EXPLORING FARMERS' PERCEPTIONS REGARDING LABOR CHANGES AND IMMIGRATION IN GEORGIA

by

KAMI A. KENT

(Under the Direction of Alexa Lamm)

ABSTRACT

The purpose of this study was to explore how farmers reacted to recent changes in farm labor availability due to immigration issues in the United States. Using qualitative research methods, eight farmers in the state of Georgia were interviewed to determine how farmers perceived manual labor changing as a result of immigration, the professional impact farmers felt as a result of immigration, and how farmers have dealt with the decrease of immigration. Using grounded theory, the interview guide was directed by the five characteristics of the Theory of Diffusion of Innovations. The results supported recommendations for practice and future research.

INDEX WORDS: Farm labor, Immigration, Grounded Theory, Technology, Diffusion of Innovation

EXPLORING FARMERS' PERCEPTIONS REGARDING LABOR CHANGES AND IMMIGRATION IN GEORGIA

by

KAMI A. KENT

BA, Auburn University, 2017

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF AGRICULTURAL AND ENVIRONMENTAL EDUCATION

ATHENS, GEORGIA

2020

EXPLORING FARMERS' PERCEPTIONS REGARDING LABOR CHANGES AND IMMIGRATION IN GEORGIA

by

KAMI A. KENT

Major Professor:	Alexa Lamm
Committee:	Don Edgar
	Matthew Chappell

Electronic Version Approved:

Ron Walcott
Interim Dean of the Graduate School
The University of Georgia
May 2020

DEDICATION

This study is dedicated to my father, the hardest working man I know. He has a true love for farming and tending to his animals. Thank you for teaching me farming, life skills, and the value of hard work. I love you and I am forever in awe of your work ethic.

ACKNOWLEDGEMENTS

I would like to acknowledge all of my professors from the Department of Agricultural Leadership, Education, and Communication (ALEC) in the College of Agriculture and Environmental Science at the University of Georgia. I am very grateful for my time in this department and education, and support given to me. I would especially like to thank the people willing to participate in this study.

To my wonderful fellow students, thank you for the many venting sessions, trivia nights, and help. I am so grateful to have such a wonderful cohort that I can call my friends. I am so excited to see what we can accomplish in our future endeavors.

Finally, I would like to acknowledge my thesis committee – Dr. Alexa Lamm, Dr. Don Edgar, and Dr. Matthew Chappell. Thank you for your time, advice, and support during my time at the University of Georgia. I sincerely appreciate the time and effort each of you put into my work. War Eagle and Go Dawgs!

TABLE OF CONTENTS

LIST OF TABLES

Page

CHAPTER 1

INTRODUCTION

There is a strong relationship between farm labor and migration. Historically, farms have relied on people who are willing to work in less than fair conditions for less than minimum wage (Martin, 2017). In recent years, the farming industry has seen a massive decrease in the availability of migrant workers due to (farm) labor laws becoming more stringent, and governmental investments in rural education in the countries whose citizens are known to travel to the United States for work (Martin, 2017b). The number of immigrants in the U.S. is about 14 million and is decreasing rapidly (Martin, 2017). Each year immigrants reduce by approximately 160,000 but the need for labor has not decreased proportionally resulting in a need for producers (Martin, 2017). For example, the California Farm Bureau found that 555 of Californian farmers did not have enough workers (Gray, 2018). There is a reason for this decrease in immigration. Mexico in particular, has invested in rural education for their citizens thus there is less of a need for them to travel for work (Greene, 2018). This former influx of immigrant workers now have different opportunities because they are more educated compared to past generations, further causing immigrant workers to increase in age.

President Trump has been at the forefront of stricter immigration laws and there have been several changes since he started his presidency. There are policies set in place to make it difficult for immigrants to enter the U.S., and a stigma associated with moving illegally for workers. If an immigrant gets a visa for work, especially with the common H-2A program, there are stipulations farmers must uphold (Martin, 2017b). However, if you employ individuals "under the table" then laws, such as minimum wage, do not have to apply.

