

**ASSESSING AGRICULTURAL LITERACY IN URBAN AND SUBURBAN  
MOTHERS AFTER THEIR COMPLETION OF THE ILLINOIS FARM  
FAMILIES PROGRAM**

A Thesis

by

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## **ABSTRACT**

A true definition of what agricultural literacy actually means, has yet to be agreed upon by researchers. The agriculture industry, after all, is constantly evolving and changing. As time passes, much of society continues to become further and further removed from America's agrarian heritage. The industry has been subject to much criticism in recent years, with allegations of mass malpractice. Due to the advent of various media platforms, people are able to publish falsified or inaccurate information for the world to see, and exploit the very industry that clothes and feeds them. What's more, there are a variety of labels and marketing campaigns that have done nothing but mislead, and confuse consumers. However, a program by the name of Illinois Farm Families sought to combat these issues by providing urban and suburban mothers from Chicagoland with a yearlong learning experience in agriculture. Since 2012, IFF has taken cohorts of these mothers out to a variety of farming operations across the state of Illinois, with the intent to provide them with a firsthand experience in stepping foot on these farms, and conversing face to face with farmers. The researcher framed this study around two theories. The first being a centralized diffusion system, in which the Illinois Farm Families program fits as the formalized change agency. The second theory is Dewey's experiential learning model, since this program is extremely experiential in nature.

This census study of all mothers who are alumna of the Illinois Farm Families program assessed their levels of agricultural literacy. They were asked to complete the

Food and Fiber Systems Literacy assessment, and answer six questions pertaining to their personal characteristics. The researcher compared their results based on personal characteristics such as: the year(s) they participated, level of completed education, number of children, ethnicity, age range, and proximity to Chicago proper. The findings revealed that these mothers are in fact agriculturally literate, based on a 60% benchmark. Although this was not a true pre/post-assessment, nor a true program evaluation, it is recommended that this study be replicated in these forms.

## **DEDICATION**

I dedicate this thesis to God, my grandmothers, and my parents. It is their unconditional love and support that have helped guide me on this journey to completing my graduate education.

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It is difficult to say that I have one decision in my life that is more valuable than all of the rest. After all, every stepping-stone inevitably leads to another along this journey. To date, however, my time spent here at Texas A&M University has had an incredibly powerful impact on me. My goals when I came here were to challenge myself, expand my network of people, and embrace a culture unlike any other. I can honestly say that all of those goals have not just been met, but exceeded.

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## **CHAPTER I**

### **INTRODUCTION**

As time passes, Americans continue to become further removed from production agriculture. Many would agree with the need for a basic understanding of agriculture, the agriculture industry, and its importance to our country and citizens (Frick, Birkenholz, Gardner & Machtmes, 1995, p. 1). Two challenges facing agricultural education today include the need for a critical mass of the next generation of agriculturists interested in food and agriculture, and to educate those who do not understand food and agriculture systems (Mercier, 2015; Roberts, Harder, & Brashears, 2016). Also, with our abundant food supply and huge agricultural industry complex, most people do not understand America's food system or its impact on society and the world (Frick, 1990). Due to this situation, the public does not understand the mission or importance of publicly supported institutions such as the cooperative extension service, colleges of agriculture and USDA research centers (Frick, 1990). Thompson (as cited in Frick, 1990) stated that even if well informed citizens remain ignorant of basic facts about food, agriculture and natural resources systems, the activities of agricultural colleges will increasingly be perceived as serving only the interests of a narrow and dwindling constituency (p. 1). The current and potential effect of these developments on society is serious; today's and tomorrow's leaders of our society know far less about the real significance of agriculture to everyone (Frick, 1990).

Most Americans, whether young or old, have limited knowledge about agriculture and food production (Frick et al., 1995, p. 1). Agricultural communicators need to recognize the escalating consumer demand for information regarding the industry's practices and products (Krause, Meyers, Irlbeck & Chambers, 2014, p. 68). An interview conducted by Brandon (2012, p. 1) with John Campbell, director of the Mississippi Bureau of Plant Industry, reported, "Most citizens today are three generations removed from the farm. They don't know where their food comes from, and they don't understand the importance of agriculture and agricultural research, or why money needs to be spent to maintain our agricultural infrastructure." The fact that approximately 2% of the population in the United States feeds the other 98% is equally as remarkable, as it is alarming (Chinn, 2014). Those individuals who are still directly tied to or involved with production agriculture, do their best to defend their livelihood, and the very industry that feeds and clothes everyone. However, many of these same individuals are also blind to the reason that they understand modern agricultural practices so well, and why others don't.

The key component they have is, experience. Anyone can read copious amounts of information about modern agriculture, but that information can only be catalyzed with a concrete experience. Dewey (1938, p. 38) noted that "the failure to take the moving force of an experience into account so as to judge and direct it on the ground of what it is moving into, means disloyalty to the principle of experience itself. All human experience is ultimately social, in that, it involves communication and contact" (Dewey, 1938, p. 38). Pedagogy, or the art of teaching children, begins with content followed by

experience; whereas, andragogy, or the art of teaching adults, begins with experience and is followed by content. While it is considerably more difficult to provide everyone with a first-hand experience in production agriculture, we need to find more meaningful ways to bridge this growing divide. “Experience does not simply go on inside of a person. It does go on there, for it influences the formation of attitudes of desire and purpose (Dewey, 1938, p. 37).” A learning experience that is truly experiential, will bridge and bind that which takes place internally and externally.

The term *food deserts* was coined by the United States Department of Agriculture in the Farm Bill (Krepp, 2016). It was defined as an area in the United States with limited access to affordable and nutritious food, particularly such an area composed of predominantly lower-income neighborhoods and communities (Krepp, 2016, p. 50). The phenomenon of food insecurity has been assessed using a model following the acronym TIDE, or Transportation Income Distance and Education. The categories created by the TIDE model seek to measure from a relative standpoint what the lowest level of nutritional access entails and how the set of economic and social criteria that accompany this state compare with populations that are more secure (Krepp, 2016, p. 50). The model scores distance from an approved retailer, average household income relative to the federal poverty level for average household size, average number of years of education, and overall access to multiple levels of transportation to more fully explain the access experienced by census block (Krepp, 2016, p. 54). The socioeconomic makeup of urban areas, for example, can stretch from that of extreme poverty all the way up to extreme wealth. The practicality of the TIDE model is rooted in its ability to

distinguish between areas of society that are technically food indigent and food insecure. It has allowed the USDA to more affectively administer federal food subsidy programs to areas of food insecurity. While food insecure or indigent portions of society may not in positions to be selective about their food choices, more economically sound households may have the abilities to be more selective in the types of food they purchase. Thus, the importance of food product labeling comes into play.

During the past few years, the agri-food system has come under strong criticism from all angles (Powell, Agnew & Trexler, 2008). The advent of various media platforms, particularly social media, has allowed for both truthful and exploited representations of the agriculture industry to flourish. More times than not, agriculturally uneducated activist groups are usually the first to the punch in providing the public with highly falsified or inaccurate portrayals of modern farming practices. Among the first of these portrayals were representations of poor animal welfare practices with livestock producers, most notably from groups such as People for Ethical Treatment of Animals (PETA) or the Humane Society of the United States (HSUS). For example, in January of 2008, HSUS released a video of workers kicking sick cows and using forklifts to force them to walk. As a result, 143 million pounds of beef was recalled by the Westland/Hallmark Meat Company-the largest beef recall in U.S. history- because the federal government banned ‘downer cows’ from the food supply to reduce the risk of mad cow disease (Shea, 2015, p. 338).” “After numerous lawsuits and widespread media coverage, Westland/Hallmark Meat Company was forced out of business, without the chance to simply reprimand or fire their employees for their actions (Shea, 2015, p.

338).” Whether a video or a photo, their visual representation of conditions in livestock operations of all types has been that all animals are barbarically mistreated. Perhaps the trendiest of portrayals is regarding the use of biotechnology in agriculture, and the famous acronym GMO [genetically modified organism]. In 2012, the dispute regarding GMOs became a mainstream concern in the United States, specifically regarding labeling requirements for products containing GMOs (Krause et al., 2014, p. 69). The controversy of genetically modified food could potentially have a negative impact on agricultural production (Krause et al., 2014, p. 69). Biotechnology’s place in modern agriculture is not simply useful, but essential. The global population is estimated to reach approximately nine billion people by the year 2050, with nearly all population growth taking place in developing countries (Food & Agriculture Organization, 2009). The only way to meet a demand that large is to enhance our crops’ abilities to produce more, with less. We can’t create more land to grow more food; what we have now, is what we have to work with.

So the question remains on how to most effectively improve agricultural literacy among the portion of society that is either not raised, or educated in, the field of agriculture. Social media campaigns are only effective to a certain extent, as they still provide no ground for a concrete experience. There are just as many social media profiles that have been created to exploit the agriculture industry, as there have to advocate for it. What’s more, some of those that advocate for agriculture, despite having the best of intentions, also post facts and information that are slightly inaccurate; thus, fueling the growing level of agricultural illiteracy. There appears to be, however,

growing concern from consumer and environmental groups not commonly associated with agricultural interests for a functional level of agricultural literacy to understand food safety concerns, and environmental trade-offs associated with the structure of the agri-food system (Powell et al., 2008). The issue at hand might be just as much of an agricultural communication issue, as it is one of literacy.

### **Purpose and Objectives**

The purpose of this census study was to: 1) assess the agricultural literacy levels of all mothers who are Illinois Farm Families alumna ( $N = 73$ ) from 2012 through 2016, and 2) compare the personal characteristics of these mothers against their performance on an agricultural literacy assessment. There were three objectives that the researcher used to guide this study.

1. Describe their personal characteristics, such as: age, ethnicity, level of education, number of children, their location in the Chicagoland area, and their cohort.
2. Determine the agricultural literacy levels of all alumna of the IFF program across all cohorts. A score of 60% was deemed acceptable compared to benchmarks previously set by other literature (Cullen, Jones & Slate, 2011).
3. Discuss comparisons between IFF alumna personal characteristics and their levels of agricultural literacy.

## **Definition of Terms**

*Agricultural Literacy* – “the understanding and possession of knowledge needed to synthesize, analyze, and communicate basic information about agriculture” (Frick, 1991, p. 107).

*Benchmark* – “a point of reference against which something may be measured” (Harvey, 2004).

*Change Agent* – an individual who influences clients’ innovation decisions in a direction deemed desirable by a change agency (Rogers, 2003).

*Chicagoland* – informally describes the greater Chicago, Illinois area, including all of its surrounding towns and suburbs.

*Communication* – a process in which participants create and share information with one another in order to reach a mutual understanding (Rogers, 2003).

*Diffusion* – “the process in which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003, p. 5).

*Food and Fiber Systems Literacy* – term used synonymously with the term agricultural literacy (Igo, 1998).

*Food and Fiber System* – term used synonymously with agriculture (Igo, 1998).

*Heterophily* – the degree to which pairs of individuals who interact with one another are different in certain attributes (Rogers, 2003).

*Heterophilous* – describes situations in which a degree of heterophily exists (Rogers, 2003).

*Homophily* – the degree to which a pair of individuals who are communicating are similar (Rogers, 2003).

*Homophilous* – describes situations in which a degree of homophily exists (Rogers, 2003).

*Suburban* – areas containing between 2,500 and 50,000 people (U.S. Census Bureau).

*Urban* – areas containing more than 50,000 people (U.S. Census Bureau).

### **Assumptions**

1. The participants in this study regularly checked their provided email addresses.
2. The email containing the link to the assessment went directly to their inbox.

3. These participants answered all questions pertaining to their personal characteristics honestly.
4. These participants answered all questions on the Food and Fiber Systems Literacy assessment honestly and to the best of their ability.

