E
IRB APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
2420 Lincoln Way, Suite 202
Ames, Iowa 50014
515 294-4566

Date: 10/19/2016

To: Cori Jane Hyde
E005 Lagomarcino Hall

CC: Dr. Carmen Bain
308 East Hall
Dr. Mari Kemis
E005 Lagomarcino Hall

From: Office for Responsible Research

Title: Trends in Practices among Women Farmers: Challenging Traditional Gender Roles and the Impact of Annie's Project

IRB ID: 16-482

Study Review Date: 10/19/2016

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey or interview procedures with adults or observation of public behavior where
 - Information obtained is recorded in such a manner that human subjects cannot be identified directly or through identifiers linked to the subjects; or
 - Any disclosure of the human subjects' responses outside the research could not reasonably place the subject at risk of criminal or civil liability or be damaging to their financial standing, employability, or reputation.

The determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**
- **You must carry out the research as described in the IRB application.** Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. **Only the IRB or designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.

Please be aware that **approval from other entities may also be needed.** For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required

by their policies. An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.