Only 27% of crop workers are U.S. born (Farm Labor, n.d., p. 26). A work visa (H2-A) is a slow and costly process because employers have to pay for transportation, meals, and housing, along with the steps that must be taken to get approval for the H-2A program (Gray, 2018) example, North Carolina could not find any native workers that were willing to work under the H2-A conditions on a North Carolina farm (Gray, 2018).

Part of the expectations for H-2A is for farmers to publish job vacancies in newspapers or on social media to give locals the opportunity to apply for these positions. Once this occurs, and Americans are not interested, farmers have met one of the requirements of H-2A. "The complexity of the current system punishes farmers who are attempting to abide by our federal laws through using the legal workforce, while giving a leg up to farmers who simply use illegal aliens" (Carter, 2019, p. 3). Despite resources given by the government to large family farms, they are struggling to hire legally due to the associated costs of H2-A workers.

The substitutions available now either cause farmers to invest money or work harder to yield the same amount of product, such as equipment. There are machines that can make up for labor, however, they are very expensive and become outdated quickly (Martin, 2013). This means that newer technology quickly replaces the investments of farmers. Farmers have a hard time keeping up with the exponential evolution of technology. A simple solution for lack of laborers is stretching the people you have employed to make up for the lack of able body workers, however, that can be strenuous for the employees involved (Martin, 2013). In addition, factors that go into energy and non-energy intensive activities can affect the ability for farmers to substitute laborers (Taylor & Charolton, 2012). However, there is risk involved due to uncertain energy prices.

To better understand the impact of reduced immigrant labor on farm production, a study on farmers' perceptions of farm labor and immigration was conducted. Most research into immigration issues has looked at California and Texas because of their farm sizes and proximity to the U.S. - Mexico border. There is very little information about states like Georgia, therefore, a study that focused on Georgia should afford other states the opportunity to better understand what future of farming in non-border states could look like. Hearing directly from farmers could result in a new and updated understanding of farm labor substitution. The findings from this study could shed light on how farmers are dealing with the current lack of labor and contribute to the larger body of knowledge.

Problem Statement

As less people are traveling into the U.S. for manual labor jobs, farmers are forced to look towards other places for solutions. "According to the Farm Bureau, about 56% of the farmers surveyed have started using mechanization in the past five years, and of the total, more than half said it was because of labor shortages" (Daniels, 2019, p. 5). However, technology is expensive, can be hard to maintain, and quickly becomes outdated (Martin, 2017).

This study explored how Georgia farmers have dealt with farm labor changes using the Theory of Diffusion of Innovation's five characteristics of consumer influence; compatibility, relative advantage, complexity, trialability, and observability (Rogers, 2003). These characteristics helped to mold an understanding of how perceptions of innovation have affected farm labor in the past few years. The use of grounded theory guided the understanding of what the changes in labor are and how these changes are affecting farm operations. This study will serve as an explanation for Georgia farmers' feasible solutions to the lack of labor, and how those substitutions could be molded to increase the strength of the industry.

Purpose of the Study

The purpose of this study was to explore how farmers reacted to recent changes in farm labor availability due to immigration issues in the U.S. The study was designed to identify best practices for labor adjustments on farms around the state of Georgia. The substitution of manual labor can come in several different forms, but it is unclear which practices will be the most productive and cost effective.

The study was guided by the following research questions:

1. How do farmers perceive manual labor changing as a result of immigration?
2. What professional impact have farmers felt as a result of immigration?
3. How have farmers feasibly dealt with the decrease of immigration in Georgia?

Significance of the Problem

There is no single or right way for farmers to substitute for their lack of available labor. A thorough analysis of the available data about farm labor laws and immigration in the U.S. found there is little to no information concerning the Theory of Diffusion of Innovation in relation to the issue of farm labor. According to a study conducted by the Farm Bureau, over 40% of farmers have been unable to recruit workers during their peak crop-picking season. Most farmers are not able to properly substitute cheap farm labor. As the decrease of labor continues, it is possible the situation will only get worse, since available manual labor is constantly decreasing. Substitution of labor through equipment and other technologies is inevitable as farm labor force decreases and the global demand for agricultural products increases.

Georgia farmers, and farmers of similar size around the U.S., will be able to benefit from the information collected. Additionally, this will contribute to the larger library of research and information on farm labor and immigration.