### **Limitations**

1. The findings from this study are limited to the Illinois Farm Families program, and should not be generalized to other populations or like-programs.
2. The size of this population was thought to be nearly double its actual size, due to a miscommunication between the researcher and the program coordinator. The response rate was much lower than expected, as a result.
3. The assessment used was developed in 2004 by Pense and Leising, making it thirteen years old when it was used for this particular study. The FFSL needs to be updated in order to match trends in modern agriculture.
4. Although the five thematic areas of the FFSL aligned quite closely with the themes that the Illinois Farm Families program seeks to improve perceptions upon, it did not do so perfectly.
5. The researcher was unable to understand the coding system of questions by theme presented with the FFSL after it was acquired. Because of this, a thematic analysis was unable to correctly be conducted.
6. Agriculture is different, not just in all parts of the world, but even between regions here in the United States. The agricultural activities that these mothers

were exposed to, ultimately differ from what mothers in other regions of the country would readily have access to experiencing.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

#### **Agricultural Literacy**

Throughout the past twenty years, efforts to define agricultural literacy have moved from the mostly technical aspects of production and distribution of agricultural goods to include a sense of broader environmental and global social significance (Powell et al., 2008). Agricultural literacy is a working concept, with considerable range in meaning and impact (Powell et al., 2008). The vast amount of issues related to agricultural literacy have become more compelling in recent years, for both the general public, and the agricultural education profession (Powell et al., 2008). Laying a foundation for a conceptual model, the Committee on Agricultural Education in Secondary Schools (National Research Council, 1988) began to develop the idea of “agricultural literacy” and proposed that an agriculturally literate person would understand the food and fiber system in relation to its historical, economic, social, and environmental significance (Pense & Leising, 2004, p. 86). Since agricultural literacy first became a concern, the agricultural education profession has responded by defining what is meant by agricultural literacy, identifying modes of delivery, and developing a knowledge base linked to standards with a valid, reliable means of assessment (Powell et al., 2008).

A growing perception of agricultural illiteracy led to the identification of a common discontent that generated pressure to combat this illiteracy in various segments

of society, such as the agricultural industry, portions of the education establishment (e.g. agriculture, science, nutrition), environmental and sustainability activist groups, and government agencies with an agricultural focus (Powell et al., 2008). The push for agricultural literacy also has suffered somewhat from a perceived lack of utility outside of the agriculture field, which makes problematic the identification of a common sense of discontent (Powell et al., 2008). Many functions in daily society, however, seem to have little direct dependency on a generalized agricultural literacy (Powell et al., 2008). Our society has made it evident, that people do not consciously make the connection as to where their food comes from when in a grocery store or at a market.

### **Labeling and Consumers**

Most Americans lack a working knowledge of agricultural production practices (Frick, 1990). In recent years, the variety of voluntary labels placed on food and fiber products has grown exponentially, including words for phrases such as: Non-GMO, Raised Without Antibiotics, Gluten Free, Pesticide Free, Organic, Cage Free, and Grass-fed. Although there is nothing wrong with providing choices to consumers based on their demands, those demands can be rooted in confusion or misperceptions of agricultural production practices. When manufacturers or marketing firms know more about production practices than consumers, a market failure may exist (Bowman, Marshall, Kuchler & Lynch, 2016). Consumers may be misled by the use of confusing language or symbols in advertisements or on packages (Hastik & Mazis, 2011, p. 160).

Congress granted the FDA (Food and Drug Administration) the authority to protect consumers from misbranded products, such as drugs and food (Pomeranz, 2013, p. 619). The greatest issue with voluntary compliance for food manufacturers is that the FDA has failed to regulate them correctly and uniformly (Pomeranz, 2013). The poultry industry makes for a great example of how deceptive labeling has played upon what consumers don't already know. In 2007, Perdue Farms Incorporated developed the label RWA, or Raised Without Antibiotics, to put on all of their retail product (Bowman et al. 2016). They did this because they recognized that consumers were willing to pay a price premium for poultry products with this particular characteristic (Bowman et al., 2016). However, a legal issue arose when other meat manufacturers caught on to the new standard Perdue Farms Incorporated had set. Tyson Foods also attached the RWA label to their poultry products, in an attempt to keep up with their competitor. The problem with Tyson's marketing attempt, was that the RWA label was not just placed on Perdue products as an already obvious indicator of production practices (Bowman et al., 2016). Perdue had developed a scientifically trademarked process by which they could legally label their products as Raised Without Antibiotics, and because consumers were unable to distinguish the difference, a legal battle ensued (Bowman et al. 2016).

Another label that has caused much confusion among consumers is the "Non-GMO Verified" label. Consumers are generally interested in knowing about the food they consume, including its source and, if processed, the ingredients that may have been added to it (Wunderlich & Gatto, 2015, p. 842). Generally speaking, however, consumers know very little about genetically modified organisms, and the science that

goes into creating such specimens (Wunderlich & Gatto, 2015). What's more, manufacturers have recognized that consumers have been willing to pay extra to have a label that is indicative of products that are higher in quality, due to an absence of biotechnology. The FDA supports any food manufacturers who are honest in letting consumers know whether or not a product contains ingredients made from genetically modified organisms (Vecchione, Feldman & Wunderlich, 2015). In terms of organizations that act as verifiers of Non-GMO products, there is only one, which goes by the name "Non-GMO Project" (Vecchione et al., 2015). The presence of only one method of verification for this voluntary label's standard is both representative of its misleading message, and wasteful cost in creating such a label in the first place.

### **The Modern Agricultural Extension System**

The Cooperative Extension Service of land-grant colleges and universities has played a key role in the United States' worldwide reputation for agricultural efficiency (Campbell, 1998, p. 139). The first to propose such a plan was a professor from Jacksonville, Illinois by the name of Jonathan Baldwin Turner. He proposed not only the foundation of a state university for the agricultural and general industrial classes in Illinois, but such a system in every single state of the Union (Campbell, 1998, p. 9). Turner's work was later continued upon by a representative from Vermont named Justin Smith Morrill, who successfully pushed forth the passing of the original proposal in both the House and the Senate in 1862 (Campbell, 1998). Justin Smith Morrill, for whom this legislation took the name of, introduced the Morrill Act, which was signed into law by

President Abraham Lincoln in 1862 (Campbell, 1998). An interest in improving agriculture was evidenced by the organization of numerous local, state, and national agricultural associations and societies during the first half of the nineteenth century (Campbell, 1998, p. 6). Over time, the outreach focuses of our land grant institutions and agricultural extension services have evolved.

When it was originally created, the vast majority of our nation's people still lived and worked on farms (Campbell, 1998). Although our land grant and cooperative extension system focused on public outreach to rural communities in the United States, educating farmers about best practices for a given growing season, it has shifted to that of urban communities. "As the world becomes increasingly urban, food demand will come mainly from people living in cities while there will be fewer rural farmers producing food on less land with less water. Cities can play a bigger role in food security" (Teng, 2012, p. 1). "The national fabric's most serious strain lies in urban America. Violence, unemployment, poverty, poor housing, and pollution are neighbors with some of our most distinguished colleges and universities" (Campbell, 1998, p. 144). Programs like the Expanded Food and Nutrition Education Program (EFNEP) and the Master Gardener Program have served as ways to combat food insecurity in urban communities, but to also educate about how food is produced (Campbell, 1998).

### **Diffusion Defined**

"Diffusion is defined as the process in which an innovation is communicated through certain channels over time among the members of a social system (Rogers,

2003, p. 5).” It is not enough, however, to simply state that an innovation or information is communicated, without knowing what communication is. Rogers (2003) also defined communication as a process in which participants create and share information with one another in order to reach a mutual understanding. Although it may be simplistic to view human communication as linear, and sometimes one directional, that is not a generalizable observation. The exchange of information between a change agent and a client is two-way, and the communication channels on both ends are highly interconnected (Rogers, 2003). The diffusion of interests and agendas under the broad umbrella of agriculture compounds the challenge posed by lack of awareness, making it difficult to gain support for a common vision of agricultural literacy (Powell et al., 2008).

### **Research and Development**

In Rogers (2003) model of a centralized diffusion system, the top level is research and development, and beneath it are the change agents, followed by opinion leaders, and finally adopters. A centralized diffusion system has been concluded to most closely align with the structure of the Illinois Farm Families program, in the context of this particular study. The reason being, is that the root of all content and experience provided to the mothers who participate, stems from a level of research and development. One could argue that a decentralized diffusion system is more appropriate, however, as it has a more level structure, opposed to top down. Nevertheless, we feel that it is more appropriate to say that these mothers are returning to decentralized

environments, after going through a centralized program. The research and development that all change agents and opinion leaders look up to can be that of either land grant institutions, or agriculture industry efforts.

### **The Change Agents**

Rogers (2003) defines a change agent as an individual who influences clients' innovation decisions in a direction deemed desirable by a change agency. A change agent, however, may be more than just an individual, but an organization. The role of a change agent is to help facilitate a change in the behavior or perception of a particular group of people. A change agent usually seeks to secure the adoption of new ideas, but he or she may also attempt to slow the diffusion process and prevent the adoption of certain innovations with undesirable effects (Rogers, 2003).

The change agency of interest for this study is Illinois Farm Families. The Illinois Farm Families program was founded in 2009, and started off by gathering affiliate organizations, including: Illinois Beef Association, Illinois Pork Producers, Illinois Corn Marketing Board, Illinois Soybean Association, Midwest Dairy Association, and the Illinois Farm Bureau (L. Olson, personal communication, July 11, 2016). The mission of this program is to educate mothers in the Chicagoland area, and provide them with a first-hand experience of stepping foot on a farm. There are various agricultural operations around the state of Illinois that are in cooperation with Illinois Farm Families, and that welcome these cohorts of mothers from Chicagoland onto their farms each year. To develop such a program, Illinois Farm Families conducted and

utilized both quantitative and qualitative data, and assessed consumer attitudes toward farmers and farming (L. Olson, personal communication, July 11, 2016). Olson (personal communication, July 11, 2016) also notes that due to the vast amount of research conducted on consumers, farming, and food, that the IFF used national data from organizations such as the United States Farmer and Ranchers Alliance (USFRA) and the Center for Food Integrity (CFI). IFF's first cohort was completed in 2012 having just ( $n = 9$ ) participants, followed by 2013 ( $n = 24$ ), 2014 ( $n = 18$ ), 2015 ( $n = 27$ ), and in 2016 ( $n = 53$ ). It is important to note that 2016 was an optional repeat year, in that both alumni and new participants were invited to go through the program over the course of that year.

The other change agent involved with the Illinois Farm Family program is MorganMyers, a communications firm that specializes in brand enhancement of farmers to consumers. MorganMyers's key role as a change agent is putting Chicagoland mothers in contact with Illinois Farm Families, in order to form cohorts of mothers each year. These mothers were chosen as a result of their involvement in online focus groups, each of them curious to learn more about the journey of their food, from farm to table. In essence, the role of Illinois Farm Families, aside from facilitating the program itself, is to also act as a liaison on the behalf of all cooperating Illinois farming operations; whereas, the role of MorganMyers is to do just the same, on the behalf of all Chicagoland mothers interested, and participating in, the Illinois Farm Families program. (L. Olson, personal communication, July 11, 2016)

## **The Opinion Leader**

Rogers (2003) defined opinion leadership, as the degree to which an individual is able to influence another individual's attitudes or overt behavior in a desired way with a relatively high frequency. The time and energy of the change agent are scarce resources (Rogers, 2003). By focusing communication activities upon opinion leaders in a social system, the change agent can leverage these scarce resources and hasten the rate of diffusion of an innovation among clients (Rogers, 2003). The opinion leaders for this study are the mothers participating in the Illinois Farm Families program. Some may argue that IFF or the cooperating farmers are the opinion leaders for the sake of this program, and that the mothers are adopters, and that argument could certainly stand. After contemplating whether IFF emulates a centralized or decentralized diffusion system, a centralized structure has been deemed more appropriate. Nevertheless, these mothers have been chosen to participate in the IFF program based on their involvement in online focus groups. Their heightened sense of curiosity of the agri-food system alone deems them an opinion leader in their local network of near peers. If an improvement in agricultural literacy is achieved, these mothers as opinion leaders will hopefully improve their near peers' perceptions of agriculture as well.