Definition of Terms

1) Labor policy- appertain to the relationship between employers and employees and between employers and trade unions
2) Immigration- the action of moving permanently to a foreign country
3) Emigration- the action of leaving your homeland
4) Migrate- to consistently move the different places
5) Migrant worker- farm laborers that travel to different areas of the United States for work depending on the season
6) Global economy- international exchange of goods and services
7) Labor substitution- possible solutions for farmers to use instead of immigrants
8) Immigration and Naturalization Service (INS)- was part of the Department of Labor (1940- 2003), is how much of the laws and regulations were enacted
9) Bracero Program- one of the first programs to aid farm laborers in the United States
10) H-2A worker- current, a temporary agricultural worker, the legal way to work in the United States if you are a citizen of a different country
11) Nativism- the policy to protect interests of native-born citizens
12) Crimmigration- blurring of the lines between immigration and criminal acts
13) Volunteer tourism- opportunity for people to volunteer on farms to gain experience while farms get free labor
14) Mortgage Crisis of 2008- occurred when banks sold too many mortgages to feed the demand for mortgage-backed securities sold through the secondary market

Limitations of the Study

Limitations to the study could result in inadequate data being collected. Perhaps farmers that have/do utilize illegal immigrants for labor are afraid to speak about the topic for fear of criminal prosecution. This is a very likely occurrence. Another limitation could be that farmers are initially uninterested in participating in an interview for the same reason. They might be uncomfortable talking about illegal activity. Also, these interviews will be done during the winter, so it could be hard to schedule meetings with interviewees. It is entirely possible farmers will be too busy preparing for spring to have time for the study.

Since most of the larger farms are in South Georgia, distance can be an issue. Due to time restrictions for both the participant and researcher, it could be difficult to plan in-person interviews, therefore, some of the interview may be conducted through a phone call interview. Additionally, since the research is qualitative there will be a lack of generalizability. Each person's interview will be unique to their own experiences. It cannot be assumed their situation is true across farming operations. Since the interviews were planned through an initial phone call, the participants may not regularly check their voicemails or have their voicemail set up. That could decrease the likelihood of calling back to schedule the interview. Potential procedural limitations for this study could be the possible restrictions associated with the types of questions asked.

Basic Assumptions

It is assumed the farmers will be honest despite asking potentially uncomfortable questions. Therefore, it will be important to start the interviews with simple questions that make the person feel comfortable and build rapport. This is an important part of qualitative research

because they will tell their unrestricted narratives if the researcher is relatable. Comfortability for the participant is an important aspect of this study because it is based in conversation.

In addition, many of the farmers' education status exceeds high school while their workers do not. It is also safe to assume that medium and large farms will not have many Caucasian workers, conversely, farm owners will likely be Caucasian. Most workers will be of Mexican descent according to Greene (2018).

Summary

Immigration in the U.S. directly effects farm worker availability. As the decrease in available immigrant labor continues, farmers will struggle more to find feasible options to produce the same amount of product with fewer people. More importantly, there is no single or right answer. This study will add to the literature about farm labor changes through Diffusion of Innovation and shed light on areas and agricultural services that are lacking.

CHAPTER 2

REVIEW OF THE LITERATURE

"Modern agricultural technology has been developed with two important things in mind: first thing is to obtain the highest yields possible and second thing is to get the highest economic profit possible" (Rehman, Jingdong, Khatoon, Hussain, & Iqhal, 2017, p. 70). As farmers learn about more technological advancements, farmers want to know that it will give a quick payback period with a high return on investment. On the other side, technology companies responsible for agricultural advancements should know the direction to take to ensure equipment will be purchased. "To achieve these goals, six basic and important practices have come to form the backbone of production agriculture: application of inorganic fertilizer, irrigation, intensive tillage, monoculture, chemical pest control and enatic manipulation of crop plants" (Rehman et al., 2017, p. 70), many of which replace the need for manual labor. Furthermore, "For years, in the industrialized world scientific and technological advancements have benefited farmers by driving agricultural production" (Rehman et al., 2017, 70). Technological advancements are the driving factor of production, so that farmers can keep up with each other and the larger farms.