## **Adopters**

“Americans have a lot of questions about where their food comes from, how it is raised and if it is good for their health long-term (Whaley & Enciso, 2011, p. 1).” The mothers in the IFF program were identified as potential adopters of knowledge that

farming practices are safe, and that there is no malicious intent behind that of agricultural research and development, change agencies, and producers. Rogers (2003) defined heterophily as the degree to which pairs of individuals who interact with one another are different in certain attributes. The relationship that these mothers have with farmers is heterophilous, in that, they live in very different environments, and have different knowledge and experiences to formulate their opinions. Although Rogers (2003) found that heterophilous communication is not typically as effective as homophilous communication, he noted that if there is an interpersonal connection between two groups, then uniquely, this 'bridge' is especially important in conveying an innovation.

What's more, the role of these mothers could shift as they move from engaging in the Illinois Farm Families program, to their urban and suburban environments. Their roles as adopters in a centralized diffusion system could potentially shift to opinion leaders in a decentralized diffusion system, in that, they now have an improved knowledge of agriculture amongst their networks of near peers. Rogers (2003) defined homophily as the degree to which a pair of individuals who are communicating are similar. These similarities may be that of socioeconomic status, background, or beliefs in general. Homophilous interactions are typically easier and more effective, because like-minded individuals are prone to a better understanding of one another. The adoption of correct perceptions of agricultural practices, combined with their homophilous relationships with near peers in their local urban and suburban networks, will hopefully yield an effective communication of their farming experiences.

## **Purpose**

Today's learners are progressive, and societal needs have changed considerably with communication advancements and access to personal technologies (Caton-Rosser, Looney, & Schneider, 2014, & Roberts et al., 2016). The purpose of this census study is to assess the agricultural literacy levels of mothers after their completion of the Illinois Farm Families program, which was established in 2009. Historically, society more closely identified with agrarian culture, and was more familiar with the production, distribution, and use of agricultural products (Powell et al., 2008). As the United States has become more urbanized, this connection has become more tenuous, (Powell et al., 2008, p. 87). Each year, IFF takes cohorts of mothers from the Chicagoland area (Figure 1) out to a variety of farming operations around the state of Illinois. The idea is to allow them to have not just a first-hand experience being on a farm, but the opportunity to speak directly with farmers about what, how, when, and why they do specific jobs in their profession. While IFF was more specifically designed to improve upon these mothers' perceptions of agriculture, another goal is to inadvertently make them more agriculturally literate consumers.

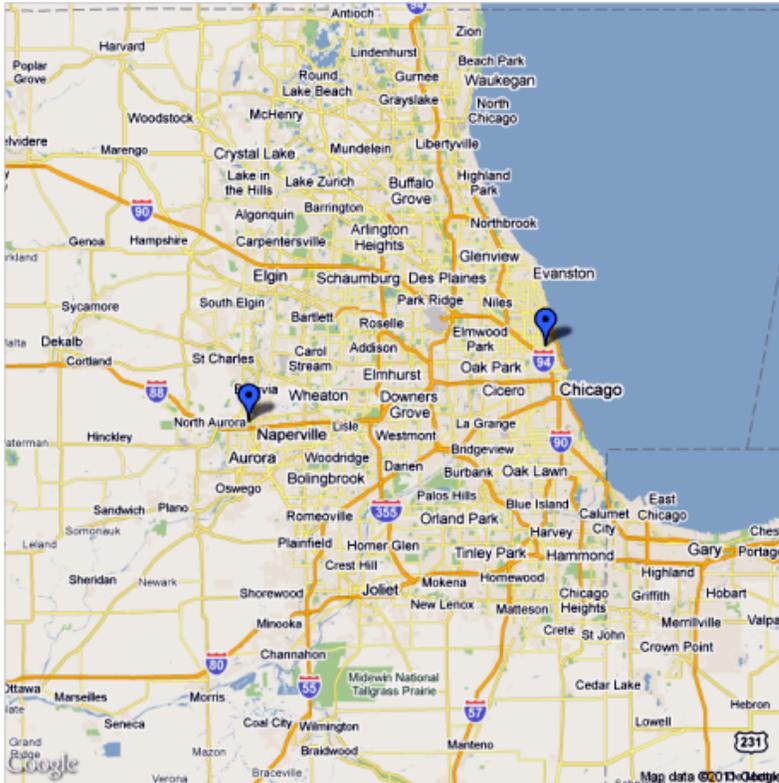


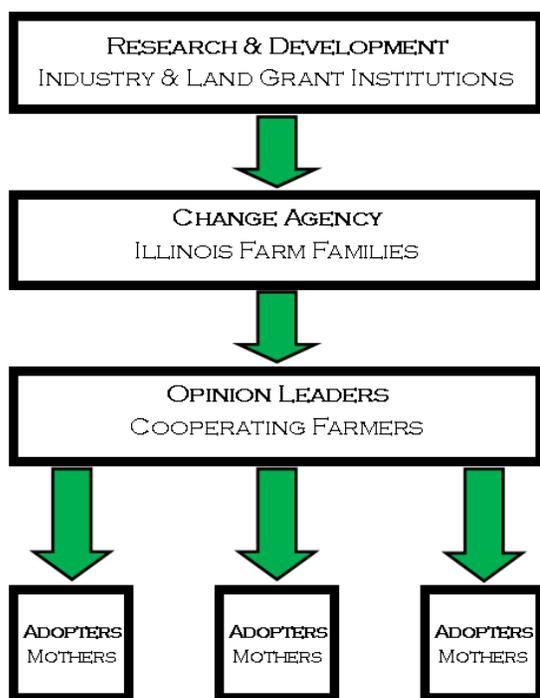
Figure 1. Map of the Chicagoland area, adapted from Google (2010).

**Research Objectives**

1. Describe their personal characteristics, such as: age, ethnicity, level of education, number of children, their location in the Chicagoland area, and their cohort.
2. Determine the agricultural literacy levels of all alumna of the IFF program across all cohorts. A score of 60% was deemed acceptable compared to benchmarks previously set by other literature (Cullen et al., 2011).
3. Discuss comparisons between IFF alumna personal characteristics and their levels of agricultural literacy.

## **Theoretical Frameworks**

The theory used to frame this study is Rogers' Diffusion of Innovations. Rogers (2003) defines diffusion as the "process by which an innovation is communicated through certain channels over time among the members of a social system (p. 5)." A system identified and structured out of diffusion theory is known as a centralized diffusion system. Centralized diffusion systems (Figure 2) are more similar to that of modern agricultural extension services, and employ a top-down method of communication (Rogers, 2003). The researcher feels that the IFF program fits into a centralized diffusion system as a change agency, followed by the cooperating farmers as opinion leaders, and the mothers as adopters and opinion leaders within their network of near peers. If the information communicated throughout the IFF program is producing agriculturally literate mothers, then the researcher assumes that there is some level of significance to their participation; and, that successful centralized diffusion communication channels are active. Further research would need to be conducted to validate these assumptions, however.



*Figure 2.* Centralized Diffusion System, in the Context of this Study.

The criteria of experience are also very important, for the Illinois Farm Families program, and especially the context of this study. While these mothers are encouraged to blog and research independently, they would not have a purpose to do so without having experienced visiting different types of farms, and directly communicating with farmers and producers (L. Olsen, personal communication, December 27, 2016). All human experience is ultimately social, in that, it involves communication and contact (Dewey, 1938, p. 38). Dewey (1938, p. 38) noted that the failure to take the moving force of an experience into account so as to judge and direct it on the ground of what it is moving into, means disloyalty to the principle of experience itself. “Dewey also indicated that each subsequent experience builds on past experiences, thus indicating a cyclical process (Roberts, 2006).” “We hope to not just educate these mothers about how their food is

produced, but also to gain their trust in that their food is produced safely and ethically” (L. Olson, personal communication, December 27, 2016). The mothers who have participated in this program ultimately have to make judgments when making their grocery-buying decisions. Their judgments have been formulated out of previous impulses, observations, and knowledge gained out of experience. Based on the criteria of experiential learning, the researcher also views the Illinois Farm Families program in the context of Dewey’s experiential learning model.

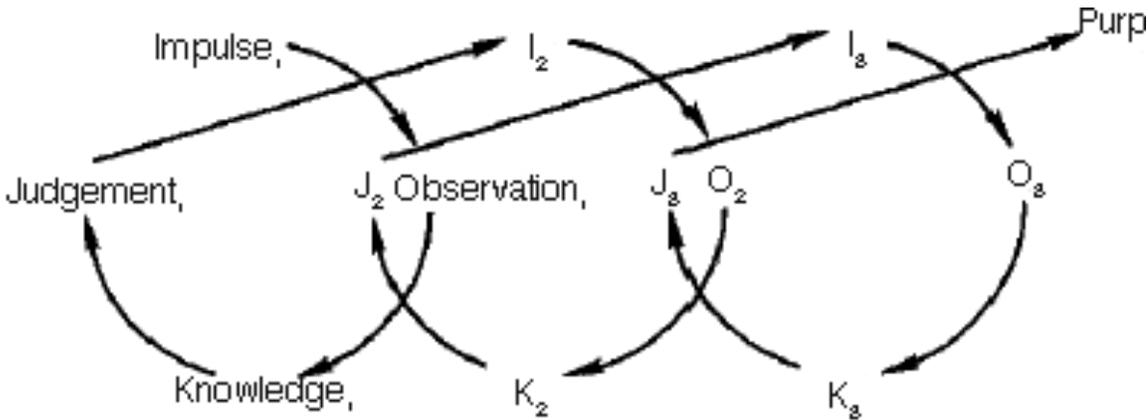


Figure 3. Dewey’s Experiential Learning Model adapted from Roberts (2006) in the Journal of Agricultural Education.

## **CHAPTER III**

### **METHODOLOGY**

#### **Introduction**

A census tries to look at the entire population, opposed to only part of one (Fraenkel, Wallen & Hyun, 2012). This census study was developed to assess the agricultural literacy levels of mothers after their completion of the Illinois Farm Families program. Two challenges facing agricultural education today include the need for a critical mass of the next generation of agriculturists interested in food and agriculture, and to educate those who do not understand food and agriculture systems (Mercer, 2015; Roberts et al., 2016). Lack of knowledge about agricultural issues could be misperceived as apathy, attenuating the perception of need for agricultural literacy (Powell et al., 2008, p. 87). Since the ultimate goal of IFF is to improve upon these mothers' perceptions of agriculture, it could also be assumed that they are agriculturally literate as well.

The researcher framed this study around Rogers' diffusion of innovations. Specifically, this study focuses on a system that was identified and structured out of diffusion theory, known as a centralized diffusion system. Centralized diffusion systems are more similar to that of the modern agricultural extension service (Rogers, 2003). Information trickles down in centralized diffusion systems, moving from research and development, to change agents, to opinion leaders, and finally to adopters (Rogers, 2003). The communication channels of interest were those between the IFF program [change agency], the cooperating farmers [opinion leaders], and the mothers in the IFF

program [adopters]. Although this was simply a post-assessment of agricultural literacy, the researcher hoped to make recommendations to IFF should there be significant areas of weakness, based on the results of this study.

### **Institutional Review Board**

Prior to conducting any research on human subjects, the investigators had to obtain approval from the Institutional Review Board of Texas A&M University. The application outlined the intentions of the researchers, and the procedures that were taken to ensure that all rights of human subjects were protected, and that this study posed no more risk than those encountered in everyday life. All necessary documents including the study information sheet and letter of consent (see Appendix B), the recruitment email (see Appendix C), and the assessment (see Appendix D) and personal questions (see Appendix E), were included in the application to be stamped for approval. There was no monetary incentive to participating in this study. If participants did not want to proceed with the online assessment, they could simply close out. This study was approved on January 20, 2017 (see Appendix A). The institutional review board assigned the code IRB2017-003 to this study.