The farm labor department recorded that U.S. agricultural visas have gone from 165,000 in 2016, to 242,000 in February of 2019 (Seiff & Gowen, 2019). In 2019, the minimum wage for Mexico was $5 a day; compared to a mean of $13.50 an hour on an H-2A visa in the U.S. (Seiff & Gowen, 2019). Seiff & Gowen (2019) interviewed a farmer near the Canadian border. He reported that once Trump was elected president, "he watched his entire pool of undocumented workers crossed the border into Canada…fearing deportation." The decrease in available

workers continues to get worse, and H-2A continues to become a more popular way for farmers to get workers.

Immigrants in Agriculture

American farmers heavily rely on immigrant farmers for labor. Currently, 70% of crop workers in the U.S. are foreign-born, leaving only 30% representing American-born workers (Martin, 2017c). This percentage was at an all-time high in the nineties, peaking at 83% (Martin, 2017c). Using these statistics, it can be argued the U.S. migrant labor system is the backbone of most low wage jobs. America has a stable population of over 11 million unauthorized foreigners, over half born in Mexico. Recently, it is becoming increasingly popular for unauthorized foreigners to enter the U.S. on a work visa and then overstay that visa, Martin (2017a) noted that there are about 500,000 unauthorized Indians in the U.S. Illegal immigration is becoming less of a problem as overstayed visas are the new answer to staying in the U.S. illegally.

Agricultural employers have created a farm labor treadmill - one that is always looking for replacements as their employees find nonfarm jobs. Seasonal workers make it easy for farms to get the labor they need only during the time that they need it; however, this keeps workers from moving beyond unskilled labor (Martin, 2013). However, there are very few unskilled laborers currently in the U.S. because farmers that use the H-2A program, must show proof that they could not find any U.S. citizens to hire in their local area.

In addition, the availability of migrant workers continues to decrease because other countries have begun creating solutions for their rural communities to aid farmers. “Some groups and communities are helping farmers become experts at managing farms as ecosystems; they also have supportive and enabling external government and nongovernmental institutions, which have reoriented their activities to focus on local needs and capabilities” (Rehman, Jingdong,

Khatoon, Hussain, & Iqhal, 2017, p. 70). No concrete programs have been created by the U.S., other than the H-2A program to provide workers with the farmers necessary for their picking season.

History of the Agricultural Migrant Workforce

Agriculture's economy is its own sector with specific characteristics associated with how adopters incorporate innovation within their own system. Agriculture looks a lot different from its traditional pre-World War II persona, so the review of innovation in agriculture is complex. Gurman (2017) argued the history of the US-Mexico border is the key to understanding why there is a huge rise in efforts to police American-Latinos or any other group that does not look like they belong. The 1950s were when immigration enforcement tactics began in the U.S. In the years before this, there was a consistent growing number of contract farm workers from Mexico but there had been no quantitative limits to the number of migrants. After the Great Depression, migrants were a burden on the economy; spearheading the campaign to start deportations.

The 9/11 attack inspired a shift in immigration enforcement. This also signified the end of Immigration and Naturalization Service (INS) with Customs Enforcement (ICE). This change in agencies caused the immigration approach to return to the Operation Wetback approach. The INS began Operation Wetback, a "strategy of internal apprehension and deportation" (Paret, 2014, p.1). Later, INS built blockades and deployed a number of operations to enhance border security, including' Operation Gatekeeper, Operation Safeguard, and Operation Rio Grande. The Bracero program relied on the assumption that migrant workers would return to Mexico (Paret, 2014). Agricultural employers created contracts that would ensure no American worker would be willing to work for the meager wages so that they could hire migrant workers at an insanely low price. The Bracero program ensured growth as a steady source of labor and it kept labor under

oppressive and harsh contracts. Much like what we see today, low farm labor wages have become a deterrent for many American and some Mexican workers to engage in a low wage/low skilled job.

Mortgage Crisis of 2008

To increase lending and loans, the financial system developed housing loans. This allowed for the U.S. government to have minimal oversight and regulation. In the early 2000s, interest rates continued to rise and hindered the housing market. “There is near consensus among experts that the housing crisis was caused primarily by the rise of predatory lending and products with exotic features marketed to consumers without adequate information or preparation...” (McArthur & Edelman, 2017, p. 15). Brokers were able to maximize fees to make money because they often knew it was an unaffordable mortgage obligation.

During this time, most Americans could not afford a house. The unemployment rate was 13.2%, many Americans were struggling to find jobs creating an increase in local labor for farmers (“Work experience unemployment rate, 2008,” n.d.). As the U.S. came out of the recession, Americans found other jobs and farmers began to struggle to find people willing to work on the farm.

Impact of Wages on the Migrant Workforce

Since 2000, unauthorized workers have served as 50% of the farm workforce for all commodities, with farms relying on legal H-2A guest workers. Guest workers work in areas such as Florida citrus and Washington state apples (Martin, 2013). Brauw (2017) argued that the wage elasticity of immigration is between -0.3 and -0.4, originally considered to be -0.2. This means that it is harder to record a significant change in wages due to an increase in immigration. There are many potential factors that change the wage elasticity of immigration, so it is important to

take into account this fact and understand that those numbers are not concrete. It is understandable that the elasticity should have more space for deviations.

Hanson and McIntosh (2017) stated three main causes for the decline in low skilled immigration: different economic conditions in their home country versus where they move, declining labor supply in Latin America, and the stricter enforcement of immigration laws in the U.S. All of which can be affecting the undocumented population in the U.S. The increase in demand for farm workers in Mexico leaves the U.S. farm labor supply shorthanded, creating competition for a necessary workforce (Taylor, 2012). U.S. agriculture will be hurt in the long run because they will not be able to keep up with the wage competitiveness as the Mexican economy grows. Keeping wages low for a short period can help but it cannot be a permanent solution if Mexico increases their minimum wage and becomes competitive.

Specifically, rural Mexico is the primary source for hired labor on U.S. farms. The economy of Mexico is slowly growing. Mexico is investing in basic education for rural children, explaining the decline of migrant-workers to the U.S. There is less of a need for Mexicans to leave for the U.S. to make more money because they can now make the same amount in their home country. Charlton (2016) mentioned the investments in rural education does negatively affect the farm labor supply in the U.S.

Burawoy (1976) examined migrant workers in California in the 1970's and came up with three core concepts to explain the price of migrant labor. These three included migrant powerlessness, restricted occupational mobility, and the regulation of movement (Burawoy, 1976). The three core concepts are still relevant considering labor has not changed since the 1970's. Workers do not have the power to challenge the status quo. Migrant workers are racial outsiders, this is largely attributed to the consistent negativity that is thrown at immigrants.

Additionally, there are factors that attribute to discrimination within socioeconomic classes in Mexico, “Hard core poverty is mainly, though not exclusively, a rural phenomenon: although only one quarter of Mexico’s population lives in rural areas, more than 60 percent of the extreme poor live there. Moreover, rural poverty differs from urban poverty in many important aspects” (Cord, n.d., p. 170).

Agriculture is also restricted to certain areas of the U.S., forcing migrants to live only in agricultural regions. Migrants are restricted, because their time in country is limited, preventing proper training and experience in working on a farm (Paret, 2014). Lastly, Burawoy (1976) explained the regulation of movement allowed for workers that have been separated from their families and the Mexican economy. This movement positively affected the U.S. while it very negatively affected the Mexican economy. Californian agricultural employers-maintained workers only temporarily while Mexico “bore the burden of caring for unemployed workers and family members” (Paret, 2014, p. 3). So, workers migrate into the U.S. to find work, with limited skills and because their time here is usually temporary, it can be hard for them to grain the experience needed to meet the farmers’ expectations.

“Regulatory changes alone have not transformed the farm labor system, and more tinkering could result in a temporary fix at the expense of another labor supply crisis in the future” (Martin, 2017b, p. 261). The U.S. is a labor-intensive country, where low wages mean there is less of a need for labor-saving innovations and mechanization. Therefore, it can be argued immigration reform will raise labor costs, making it harder for America to compete with lower-wage countries (Martin, 2013). The less people you have to fill farm jobs will require farms to raise wages, making it easier to hire. Hanson (2017) made an interesting statement, during the housing crisis to 2014, the number of foreigners illegally entering the U.S. declined

annually by 160,000 people, while the working age remained the same. This could be due to the housing market crash of 2006 or the Great Recession triggering an inevitable reduction of immigration into the U.S.