### **Instrumentation**

The IFF program seeks to address and improve upon criteria such as: food safety, antibiotics, hormones, genetically modified foods, pesticides, sustainability and environment, and health. Through analyzing both quantitative and qualitative research,

regarding consumer preferences and purchasing behaviors, we concluded that these were the most important categories to address and improve perceptions upon (L. Olson, personal communication, December 27, 2016). The instrument intended for use in this study was derived from another study found in the review of literature, and is titled the Food and Fiber Systems Literacy assessment (FFSL). Pense and Leising (2004) identified that there was no existing instrument that could be used to assess agricultural literacy levels, and thus, developed the FFSL to do just that on grades 9-12. The instrument underwent a considerable amount of revision, and was written in a format that would be consistent with a criterion-referenced knowledge test (Pense & Leising, 2004, p. 89).

While the FFSL was created on the benchmark and frameworks of agricultural literacy assessment in adolescents, it has since been used to do the same in emerging adults. Jones (2013) adapted the FFSL to assess agricultural literacy in incoming freshman at Oklahoma State University by reducing the number of questions from the original fifty, to twenty-five, while still equally assessing the five thematic areas of the instrument. The five themes of the FFSL included: A) Understanding Agriculture, B) History, Culture, and Geography, C) Science and Environment, D) Business and Economics, E) Food, Nutrition, and Health.

### **Validity and Reliability**

Pense and Leising (2004) conducted two pilot tests to determine the validity and reliability of the instrument. The first pilot test was with 17 high school seniors at Yale

Senior High School, a small rural high school in Oklahoma (Pense & Leising, 2004, p. 89). Acknowledging that the instrument was criterion-referenced with five thematic areas in agriculture, and that the instrument was less homogenous, a reliability coefficient of 0.846 was computed for the first pilot test using the Kuder/Richardson-20 (KR-20) Method (Pense & Leising, 2004, p. 89). The second and final pilot test was conducted with twenty high school seniors at Glencoe High School, also a small rural high school in Oklahoma (Pense & Leising, 2004, p. 89). Also using the Kuder/Richardson-20 (KR-20) Method, the second pilot test yielded a reliability coefficient of 0.933 (Pense & Leising, 2004, p. 89). Pense and Leising (2004) found the instrument to also have validity after the extensive revision that the FFSL underwent throughout the pilot testing process.

### **Population**

The target population for this study was all urban and suburban mothers in the state of Illinois. The accessible population was all mothers in the Chicago, Illinois metropolitan area. Our focus for this study was a census of all mothers who are alumnae of the Illinois Farm Families program ( $N = 73$ ). These mothers are important, in that, grocery-buying decisions in a household have been found to be dominated by the wife (Green & Cunningham, 1975). “A mother draws upon past experiences of experts, as well as her own, to guide how she regulates the decisions made on the behalf of her children (Dewey, 1938, p. 42).” The researcher recognizes that not all households have mothers or mother figures in them; therefore it is reasonable to use the term ‘parent’ to

describe such a role. Hindin, Contento, and Gussow (2004) found that parents might play an important role in teaching their children how to understand and critically observe commercials, or media in general. Parents placed increased value on good nutrition, and they felt that it was important to them that their children understand what is truthful in advertisements (Hindin et al., 2004).

### **Data Collection**

“Surveys that are completely electronic, relying only on email contacts to obtain internet responses, are the fastest growing form of surveying occurring throughout the United States, as well as throughout most of the world (Dillman, Smyth, & Christian, 2014, p. 301).” Since distance played a factor in separating the researcher and the population for this study, an online version of the FFSL was sent electronically using IFF participants’ email addresses. A list serve of IFF program participant email addresses was obtained from the IFF program coordinator, in order to distribute the survey. A description of the study, as well as, a letter of consent was visible to participants prior to the commencement of the survey. Should they have declined, the survey ended immediately, thanking the participant for their time. The total number of participants that received the online assessment was ( $N = 73$ ). The total number of completed responses was ( $N = 31$ ), which yielded a 42.5% response rate.

The web-based survey was constructed and distributed according to The Tailored Design Method (Dillman et al., 2014). The time needed for participants to complete this survey should not have exceeded fifteen minutes. There were reminder emails sent at

one week to participants who had not yet responded. A second reminder email was sent after two weeks to the remainder of participants who had not yet responded. The researcher closed the data collection process after three weeks of the survey being distributed. To control for nonresponse error, the researcher compared early and late responders, operationally defined as the first and last 50% of respondents (Lindner, Murphy, & Briers, 2001). The researcher also used “Days to Respond” as a regression variable, comparing respondents to nonrespondents (Lindner et al., 2001). “The regression model did not yield statistically significant results, so it was assumed that nonrespondents did not differ from respondents (Lindner et al., 2001).”

### **Data Analysis**

The data were exported from Qualtrics into Microsoft Excel 2011. To interpret the data, the variables for this study were coded numerically in the order they were listed in the original question. For example, cohort 2012 was assigned a number one, 2013 was assigned a number 2, 2014 was assigned a number three, 2015 was assigned a number four, and 2016 was assigned a number five. These data were expressed using means as a measure of central tendency. They were also expressed as frequencies, percentages, and standard deviations as measures of variability.

The first objective was to describe the personal characteristics of mothers who have participated in the IFF program. These included age, ethnicity, level of education, number of children, their location in the Chicagoland area, and their cohort. The researcher used frequencies and percentages to express these data.

The second objective of this study was to determine the agricultural literacy levels of IFF alumni from all five cohorts. A percentage score of 60% of the 50-question assessment was deemed acceptable, or passing. These data were expressed as frequencies, percentages, means, and standard deviations, and were broken up according to the personal characteristics identified from objective one.

Objective three was to analyze any relationships between participants' personal characteristics and their results, based on the FFSL. Because the researcher only reached ( $N = 31$ ) total responses, a correlation or regression analysis was not feasible. So, to address objective three, the researcher compared the findings between objectives one and two against each other.

## **CHAPTER IV**

### **FINDINGS**

#### **Introduction**

A census tries to look at the entire population, opposed to only part of one (Fraenkel et al., 2012). This census study was developed to assess the agricultural literacy levels of mothers after their completion of the Illinois Farm Families program. Two challenges facing agricultural education today include the need for a critical mass of the next generation of agriculturists interested in food and agriculture, and to educate those who do not understand food and agriculture systems (Mercer, 2015; Roberts et al., 2016). Lack of knowledge about agricultural issues could be misperceived as apathy, attenuating the perception of need for agricultural literacy (Powell et al., 2008, p. 87). Since the ultimate goal of IFF is to improve upon these mothers' perceptions of agriculture, it could also be assumed that they are agriculturally literate as well.

The researcher framed this study around Rogers' diffusion of innovations. Specifically, this study focuses on a system that was identified and structured out of diffusion theory, known as a centralized diffusion system. Centralized diffusion systems are more similar to that of the modern agricultural extension service (Rogers, 2003). Information trickles down in centralized diffusion systems, moving from research and development, to change agents, to opinion leaders, and finally to adopters (Rogers, 2003). The communication channels of interest are those between the IFF program [change agency], the cooperating farmers [opinion leaders], and the mothers in the IFF

program [adopters]. Although this is simply a post-assessment of agricultural literacy, the researcher hopes to make recommendations to IFF should there be significant areas of weakness, based on the results of this study.

## **Purpose**

Today's learners are progressive, and societal needs have changed considerably with communication advancements and access to personal technologies (Caton-Rosser et al., 2014; Roberts et al., 2016). The purpose of this census study was to assess the agricultural literacy levels of mothers after their completion of the Illinois Farm Families program, which was established in 2009. Historically, society more closely identified with agrarian culture, and was more familiar with the production, distribution, and use of agricultural products (Powell et al., 2008). As the United States has become more urbanized, this connection has become more tenuous, Powell et al., 2008), p. 87). Each year, IFF takes cohorts of mothers from the Chicagoland area (Figure 1) out to a variety of farming operations around the state of Illinois. The idea is to allow them to have not just a first-hand experience being on a farm, but the opportunity to speak directly with farmers about what, how, when, and why they do specific jobs in their profession. While IFF was more specifically designed to improve upon these mothers' perceptions of agriculture, another goal is to inadvertently make them more agriculturally literate consumers.

## **Research Objectives**

1. Describe their personal characteristics, such as: age, ethnicity, level of education, number of children, their location in the Chicagoland area, and their cohort.
2. Determine the agricultural literacy levels of all alumna of the IFF program across all cohorts. A score of 60% was deemed acceptable compared to benchmarks previously set by other literature (Cullen et al., 2011).
3. Discuss comparisons between IFF alumna personal characteristics and their levels of agricultural literacy.

These mothers ( $N = 31$ ) were asked which year, or years, they participated in the Illinois Farm Families Program. The 2016 cohort was also a repeat year, in that, any mothers who had participated in the previous four years were invited back to participate again. There were 2 (6.45%) in the 2012 cohort, 9 (29.03%) in the 2013 cohort, 8 (25.81%) in the 2014 cohort, 12 (38.71%) in the 2015 cohort, and 6 (19.35%) in the 2016 cohort (see Table 1).

Table 1.

*Personal Characteristics of Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Year(s) Participated*

Year(s) Participated	<i>f</i>	%
2012	2	6.45
2016	6	19.35
2014	8	25.81
2013	9	29.03
2015	12	38.71

The age of these mothers ( $n = 30$ ) was also taken into consideration, and they were asked to identify which age range they fell within. There were 0 (0.00%) of these mothers that fell between ages 20-29, 7 (23.33%) fell between ages 30-39, 18 (60%) fell between ages 40-49, 5 (16.67%) fell between ages 50-59, and 0 (0.00%) fell between ages 60-69 (see Table 2).

Table 2.

*Personal Characteristics of Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 30), Age Range*

Age Range	<i>f</i>	%
20-29	0	0
60-69	0	0
50-59	5	16.67
30-39	7	23.33
40-49	18	60

When considering the ethnicities of these mothers ( $n = 31$ ), 28 (90.32%) identified themselves as being Caucasian (White). Only 1 (3.23%) of these mothers identified themselves as being Black, 2 (6.45%) of these mothers that identified themselves as being Hispanic, 0 (0.00%) identified as Asian, and 0 (0.00%) of them identified as Other or an ethnicity not provided (see Table 3).

Table 3.

*Personal Characteristics of Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Ethnicity*

Ethnicity	<i>f</i>	%
Asian	0	0
Other	0	0
Black	1	3.23
Hispanic	2	6.45
Caucasian (White)	28	90.32

Regarding these mothers' levels of education, 2 (6.45%) reported having completed a high school diploma, 0 (0.00%) had obtained a technical certificate, 1 (3.23%) had obtained an associate's degree, 13 (41.94%) earned a bachelor's degree, 15 (48.39%) reported earning a master's degree, and 0 (0.00%) had earned a doctorate (see Table 4).

Table 4.

*Personal Characteristics of Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Level of Education*

Level of Education	<i>f</i>	%
Doctorate	0	0
Technical Certificate	0	0
Associate's Degree	1	3.23
High School Diploma	2	6.45
Bachelor's Degree	13	41.94
Master's Degree	15	48.39

As for the number of children these mothers have, 1 (3.23%) reported having just one child, 11 (35.48%) reported having two children, 14 (45.16%) reported having three children, 2 (6.45%) reported having four children, and 3 (9.68%) reported having five or more children in their families (see Table 5).

Table 5.

*Personal Characteristics of Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Number of Children*

Number of Children	<i>f</i>	%
1	1	3.23
4	2	6.45
5+	3	9.68
2	11	35.48
3	14	45.16

When considering the approximate areas that these mothers reside in the Chicagoland area, 8 (25.82%) identified themselves living in Area 1, being Chicago proper. There were 9 (29.03%) who identified living in Area 2, 10 (32.26%) who identified living in Area 3, 3 (9.68%) who identified living in Area 4, and 1 (3.23%) who identified living in Area 5 (see Table 6). For clarification, Areas 2 is approximately 10 miles from Area 1, Area 3 is approximately 20 miles from Area 1, Area 4 is approximately 30 miles from Area 1, and Area 5 is approximately 40 miles from Area 1.

Table 6.