The pressure of raising wages causes two responses as documented by Taylor & Charolton (2003); the exploration and development response and the conservation response. The exploration and development response assessed that potential employees from the U.S. are in extremely short supply, with domestic farm labor supply considered inelastic. Agricultural employers must explore other options in response to a decreased in labor supply, including resources such as oil and equipment to make up for the loss of labor, which is the conservation response. Taylor and Charolton (2012, p. 596) stated, "shifting to less energy-demanding production and consumption activities and developing alternative energy sources and efficiency-enhancing technical change" could be a solution. Low-wage workers are an easy substitution for expensive farming equipment, but there are no real answers for how to successfully substitute workers with technology in many cases.

Farm production has dramatically increased with increasing population. There has been a reduction in energy intensity (Suh, 2015). The reason for this reduction is "attributable to increases in energy prices, advances in energy efficiency or changes in output composition" (Suh, 2015, p. 13202). Moreover, energy is an important factor in sustainable agriculture. Suh (2015) examined substitution possibilities between energy and non-energy factors; concluding regional requirements will be predominant when discussing possible substitutions and the rate of energy intensity used.

Price induced substitution of variable inputs would generate transitory energy savings, while innovation induced by energy prices would have only minor impacts on the US economy.

Innovative activities to reduce energy intensity would be needed for sustainable agricultural production, because they could reduce the risk associated with uncertain energy prices (Suh, 2015, p. 13203).

H-2A Program

The H-2A program allows the lawful admission of international citizens into the U.S. for nonimmigrant work (meaning agricultural labor) or services that are temporary. Once farmers have documented proof that they have advertised employment opportunities in their community, without success in attracting an employee, they can then move on in the process of H-2A. H-2A workers are guaranteed amenities at no cost including; housing, three meals a day or cooking and kitchen appliances, transportation to and from their place of origin, bathrooms in the facilities they work, and a minimum wage of $13.50 an hour ("How much does the program cost," n.d.). According to U.S. farm labor, there is a $400 deposit for new clients, $695 administration fee (deposit goes toward this), $100 first time processing fee, $70 placement fee every month that a worker has been employed by you, and a $400-$925 recruitment fee (Department of Labor, n.d.). There are additional fees that go along with these. With all the requirements, and unforeseen expenses, H-2A can be a costly program to implement.

Extension Agents

Seaman Knapp is known as the "father of Extension," and he used farm demonstrations on the farmers' own land to teach them about new farming technology (Pigg, 1983). Knapp stated, "What a man hears, he may doubt; what he sees he may also doubt; but what he does, he cannot doubt" (Pigg, 1983, pp. 1). There are different types of knowledge that should change based on the situation, knowledge of these practices can encourage behavioral change within the farmers. "Using demonstration methods involves recognizing that demonstrations isn't one

method, but a variety of methods" (Pigg, 1983, pp. 21). Knapp believed that farm demonstrations could influence farming technology adoption.

Diffusion of Innovation

The theoretical framework used for this study was the Theory of Diffusion of Innovation. Diffusion is "the process in which an innovation is communicated through certain channels over time among members of a social system" (Roger, 2003, p. 5). Five characteristics of innovations can be used to explain the rate of adoption (Rogers, 2003). Because there is little literature on farm labor change within this model, this study will cover all five characteristics. "A growing number of studies that cut across many disciplines have identified several factors, including personal, cultural, social, and economic attributes, we well as characteristics of the technology, which influence technology adoption" (Ugochkwu & Phillips, 2017, 362). These factors affect the adoption-decision process, the five stages of this process allow people to decide whether they want to adopt or reject the new technology.

In order to better understand farmers rate of adoption or rejection, the five characteristics of Diffusion of Innovation will allow for sufficient information involving motives, incentives, and resources farmers have. "The potential benefits of a new technology can only be realized when it is adopted and used; the adoption decision involves a critical comparison of perceived benefits and costs associated with the technology" (Ugochkwu & Phillips, 2017 ,369). Within the rate of adoption, five characteristics have been organized to better understand how and why individuals are more or less likely to adopt something based on the norm of the individuals or those around them.

Relative Advantage

Relative advantage refers to the degree that an innovation is perceived as better than the original idea or item (Rogers, 2003). This can be measured through economic profitability and how popular the innovation is within social circles. New equipment, genetic modification, and other forms of innovation are rapidly entering the agriculture community. It can be difficult for farmers to adopt new innovation because any innovation is expensive and ever-changing.

If cost-efficient machinery comes to the market, farmers are hesitant to replace present workers with expensive equipment that will depreciate overdepreciate quickly with time. Additionally, new machinery will likely improve and be more efficient over time, quickly becoming outdated. This is an inefficient decision for farmers because they will pay a premium for equipment that must be paid off, even if it does not meet expected lifespan or gains in efficiency, making it an unsafe option to choose. Growers do, however, have a consistent flow of guest workers to replace any current workers that might leave, which is cheaper than buying whatever is new for the year. However, H-2A stipulations and regulations make it hard to get the number of workers needed, if the correct steps are taken. Additionally, the available number of illegal immigrants in the U.S. is limited.

Martin (2017b) proposes that economic incentives will be the best way to transform where workers come from and methods that farms use workers to produce crops. This may usher in a new era of farm labor management. “Farmers are grappling with the optimal strategy that is likely to be determined by nonfarm developments, including the speed at which costs fall and performance improves for labor-saving advancements, potential changes to trade policy that affects imports, and changes that make guest workers cheaper or more expensive” (Martin, 2017b, p. 260). Farming labor-intensive products requires high monetary inputs and this

uncertainty keeps many farmers from investing in changes. “A key determinant of sustained adoption is the profitability for agricultural enterprises and changing prices for agricultural products are shown to be a major factor in agricultural adoption technology” (Rehman, Jingdong, Khatoon, Hussain, & Iqhal, 2017, p. 70). Rehman et al. (2017) go on to note that profitability and expected benefits have to be high in order for farmers to invest in the technology.

Compatibility

Compatibility refers to how consistent an innovation is with existing values and morals, past experiences, and the needs of potential adopters (Rogers, 2003). When adopters can associate a new innovation with what is already familiar, the innovation will likely be successfully adopted (Roger, 2003). Osterheider and Raupp (2003) found farmers are less likely to adopt an innovation if it jeopardizes animal welfare or consumer welfare. People are especially susceptible to adoption intention if they know someone who has been personally affected by the innovation (Rogers, 2003). Farmers rely heavily on this stage of the diffusion of innovations because one of their main sources of education and “staying up-to-date” is through social interactions. If one farmer mentions negative effects of a product, then others will be vastly less likely to adopt. Brown (2016) found New Zealand farmers mistrust local government but trust other farmers.

An example of an agricultural innovation was the “miracle” varieties of rice by the International Rice Research Institute (IRRI) (Rogers, 2003). This rice gained ground throughout Asia so rapidly that it caused a Green Revolution (Rogers, 2003). However, local villagers thought the rice tasted different from what they were used to. Therefore, growers kept growing the original rice for the locals and sold the “miracle rice” on the international market. It sold at 20% less in the local marketplace because of the incompatibility within the Asian culture.

Rogers (2003) explains compatibility as the ability for a new idea to be incorporated into the existing practices that the farmer is already familiar with. Often times change agents assume an individual has knowledge or relevant experience regarding a new idea (Rogers, 2003). This knowledge system is important to note because there is a lot of knowledge often covered by an indigenous (institutional) knowledge system, so individuals that do not use certain practices or technologies should not be stereotyped as a *blank slate* (Rogers, 2003).

Complexity

Complexity is the opposite of compatibility; it is the degree to which an innovation is perceived as tough to understand and integrate into current practice (Rogers, 2003). Innovations can be associated with a complex-simple continuum, it can be a barrier for adopters (Rogers, 2003). This concept of innovations and their rate of adoption is one of the most important for farmers because of the complexities associated with technology and the politics that drive agricultural decision-making in the U.S.