*Personal Characteristics of Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Area in Chicagoland*

Area in Chicagoland	<i>f</i>	%
Area 5	1	3.23
Area 4	3	9.68
Area 1	8	25.81
Area 2	9	29.03
Area 3	10	32.26

Objective two sought to determine the agricultural literacy levels of all alumni of the Illinois Farm Families Program, based on the Food and Fiber Systems Literacy assessment. On the 50-item FFSL test, mothers from the 2012 cohort ( $n = 2$ , 6.45%) had a mean score of 34.5 ( $SD = 10.61$ ). Mothers from the 2013 cohort ( $n = 9$ , 29.03%) had a mean score of 33.88 ( $SD = 5.25$ ). Mothers from the 2014 cohort ( $n = 8$ , 25.81%) had a mean score of 33.88 ( $SD = 5.25$ ). Mothers from the 2015 cohort ( $n = 12$ , 38.71%) had a mean score of 32.83 ( $SD = 6.41$ ). Mothers from the 2016 cohort ( $n = 6$ , 19.35%) had a mean score of 31.83 ( $SD = 5.91$ ) (see Table 7).

Table 7.

*A description of FFSL test scores for Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Cohort*

Cohort	<i>f</i>	%	<i>M</i>	<i>SD</i>
2016	6	19.35	31.83	5.91
2015	12	38.71	32.83	6.41
2013	9	29.03	33.88	5.25
2012	2	6.45	34.5	10.61
2014	8	25.81	38.25	4.4

Regarding these mothers' performance on the FFSL test based on their age range, mothers from ages 20-29 ( $n = 0$ , 0.00%) had a mean score of 0 ( $SD = 0$ ). Mothers from ages 30-39 ( $n = 7$ , 22.58%) had a mean score of 33 ( $SD = 5.83$ ). Mothers from ages 40-49 ( $n = 18$ , 58.06%) had a mean score of 34.61 ( $SD = 5.49$ ). Mothers from ages 50-59 ( $n = 5$ , 16.12%) had a mean score of 33.8 ( $SD = 10.85$ ). Mothers from ages 60-69 ( $n = 0$ , 0.00%) had a mean score of 0 ( $SD = 0$ ) (see Table 8).

Table 8.

*A description of FFSL test scores for Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 30), Ages*

Ages	<i>f</i>	%	<i>M</i>	<i>SD</i>
20-29	0	0	0	0
60-69	0	0	0	0
30-39	7	22.58	33	5.83
50-59	5	16.12	33.8	10.85
40-49	18	58.06	34.61	5.49

Regarding these mothers' performance on the FFSL based on their ethnicity, those who identified as Caucasian (White) ( $n = 28, 90.32\%$ ) had a mean score of 35.18 ( $SD = 5.99$ ). Those mothers who identified as Black ( $n = 1, 3.22\%$ ) had a mean score of 27 ( $SD = 0$ ), and mothers identifying as Hispanic ( $n = 2, 6.45\%$ ) had a mean score of 25 ( $SD = 2.82$ ). There were no mothers who identified as Asian or Other ( $n = 0, 0.00\%$ ), 0 ( $SD = 0$ ) (see Table 9).

Table 9.

*A description of FFSL test scores for Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Ethnicity*

Ethnicity	<i>f</i>	%	<i>M</i>	<i>SD</i>
Asian	0	0	0	0
Other	0	0	0	0
Hispanic	2	6.45	25	2.82
Black	1	3.22	27	0
Caucasian (White)	28	90.32	35.18	5.99

As for these mothers' performance on the FFSL based on their level of completed education, those having completed a High School Diploma ( $n = 2$ , 6.45%) had a mean score of 26 ( $SD = 7.07$ ). There were no mothers ( $n = 0$ , 0.00%) who reported earning a Technical Certificate, 0 ( $SD = 0$ ). Those mothers having earned an Associate's degree ( $n = 1$ , 3.22%) had a mean score of 22 ( $SD = 0$ ). Mothers having earned a Bachelor's Degree ( $n = 13$ , 41.94%) had a mean score of 34.31 ( $SD = 4.59$ ). Those mothers who reported earning a Master's Degree ( $n = 15$ , 48.39%) had a mean score of 36.13 ( $SD = 6.45$ ). Mothers having earned a Doctorate ( $n = 0$ , 0.00%) had a mean score of 0 ( $SD = 0$ ) (see Table 10).

Table 10.

*A description of FFSL test scores for Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Education*

Education	<i>f</i>	%	<i>M</i>	<i>SD</i>
Doctorate	0	0	0	0
Technical Certificate	0	0	0	0
Associate's Degree	1	3.22	22	0
High School Diploma	2	6.45	26	7.07
Bachelor's Degree	13	41.94	34.31	4.59
Master's Degree	15	48.39	36.13	6.45

These mothers' number of children was taken into consideration regarding their performance on the FFSL test. Mothers who reported having 1 child ( $n = 1$ , 3.22%) had a mean score of 22 ( $SD = 0$ ). Mothers who reported having 2 children ( $n = 11$ , 35.48%) had a mean score of 33.58 ( $SD = 7.89$ ). Mothers who reported having 3 children ( $n = 14$ , 45.16%) had a mean score of 35.07 ( $SD = 4.43$ ). Mothers who reported having 4 children ( $n = 2$ , 6.45%) had a mean score of 29.5 ( $SD = 3.55$ ). Mothers who reported having 5 or more children ( $n = 3$ , 9.68%) had a mean score of 36.33 ( $SD = 7.57$ ) (see Table 11).

Table 11.

*A description of FFSL test scores for Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Number of Children*

Number of Children	<i>f</i>	%	<i>M</i>	<i>SD</i>
1	1	3.22	22	0
4	2	6.45	29.5	3.55
2	11	35.48	33.58	7.89
3	14	45.16	35.07	4.43
5+	3	9.68	36.33	7.57

Regarding these mothers' performance on the FFSL based on their approximate area of residence in the Chicagoland area, those who reported living in Area 1 ( $n = 8$ , 25.81%) had a mean score of 33.5 ( $SD = 7.07$ ). Mothers who reported living in Area 2 ( $n = 9$ , 29.03%) had a mean score of 36.44 ( $SD = 5.43$ ). Mothers who reported living in Area 3 ( $n = 10$ , 32.25%) had a mean score of 33.7 ( $SD = 6.67$ ). Mothers who reported living in Area 4 ( $n = 3$ , 9.68%) had a mean score of 31.33 ( $SD = 8.96$ ). Mothers who reported living in Area 5 ( $n = 1$ , 3.22%) had a mean score of 35 ( $SD = 0$ ) (see Table 12).

Table 12.

*A description of FFSL test scores for Illinois Farm Families Alumnae, Cohorts 2012-2016 (N = 31), Area in Chicagoland*

Area in Chicagoland	<i>f</i>	%	<i>M</i>	<i>SD</i>
4	3	9.68	31.33	8.96
1	8	25.81	33.5	7.07
3	10	32.25	33.7	6.67
5	1	3.22	35	0
2	9	29.03	36.44	5.43

## CHAPTER V

### CONCLUSIONS

#### **Introduction**

A census tries to look at the entire population, opposed to only part of one (Fraenkel et al., 2012). This census study was developed to assess the agricultural literacy levels of mothers after their completion of the Illinois Farm Families program. Two challenges facing agricultural education today include the need for a critical mass of the next generation of agriculturists interested in food and agriculture, and to educate those who do not understand food and agriculture systems (Mercer, 2015; Roberts et al., 2016). Lack of knowledge about agricultural issues could be misperceived as apathy, attenuating the perception of need for agricultural literacy (Powell et al., 2008, p. 87). Since the ultimate goal of IFF is to improve upon these mothers' perceptions of agriculture, it could also be assumed that they are agriculturally literate as well.

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program [adopters]. Although this is simply a post-assessment of agricultural literacy, the researcher hopes to make recommendations to IFF should there be significant areas of weakness, based on the results of this study.

## **Purpose**

Today's learners are progressive, and societal needs have changed considerably with communication advancements and access to personal technologies (Caton-Rosser et al., 2014; Roberts et al., 2016). The purpose of this census study was to assess the agricultural literacy levels of mothers after their completion of the Illinois Farm Families program, which was established in 2009. Historically, society more closely identified with agrarian culture, and was more familiar with the production, distribution, and use of agricultural products (Powell et al., 2008). As the United States has become more urbanized, this connection has become more tenuous, (Powell et al., 2008, p. 87). Each year, IFF takes cohorts of mothers from the Chicagoland area (Figure 4) out to a variety of farming operations around the state of Illinois. The idea is to allow them to have not just a first-hand experience being on a farm, but the opportunity to speak directly with farmers about what, how, when, and why they do specific jobs in their profession. While IFF was more specifically designed to improve upon these mothers' perceptions of agriculture, another goal is to inadvertently make them more agriculturally literate consumers.

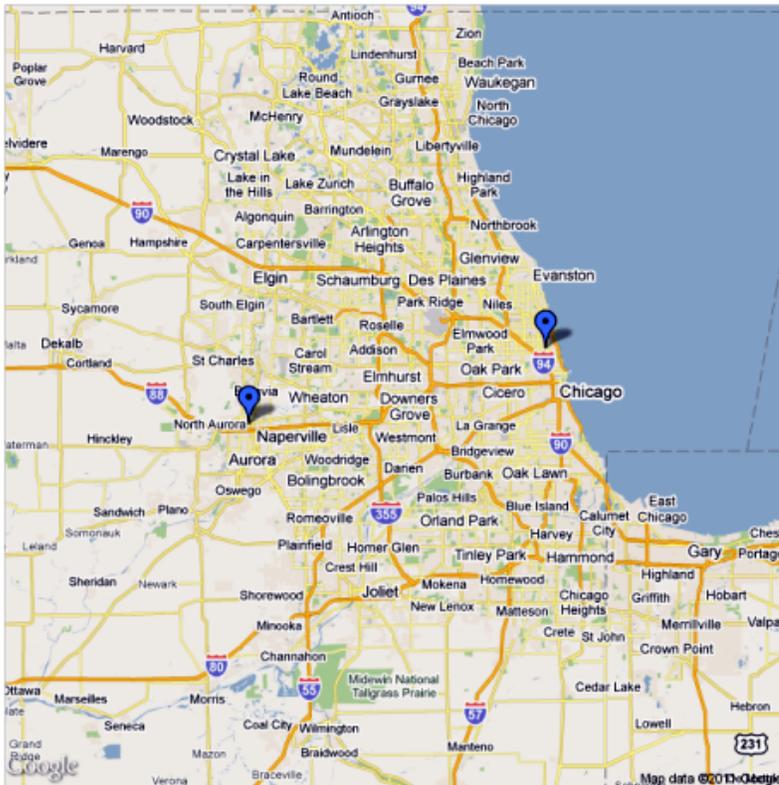


Figure 4. Second map of the Chicagoland area, adapted from Google (2010).

## Research Objectives

1. Describe their personal characteristics, such as: age, ethnicity, level of education, number of children, their location in the Chicagoland area, and their cohort.
2. Determine the agricultural literacy levels of all alumnae of the IFF program across all cohorts. A score of 60% was deemed acceptable compared to benchmarks previously set by other literature (Cullen et al., 2011).
3. Discuss comparisons between IFF alumnae personal characteristics and their levels of agricultural literacy.

## **Methods**

To measure these mothers' knowledge of agriculture, a 50-question criterion-referenced test was used. More specifically, the Food and Fiber Systems Literacy test, designed by Pense and Leising (2004) was used to assess agricultural literacy levels in all mothers who are alumnae of the Illinois Farm Families program. Added to the FFSL were six questions used to identify personal characteristics of these alumnae. The researcher collected information to observe any relationships between these mothers' personal characteristics and their agricultural literacy levels. All data were analyzed using frequencies, percentages, means, and standard deviations. These statistics were to reflect only that of the population of interest, and are not to be generalized to other populations outside of this one (R. Strong, personal communication, December, 15, 2016).

## **Limitations**

The findings from this study are limited to the Illinois Farm Families program, and should not be generalized to other populations or like-programs. Due to a miscommunication between the researcher and program coordinator, the size of this population was thought to have been nearly double its actual size ( $N = 131$ ). As a result, the response rate achieved was much lower than expected, and hindered the ability to run more advanced statistical analyses. Also, the instrument used was developed back in 2004 by Pense and Leising, which meant that it was thirteen years old when it was used

to assess agricultural literacy in this study. The FFSL needs to be updated to match the trends of modern agriculture.

Also, the five thematic areas of the FFSL aligned quite closely with the themes that the Illinois Farm Families program seeks to improve perceptions upon, but it did not do so perfectly. What's more, when the instrument was finally acquired, the researcher was unable to understand the coding system of question by theme. Had the instrument creator been clearer about this, a thematic analysis would have been conducted to provide more detailed recommendations. Finally, the researcher recognized that agriculture is different in all parts of the world, and even between regions here in the United States. The experiences of these mothers ultimately differed from what could have been experienced in other populations, which is why these results should not be generalized to others.

## **Conclusions and Discussion**

To date, no outside entity has expressed an interest in conducting research on the Illinois Farm Families program, so this study was the first. The typical mother that participates in the IFF program is Caucasian (White), and between the ages of 40 and 49. The majority of them had either 2 or 3 children, and were evenly distributed residing in Areas 1, 2, or 3; meaning that, they all live within an approximate 30-mile radius of downtown Chicago. Interestingly, many of them possess at least a Bachelor's degree, and approximately half of them possess a Master's degree. The level of participation gradually increased over time in the Illinois Farm Families program, with the largest

cohort being in 2015. The researcher did not run any inferential statistics; therefore, the descriptive data from this study may not be generalized to other populations. Also, there were no major differences in these mothers' performance on the FFSL based on their personal characteristics.

The range of scores for all alumnae of the Illinois Farm Families program was from 21 to 45, with a mean score of 34.25 out of 50 questions. The IFF range of mean score percentages was from 42% to 90%, with a mean score percentage of 68.5%. Based on the framework of the FFSL, this finding indicates that the IFF alumna possess knowledge of agriculture. Also, based on the benchmark set by the researcher, this finding also indicates that these mothers are in fact agriculturally literate due to their mean percentage score exceeding 60%, or passing. Since the exchange of information between change agents and opinion leaders, and adopters is two-way (Rogers, 2003), it is assumed that the communication channels between IFF alumnae have been successful and hold merit based on their holistic performance on the FFSL.

There were differences in these mothers' performance on the FFSL when they were broken up by variables such as their cohort, age range, ethnicity, level of completed education, number of children, and proximity to Chicago proper. The mean range of scores based on the year(s) these mothers participated in the IFF program was from 31.83 to 38.25. The highest performing cohort was from 2014, with a mean score of 38.25, or 76.5%. The lowest performing cohort was from 2016, with a mean score of 31.83, or 63.7%. The other lowest performing cohort was from 2015, with a mean score of 32.83, or 65.7%. The principal of continuity in its educational application means,

nevertheless, that the future has to be taken into account at every stage of the educational process (Dewey, 1938, p. 47). This finding between the two lower performing cohorts is important because the 2015 cohort only included mothers who had not yet participated in the IFF program; whereas, the 2016 cohort included both mothers who had been through the program in the previous four years, and some that were new. The duration since participating in the IFF program, however, did not yield a pattern of lower literacy levels from the first cohort to the last.

The mean range of scores based on age range was from 33 to 34.61. The minimum reported age range that these mothers identified as was 30 to 39, and the oldest was 50 to 59. Based on the criteria of age, the highest performing group of mothers fell between the ages of 40 and 49, having a mean score of 34.61 of 50 questions, or 69.2%. The lowest performing age group was ages 30 to 39, with a mean score of 33, or 66%. The age group of 50 to 59 only performed slightly better, with a mean score of 33.8, or 67.6%. These findings contradict what Rogers (2003) found, in that, younger people are typically faster at adopting knowledge than older members of society.

No research has been conducted to compare the agricultural literacy level of individuals from various ethnic groups (Frick et al., 1995, p. 1). As for how these mothers performed based on ethnicity, the ethnic profile of mothers who participated in the IFF program was overwhelmingly ( $n = 28$ , 90.32%) Caucasian (White). The mean range of scores based on ethnicity was from 25 to 35.18. The mothers who identified as Caucasian (White) yielded a mean score of 35.18, or 70.4% of the 50 questions. This finding is important, because their degree of homophily to that of the change agents and

opinion leaders was quite high, and could have promoted a greater level of trust during each subsequent experience (Rogers, 2003). Only ( $n = 1$ , 3.22%) mother identified as Black, and yielded a mean score of 27, or 54%. The third ethnicity identified with by these mothers was Hispanic ( $n = 2$ , 6.45%), and they yielded a mean score of 25, or 50%.

The researcher was also interested in how the IFF mothers would perform based off of their completed level of education. The criteria of education is one that binds the theoretical frameworks for this study, in that, both Rogers (2003) and Dewey (1938) found that more educated people also tend to have more experience to base their decisions off of. The mean range of scores based on their completed level of education was from 22 to 36.13. Interestingly, about half ( $n = 15$ , 48.39%) of these mothers had earned a Master's degree of some sort. The Master's degree group performed the highest, with a mean score of 36.13, or 72.26% of the 50 questions. The lowest performing group had earned an Associate's degree, and had a mean score of 22, or 44%. It is important to note that none of these mothers reported earning either a Technical Certificate or a Doctorate. Based on these findings, less educated clients, or adopters, need the assistance of change agents more than that of more educated clients (Rogers, 2003, p. 383). Perhaps the effectiveness of communication between adopters and the IFF change agents and opinion leaders, has been impeded by a higher degree of heterophily (Rogers, 2003). Thus, supporting the generalization that a change agent's success in securing the adoption of knowledge by clients is positively related to their homophily with clients.

A mother draws upon past experiences of experts, as well as her own, to guide how she regulates the decisions made on the behalf of her children (Dewey, 1938, p. 42). These mothers are important, in that, grocery-buying decisions in a household have been found to be dominated by the wife (Green & Cunningham, 1975). Regarding the number of children these mothers had, the researcher felt that family size could play a factor in, not just the types of grocery buying decisions they make, but also their level of agricultural literacy. The mean range of scores based on the number of children had, was from 22 to 36.33 of the 50 questions. The highest performing group of mothers had 5 or more children ( $n = 3$ , 9.68%), and yielded a mean score of 36.33, or 72.66%. The lowest performing group reported having only one child, and yielded a mean score of 22, or 44%. Although mothers having 5 or more children technically performed the highest on the FFSL, the researcher found it important to note that the largest group of mothers reported having three children ( $n = 14$ , 45.16%), and yielded a mean score of 35.07, or 70.14%; only 2.52% lower than those with 5 or more children.

The demographic of the Chicagoland area is interesting, in that, if one of these mothers were to live on the outer edge of it, the likelihood of them being exposed to some form of agricultural activity would be much higher than someone who lives and works in downtown Chicago. For this very reason, the researcher wanted to know how these mothers would perform based on their proximity to Chicago proper. Based on their approximate area of residence, the mean range of scores was from 31.33 to 36.44. The highest performing group of mothers resided in area two, or approximately ten miles from Chicago proper, and yielded a mean score of 36.44, or 72.88%. The lowest

performing group of mothers resided in area four, or approximately 30 miles from Chicago proper, and yielded a mean score of 31.33, or 62.66%. These findings contradict how the researcher assumed these mothers would perform on the FFSL; however, they are more consistent with the findings of Pense and Leising (2004), which revealed that urban and suburban students performed higher than their rural counterparts. Also, because they are technically more urban based on where they reside in Chicagoland, they have a higher degree of heterophily to the opinion leaders (Rogers, 2003), thus stimulating a greater curiosity to learn more from farmers and producers.

### **Implications**

The ability to make judgments and apply them to personal and public decision-making, would focus the discussion of agricultural literacy onto an entirely different plane of deliberate values education (Powell et al., 2008, p. 89). It could be argued that the issues surrounding the agriculture industry are just as much from errors in communication between producers and consumers, as they are issues regarding agricultural illiteracy. Illinois Farm Families' ultimate goal is to gain the trust of these mothers, and to help them make more educated decisions when making their grocery purchases. This education for values would become uniquely agricultural through the recognition and cultivation of a culture with a system of beliefs and values inherent to agriculture (Powell et al., 2008, p. 89). There are a variety of labels and marketing campaigns that can mislead consumers, and IFF sought to capitalize on that issue. Based on the conclusions made from this study, the researcher will be pleased to inform the

program coordinator that these mothers are in fact, agriculturally literate. Although the FFSL was not specifically designed to evaluate the Illinois Farm Families program, the overall performance of these mothers could be reasonably indicative that this program's efforts have been worthwhile.

It is also a hope of the researcher that more programs like Illinois Farm Families are founded in other regions of the United States. Campbell (1998) noted that public service through teaching and education will always be a mission of the cooperative extension system, and that its focus has shifted over time from rural to urban society. We, as agriculturists, need to continue to make stronger efforts to bridge the ever-growing divide between that of urban and rural America. The types of agricultural commodities produced ultimately vary from region to region, and thus, the experiences than can be provided will differ from one another. The point is, that urban and suburban populations won't have reliable avenues to learning more about how their food and fiber supply is produced, if agriculturists don't continue to reach out to them, and to ensure that their practices are both safe and ethical.

### **Recommendations for Future Research**

Due to the time at which the researcher became interested in this particular program, a post-assessment in the form of a census was all that could be managed for this study. This study should be replicated again as a true pre-post assessment, should Illinois Farm Families continue a program of this nature. As a process, experiential learning is cyclical in nature, and requires an initial focus on the learner, followed by

interaction, with the phenomenon being studied, reflecting on the experience, developing generalizations, and then testing those generalizations (Roberts, 2006, p. 27). It would be more interesting to know how these mothers' agricultural literacy levels change over the course of their yearlong experience.

If the researcher could conduct this study again, it would be incentivized to help drive a higher response rate. The components of food and purchasing decisions by consumers are both important in the IFF program. To incentivize these mothers to complete the assessment, coupons or gift certificates would be offered in exchange for their participation. Depending on where the population exists, popular grocery store chains would be identified to ensure that the incentive could be used conveniently. These coupons or gift certificates would be worth five to ten dollars each, and be distributed at the end of the assessment.

Dating back to the origins of agricultural literacy research, a universal definition of what agricultural literacy actually means remains to be seen. Although it may be frustrating from a research perspective, this ambiguity could be more realistic, since the variations of agriculture are region-dependent. Because agriculture is ever changing and evolving, the FFSL test should be enhanced to capture updated fields and issues in the industry, which also could be used with older demographic populations (Jones, 2011, p. 72). Since the themes of the IFF program are aligned with more modern trends in agriculture and consumer education, it is recommended that a true program evaluation be conducted. There would be a need to design an instrument specifically tailored to the constructs of IFF.

A deeper understanding of these mothers food-purchasing behaviors could also be valuable in further research on a program like Illinois Farm Families. While this study was framed using Rogers (2003) diffusion of innovations and centralized diffusion system, there was no investigation conducted regarding the communication channels that may or may not exist between the IFF alumnae. Since they were identified as adopters of agricultural knowledge, do they become opinion leaders among their near peers when they return to their home environments? The education of those responsible for disseminating scientific knowledge through various public media sources is of crucial importance, because their explanations spread the fastest (Wunderluch & Gatto, 2015). Also, research could be conducted to find how they are affected by popular labels such as RWA or Non-GMO Verified, since consumer acceptance levels of these types of food products have also been shown to moderate between perceived benefits, risks, trust in institutions and scientific knowledge, and pricing (Vecchione et al., 2015). The issue therein lies between that of whether or not the industry is facing a problem with agricultural literacy, or agricultural communication. It could be that multiple errors in communication have led to a perceived lack of agricultural literacy.

Although a focus on research within agriculture classrooms is important, especially in keeping teaching methods modern and innovative, it is recommended that a greater focus be devoted to other populations than that of K-12 students. While younger generations are the foundation of what society will eventually evolve into, a knowledge of agriculture is important in all other populations. Particularly in the context of agricultural literacy, there has been very minimal research conducted on age groups

older than that of freshmen in college, who could easily just be considered seniors in high school. The concept of people having a working knowledge of agricultural production practices is important, especially in the greater portion of society that is actually fiscally engaged in food and fiber purchases (i.e. adults). It is otherwise, stagnant, to continue to only focus on populations that are either already involved in agriculture education or FFA programs.

Rogers (2003) noted that a centralized diffusion system is quite similar to how the modern agricultural extension service communicates and conveys its information. Since this study was framed using Rogers (2003) centralized diffusion system, and Illinois Farm Families was identified as the change agency of interest, it would be interesting to conduct comparative research of this program up against the existing cooperative extension system in the state of Illinois. IFF works by taking mothers out of their typical urban and suburban environments, and immersing them in rural ones. Programs like Master Gardner and the Expanded Food and Nutrition Education Program (EFNEP) seek to help combat food insecurity in urban areas (Campbell, 1998), however, that urban setting remains the same. A study such as this could also be framed using Bandura's Social Cognitive Theory, to comparatively investigate relationships between environments, personal factors, and behaviors.

### **Recommendations for Practitioners**

The distribution of certain personal characteristics of the mothers that responded, gives rise to a few questions. The researcher finds it interesting that of the ( $N = 31$ )

mothers who responded, that 28 (90.32%) of them had earned at least a Bachelor's degree, and 15 (48.39%) had earned a Master's degree. For the Chicagoland area, the range of individuals who have earned at least a Bachelor's degree is from 31% to 46% (U.S. Census, 2015); much lower than what was reported from this study. Two questions arose from this finding: 1) Did these mothers respond to this study because they are more educated? and 2) Are the mothers who have participated in the IFF program typically more educated, due to a heightened sense of intellectual curiosity? "Educated people contribute new ideas and ideals for the improvement of technology and organization applicable to business and industry, government, and nonprofit entities" (Campbell, 1998, p. 136). Also, The vast majority of mothers who responded, reported residing in areas one, two, or three. Two questions arose from this finding: 1) Is this where the communications firm, MorganMyers, pays more attention to when identifying these mothers in online focus groups? and 2) Since these mothers are technically more urban due to their proximity to Chicago proper, does their degree of heterophily to agriculture make them prone to being more curious as to where their food comes from?

Also, 28 (90.32%) of these mothers identified as being Caucasian (White). Contrary to this finding, the range of percentages regarding people identifying as White for the Chicagoland area spans from 65% to 87% (U.S. Census, 2015). Why does the ethnic profile of the moms who have participated in IFF lack diversity compared to the norm of this metropolitan area? We must give priority to identifying and cultivating abilities in races and ethnicities that have previously been excluded (Campbell, 1998).

The researcher recommends that greater priority be placed in diversifying the typical profile of an IFF mother.

The level of communication between these mothers and the IFF program coordinator has been quite high since the program was established. What's more, they are all encouraged to write and reflect about their experiences over the course of the year they participated. Their level of engagement and communication with this program contradicts the low response rate achieved for this study. It could simply be that they were not as familiar with the researcher, and thus, did not have the same level of trust had in the program coordinator. It could also be that they are simply not as passionate about the IFF program. A possible solution to this problem could be incentivizing this study, if it were to be replicated again.

It would also be interesting if Illinois Farm Families teamed up with the University of Illinois Extension to help strengthen their efforts. The program coordinator indicated that they had some difficulty getting mothers involved with a program like IFF. It is, after all, somewhat time consuming and spans the length of an entire year. Teaming up with the University of Illinois Extension could help in terms of content development and outreach, since it has been around much longer.

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## APPENDIX A

### IRB APPROVAL LETTER

DIVISION OF RESEARCH



**Submission Approval DATE:** January 20, 2017

**MEMORANDUM**

**TO:** Robert Strong Jr, PhD  
ALRSRCH - Agrilife Research - Ag Leadership, Education & Communication

**FROM:** Human Research Protection Program  
Institutional Review Board

**SUBJECT:** Exempt Determination REF: 048126

**Study Number:** IRB2017-0003

**Title:** ASSESSING AGRICULTURAL LITERACY IN URBAN AND SUBURBAN MOTHERS AFTER THEIR COMPLETION OF THE ILLINOIS FARM FAMILIES PROGRAM

**Determination Date:** 01/20/2017

**Continuation Due:** 12/15/2021

**Expiration Date:** 01/15/2022

**Documents Reviewed:**

Only IRB-stamped approved versions of study materials (e.g., consent forms, recruitment materials, and questionnaires) can be distributed to human participants. Please log into iRIS to download the stamped, approved version of all study materials. If you are unable to locate the stamped version in iRIS, please contact the iRIS Support Team at 979.845.4969 or the IRB liaison assigned to your area.

Submission Components			
Study Document			
Title	Version Number	Version Date	Outcome
IFF recruitment email	Version 1.0	01/17/2017	Approved
Assessing IFF Ag Literacy survey	Version 1.0	01/17/2017	Approved
Study Consent Form			
Title	Version Number	Version Date	Outcome
Assessing Agricultural Literacy in the Illinois Farm Families Program	Version 1.0	12/19/2016	Approved

**Comments:** • This IRB study application was determined to be Minimal Risk, Exempt 2

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under 45 CFR 46, and the research may be active during the period indicated above.

- This study has been approved for 131 participants.
- Research is to be conducted according to the study application approved by the IRB prior to implementation.
- Any future correspondence should include the IRB study number and the study title.

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Investigators assume the following responsibilities:

1. **Exempt Continuation Form:** The study must be renewed by the expiration date in order to continue with the research. An Exempt Continuation Form application along with required documents must be submitted by the continuing review deadline. Failure to do so may result in processing delays, study expiration, and/or loss of funding.
2. **Completion Report:** Upon completion of the research study (including data collection and analysis), a Completion Report must be submitted to the IRB.
3. **Unanticipated Problems and Adverse Events:** Unanticipated problems and adverse events must be reported to the IRB immediately.
4. **Reports of Potential Non-compliance:** Potential non-compliance, including deviations from protocol and violations, must be reported to the IRB office immediately.
5. **Amendments:** Changes to the protocol and/or study documents must be requested by submitting an Amendment to the IRB for review. The Amendment must be approved by the IRB before being implemented.
6. **Consent Forms:** When using a consent form or information sheet, the IRB stamped approved version must be used. Please log into iRIS to download the stamped approved version of the consenting instruments. If you are unable to locate the stamped version in iRIS, please contact the iRIS Support Team at 979.845.4969 or the IRB liaison assigned to your area. Human participants are to receive a copy of the consent document, if appropriate.
7. **Post Approval Monitoring:** Expedited and full board studies may be subject to post approval monitoring. During the life of the study, please review and document study progress using the PI self-assessment found on the RCB website as a method of preparation for the potential review. Investigators are responsible for maintaining complete and accurate study records and making them available for post approval monitoring. Investigators are encouraged to request a pre-initiation site visit with the Post Approval Monitor. These visits are designed to help ensure that all necessary documents are approved and in order prior to initiating the study and to help investigators maintain compliance.
8. **Recruitment:** All approved recruitment materials will be stamped electronically by the HRPP staff and available for download from iRIS. These IRB-stamped approved documents from iRIS must be used for recruitment. For materials that are distributed to potential participants electronically and for which you can only feasibly use the approved text rather than the stamped document, the study's IRB Study Number, approval date, and expiration dates must be included in the following format: TAMU IRB#20XX-XXXX Approved: XX/XX/XXXX Expiration Date: XX/XX/XXXX.
9. **FERPA and PPRA:** Investigators conducting research with students must have appropriate approvals from the FERPA administrator at the institution where the research will be conducted in accordance with the Family Education Rights and Privacy Act (FERPA). The Protection of Pupil Rights Amendment (PPRA) protects the rights of parents in students ensuring that written parental consent is required for participation in surveys, analysis, or evaluation that ask questions falling into categories of protected information.
10. **Food:** Any use of food in the conduct of human research must follow Texas A&M University Standard Administrative Procedure 24.01.01.M4.02.
11. **Payments:** Any use of payments to human research participants must follow Texas A&M University Standard Administrative Procedure 21.01.99.M0.03.
12. **Records Retention:** Federal Regulations require records be retained for at least 3 years. Records of a study that collects protected health information are required to be retained for at least 6 years. Some sponsors require extended records retention. Texas A&M University rule 15.99.03.M1.03 Responsible Stewardship of Research Data requires that research records be retained on Texas A&M property.

This electronic document provides notification of the review results by the Institutional Review Board.

## APPENDIX B

### EMAIL CORRESPONDENCE



Howdy City Moms!

My name is Matthew Marr, and I am currently a graduate student at Texas A&M University working toward my master's degree. I am a native of central Illinois, and grew up working on my family's farming operation there. I have followed the Illinois Farm Families program since it began back in 2012, and have been intrigued by its mission ever since.

You are being invited to participate in a research study that is part of my master's thesis, since you are an alumnus of the Illinois Farm Families program. Your participation is voluntary, however, the research conducted in this study will be used to help improve the IFF program for future participants. Your contact information will remain anonymous, as your

confidentiality is of the utmost importance to me. The link to the survey is below.

[http://tamuag.az1.qualtrics.com/SE/?SID=SV\\_1SmJDrpA2wJ36tL](http://tamuag.az1.qualtrics.com/SE/?SID=SV_1SmJDrpA2wJ36tL)

Just click on the link to proceed. The survey should take no more than fifteen minutes. Let me know if you have any questions. If you would please take the time to complete this survey, I'd really appreciate it!

Thanks and Gig Em,

A handwritten signature in black ink that reads "Matthew L. Marr". The signature is written in a cursive, flowing style.

Matthew L. Marr

217-473-8808

matthew.marr@tamu.edu

**APPENDIX C**  
**INFORMATION SHEET**

**Texas A&M University Human Subjects Protection Program**

**Information Sheet**

Project Title: Assessing Agricultural Literacy in Urban and Suburban Mothers After Their Completion of the Illinois Farm Families Program

**You are invited to take part in a research study being conducted by Matthew Marr and Dr. Robert Strong Jr., researchers from Texas A&M University. The information in this form is provided to help you decide whether or not to take part. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have.**

**Why is this study being done?**

The purpose of this study is to assess agricultural literacy in the mothers who have completed the Illinois Farm Families Program.

**Why am I being asked to be in this study?**

You are being asked to participate in this study, because you are an alumnus of the Illinois Farm Families Program.

**How many people will be asked to be in this study?**

Seventy-three individuals will be invited to participate in this study.

**What are the alternatives to being in this study?**

The alternative to being in this study is to not participate.

**What will I be asked to do in this study?**

You will be asked to complete an assessment. Your participation in this study will take no longer than fifteen minutes.

**Are there any risks to me?**

The things that you will be doing are no more/greater than risks that you would come across in everyday life. Although the researchers have tried to avoid risks, you may feel that some questions asked are difficult. You do not have to answer anything you do not want to.

**Will there be any costs to me?**

Aside from your time, there are no costs for taking part in this study.

**Will I be paid to be in this study?**

You will not be paid for being in this study.

**Will information from this study be kept private?**

The records from this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only Dr. Roberts Strong Jr. and Matthew Marr will have access to the records. Your completed assessment will be stored on a secured server.

Information about you will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

Information about you and related to this study will be kept confidential to the extent permitted or required by law.

**Who may I contact for more information?**

You may contact the Principal Investigator, Dr. Robert Strong Jr., to tell her about a concern or complaint about this research at [r-strong@tamu.edu](mailto:r-strong@tamu.edu). You may also contact the Co-Investigator, Matthew Marr at 217-473-8808 or [matthew.marr@tamu.edu](mailto:matthew.marr@tamu.edu).

For questions about your rights as a research participant, to provide input regarding research, or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Subjects Protection Program office by phone at 979-458-4067, toll free at 1-855-795-8636, or by email at [irb@tamu.edu](mailto:irb@tamu.edu).

**What if I change my mind about participating?**

This research is voluntary and you have the choice whether or not to be in this research study. You may decide to not begin or to stop participating at any time. If you choose not to be in this study or stop being in the study, there will be no effect on you.

By completing this assessment, you are giving permission for the investigator to use your information for research purposes.

Thank You,

**Matthew Marr**

**Dr. Robert Strong Jr.**

**APPENDIX D**  
**FFSL ASSESSMENT**

1. Which of the following *does not* influence farmer/producer decisions about what type of product to grow and how it is processed?
  - A. Consumer preferences
  - B. Government regulations
  - C. Historical events
  - D. Specific commodity prices overseas
  
2. A genetically modified corn plant has been developed with natural resistance to pests. What type of agricultural business will be most directly affected by this new technological advancement?
  - A. Agricultural chemical company
  - B. Feed and milling company
  - C. Tractor and equipment dealership
  - D. Veterinary supply store
  
3. What nutrient develops and repairs body organs and tissues?
  - A. Carbohydrates
  - B. Minerals
  - C. Proteins
  - D. Vitamins
  
4. Which of the following occupations is *least related* to the industry of agriculture?
  - A. Fashion designer
  - B. Park ranger
  - C. Landscape designer
  - D. Meat inspector
  
5. Which one of the following government agencies regulates food handling, preparation and storage?
  - A. Environmental Protection Agency (EPA)
  - B. Food and Drug Administration (FDA)
  - C. Natural Resource Conservation Service (NRCS)
  - D. United States Department of Agriculture (USDA)
  
6. What does consumer product testing not determine?

- A. Customer health related to products
  - B. Customer preferences
  - C. Durability of products
  - D. Shopping patterns within a retail outlet
7. Planting trees on a farm field border will help protect the environment in what way?
- A. Increase the amount of top soil
  - B. Reduce the need for fertilizers
  - C. Reduce water use
  - D. Reduce wind erosion
8. What role did agriculture *not* play in the growth and development of America?
- A. Communications
  - B. Food & textile industry
  - C. Immigration policy
  - D. Trade
9. What will energy shortages/surpluses experienced in the United States impact?
- A. Banana production
  - B. Cross cultural relations
  - C. Food prices
  - D. Food safety
10. What is an essential part of the Food and Fiber System?
- A. Consumer Demand
  - B. Consumer Supply
  - C. Natural resources
  - D. Value-added products
11. Why is America able to sustain a high standard of living?
- A. Agricultural Industry
  - B. International Trade
  - C. Micro-computer industry
  - D. Stock Market
12. What technology was recently introduced in the Meat Industry to increase shelf life?
- A. Curing
  - B. Dehydration
  - C. Freezing
  - D. Irradiation
13. What supports plant growth and represents the living reservoir that buffers the flow of water, nutrients, and energy through an ecosystem?
- A. Air

- B. Soil
  - C. Sunlight
  - D. Worms
14. What renewable natural resources are necessary for agricultural production?
- A. Air, water, fertilizer, and sunlight
  - B. Soil, air, sunlight, and water
  - C. Soil, air, water, and fertilizer
  - D. Water, sunlight, organic matter, and air
15. What was the effect on United States' beef exports to the United Kingdom when England detected Mad Cow Disease in their beef herds?
- A. No change in United Kingdom's demand for United States' beef
  - B. United Kingdom's demand decreased for United States' beef
  - C. United Kingdom's demand for United States' beef increased
  - D. United States' demand for beef decreased
16. What technological innovation has the potential to increase plant resistance to disease and insects, and decrease food and fiber production costs?
- A. Cloning
  - B. Genetic engineering
  - C. Hydroponics
  - D. Integrated Pest Management
17. What components does Agriculture include?
- A. Farming, distribution and research of food, clothing and shelter
  - B. Production and regulation of food, clothing and shelter
  - C. Production, processing and selling of food, clothing and shelter
  - D. Production, processing, marketing and distribution of food and fiber
18. What is the primary cause of food safety problems in the United States?
- A. Confusing regulations
  - B. Improper food handling and preparation
  - C. Improper food processing
  - D. Improper use of antibiotics in animals
19. How has new technology in agriculture impacted America?
- A. Increased food prices and increased number of available food products
  - B. Increased the number of people employed in farming and ranching, and decreased labor required
  - C. Reduced access to new equipment for most farmers, and decreased cost of production
  - D. Reduced required physical labor and increased production

20. In what way are wheat farmers most likely to increase their profits?
- A. Organize a marketing cooperative to export more of their wheat to developing countries
  - B. Plant more acres of soybeans on the best land available
  - C. Use vertical integration to process their raw wheat into flour, frozen dough and other food products
  - D. Use genetic engineering to develop new improved wheat varieties
21. What has the *least influence* on production practices of farmers in the United States?
- A. Machinery costs to producers
  - B. New York Stock Exchange
  - C. Price of the commodity to the processor
  - D. Consumer preferences
22. Which of the following action or procedures placed on an agricultural commodity *will inhibit* international trade?
- A. Letter of Credit
  - B. North America Free Trade Agreement
  - C. Product labeling
  - D. Tariff
23. If hoof and mouth disease were discovered in the United States, what populations would be at risk of infection?
- A. Humans and cattle
  - B. Poultry and cattle
  - C. Cattle and horses
  - D. Cattle and swine
24. What was significant about the cotton gin, plow, and mechanical reaper?
- A. Increased crop yields per acre
  - B. Increased the status of farmers
  - C. Increased the work load of farmers
  - D. Freed up laborers to do other jobs
25. Why is planting grass an important practice in sustaining the ecological system?
- A. Contributes to rapid water run-off
  - B. Increases microorganisms in the soil
  - C. Increases nutrients in the soil
  - D. Prevents wind and water erosion
26. Until recently, what components were commonly added in the feed rations of cattle and sheep?

- A. Animal by-products
- B. Human waste
- C. Vegetable by-products
- D. Wood by-products

27. The major world producer of dates in 1992 was Iraq, while the state of California was the second largest producer. What was the impact of the gulf war on the date industry?

- A. Demand decreased and price increased
- B. Demand increased and price increased
- C. Supply decreased and price increased
- D. Supply increased and price increased

28. How does the percentage of the population working directly in farming and production agriculture in the United States compare to other countries in the world?

- A. Population is declining compared to less developed countries of the world.
- B. Population is greater than in less developed countries of the world.
- C. Population is greater than other developed countries of the world.
- D. Population is increasing due to population growth & the increasing demand for food.

29. What are the benefits of eating a balanced diet?

- A. Increases physical fitness
- B. Increases the number of hours of sleep required
- C. Lowers food costs
- D. Prevents nutritional diseases

30. Which agricultural sector has *the least* number of workers?

- A. Distribution
- B. Processing
- C. Production
- D. Transportation

31. What is the most important energy source in the production, processing and distribution of food products?

- A. Ethanol
- B. Fossil fuels
- C. Hydroelectric energy
- D. Solar energy

32. What impact did the American Revolutionary War have on the price of cotton in England?

- A. The cost of men's cotton pants decreased.

- B. The cost of men and women's cotton clothing stayed the same.
  - C. The cost of men's cotton shirts increased.
  - D. The cost of women's cotton blouses decreased.
33. The outbreak of a contagious animal disease in Taiwan would likely bring what type of response from the United States Government?
- A. United States would increase the tariff on meat imports from Taiwan.
  - B. United States would stop imports of meat and meat by-products from Taiwan.
  - C. United States would quarantine sick animals in Taiwan.
  - D. United States would require vaccination of animals in the United States against the disease.
34. How do plants and animals meet society's needs in ways other than food, clothing, and shelter?
- A. Fuels and Electronics
  - B. Medicines and Plastics
  - C. Medicines and Recreation
  - D. Plastics and Recreation
35. How have the United States' agricultural technology and conservation impacted other countries?
- A. Improved seed varieties and introduced efficient farm machinery
  - B. Improved seed varieties and introduced organic fertilizers
  - C. Improved seed varieties and encouraged manual harvesting
  - D. Improved seed varieties and encouraged synthetic rubber
36. Predict the price of coffee in the United States if the supply of coffee in Brazil decreased.
- A. The drought in Brazil would not affect coffee prices in the United States.
  - B. The price of coffee in the United States would decrease.
  - C. The price of coffee in the United States would increase.
  - D. The price of coffee in the United States would stay the same.
37. Why were past predictions that agriculture would not be able to meet the world's demand for food inaccurate?
- A. Average farm size increased
  - B. Cost of food significantly increased
  - C. New technology introduced
  - D. World population growth slowed
38. When other countries adopted new technologies for growing wheat, what was the effect on wheat growers in the United States?
- A. United States wheat growers gained a production advantage in the world wheat market.

- B. United States wheat growers gained a processing advantage in the world wheat market.
  - C. United States wheat growers lost the production advantage in the world wheat market.
  - D. United States wheat growers lost the processing advantage in the world wheat market.
39. How did the North American Free Trade Agreement (NAFTA) impact United States' trade with other countries?
- A. Decreased trade with Mexico and Canada
  - B. Increased trade with Canada and Mexico
  - C. Slowed trade with Canada but accelerated trade with Mexico
  - D. Slowed trade with Mexico but accelerated trade with Canada
40. In Columbus' first voyage to America, his intent was to obtain what commodities?
- A. Corn and potatoes
  - B. Iron ore
  - C. Silver and gold
  - D. Sugar and spices
41. Of the following answers, which one *is not* a purpose of a food additive?
- A. Improve appearance
  - B. Improve flavor
  - C. Improve nutrition
  - D. Reduce production costs
42. What governmental agency regulates fertilizers, pesticides, and herbicides?
- A. United States Department of Agriculture (USDA)
  - B. Environmental Protection Agency (EPA)
  - C. Food and Drug Administration (FDA)
  - D. Health and Human Services (HHS)
43. How has the conversion of wetland to farmland affected waterfowl populations?
- A. Waterfowl populations have decreased
  - B. Waterfowl populations have increased
  - C. Waterfowl populations have not been studied
  - D. Waterfowl populations have stayed the same
44. What factors made it possible for early Americans to establish settlements rather than assume the wandering lifestyle of hunters/gathers?
- A. Ability to produce food
  - B. Abundance of wildlife
  - C. Fur trading
  - D. Trade with Native Americans

45. What term describes the control and management of resources for present and future use?
- A. Conservation
  - B. Preservation
  - C. Reclamation
  - D. Restoration
46. What factor contributed to the western expansion of the United States?
- A. Available capital
  - B. Available labor
  - C. Available land
  - D. Available water
47. Why is homogenization used in milk processing?
- A. To extend shelf life
  - B. To reduce milk fat content
  - C. To reduce milk fat to smaller particles
  - D. To separate milk solids and liquids
48. What is the oldest and most essential industry in the world?
- A. Construction
  - B. Food/Fiber production
  - C. Manufacturing
  - D. Mining
49. What is a major source of protein for humans?
- A. Corn and spinach
  - B. Beans and spinach
  - C. Rice and beans
  - D. Rice and corn
50. Which of the following food combinations best describes a balanced meal using the four basic food groups?
- A. Broccoli, biscuits, peaches, & lamb
  - B. Eggs, milk, pancakes, & orange juice
  - C. Milk, granola, grapefruit, & bread
  - D. Steak, toast, butter, & eggs

## APPENDIX E

### PERSONAL CHARACTERISTIC QUESTIONS

1. What year did you participate in the Illinois Farm Families Program?
  - 2012
  - 2013
  - 2014
  - 2015
  - 2016
  
2. What is your age?
  - 20-29
  - 30-39
  - 40-49
  - 50-59
  - 60-69
  
3. What is your ethnicity?
  - Caucasian (White)
  - Black
  - Hispanic
  - Asian
  - Other
  
4. What is your highest level of completed education?
  - High School Diploma
  - Technical Certificate
  - Associate's Degree
  - Bachelor's Degree
  - Master's Degree
  - Doctorate
  
5. How many children do you have?

- 1
- 2
- 3
- 4
- 5+

6. Using the following map, please select the approximate area you reside in, in the Chicagoland area.



Adapted from Google (2010).

- Area 1
- Area 2
- Area 3
- Area 4
- Area 5