Trump moved quickly to carry out his vision of nativism, starting with a series of executive orders targeting immigrants (Gurman, 2017). Trump instituted travel bans from some Muslim countries, initiated construction of a U.S. – Mexico boarder wall, hired 15,000 Border Patrol officers, and increased the power of ICE officers (Gurman, 2017). President Trump combined immigration, terrorism, and the need to protect into a new political narrative; this was an effort on his part to increase border security. Albeit, this increased the number of border patrol police and Americans started to use racial profiling (Gurman, 2017). Combining crime, immigration, and terrorism into one concept irrevocably caused the general public to see all three concepts as the same thing.

Recent politics make immigrant hiring practices incredibly complex (Greene, 2018). The Economic Research Service of the United States Department of Agriculture stated that annual growth of the total factor productivity, which is the productivity of the inputs and outputs subtracted by the labor required, was more than 1.4% from 1948 to 2011 (Greene, 2018). Agricultural output has increased annually at a rate of 1.5%, showing the growth of production factors has been very stable since 1948. In addition, since 1948 the agricultural sector has decreased labor by 78% and land by 26% while increasing factors such as energy, materials, and other factors (Greene, 2018). "The contribution of capital and intermediate factors to the agricultural output growth has been offset by the negative impact of labor and land growth" (Suh, 2015, p. 13193).

Trialability

Trialability describes the level to which an adopter can try something on a limited basis before adopting (Rogers, 2003). Trialability can be an important concept when trying to encourage late adopters to try a new innovation. "An innovation that is trialable represent less uncertainty to the individual who is considering it for adoptions, as it is possible to learn by doing" (Rogers, 2003, 16). Rural communities are usually considered late adopters, so it is important to recognize who the leaders are in the community, as they are key persuaders if adoption of a technology is important for that demographic.

Diffusing new ideas for farming is best done through successful demonstrations. A study was conducted in New Zealand and other countries identifying that credible members of a community who adopt new practices connected these innovations to their network of farmers, making the adoption rate fast-track through the community (Brown, 2016). They found that this was a feasible way to make others in the community adopt new technologies.

Observability

Observability is the level to which an innovation is visible to others. Depending on the innovation, visibility may be tangible or tangential (Rogers, 2003). Most of the research on observability has been through studies of technology (Rogers, 2003). An example of technological innovation is cellular phones, which is highly visible because of its portability. Public places almost always have one person with a phone so others could notice and hear the phone ring (Rogers, 2003). The constant exposure made others more inclined to adopt cellular phones.

Observability can have adverse effects. “With regard to agricultural technology adoption, peer effects can lead to economies of scale lowering transportation costs but can also lead to increased competition and land prices, which can spur dis-adoption" (Rehman et al., 2017, p. 70). Because of the competitive nature of farming technology, farmers who do not adopt or cannot afford it, cannot maintain economic pace with the farmers who are increasing productivity due to technology. Additionally, the adoption of something can also depend on the stakeholders of the community. “The technical adoption of social network leaders on a particular technology effects adoption by members of the social network. If the leader’s opinion is not in favor of the new technology, a member may not adopt” (Ugochkwu & Phillips, 2018, p. 362). Observability can have a lot of power when it comes to the adoption process, especially in rural communities, so having stakeholders at the forefront of the adoption process will start and fuel the process throughout the community.

Summary

This chapter outlined the information available regarding immigration associated with agricultural labor in the U.S. It also provided a short history of how the decrease in available

labor has changed over time. It also presented relevant information concerning the potential causes for the consistent decline in farm labor (160,000 individuals annually). Finally, the chapter outlined the five characteristics of Diffusion of Innovation and how they relate to labor issues. Based on the information gathered, the next chapter will justify the methods used to better understand the changes happening to farm labor.

CHAPTER 3

METHODOLOGY

The purpose of this qualitative study was to understand how farmers in Georgia are dealing with changes to farm labor because the number of available skilled agricultural laborers are decreasing and there is no feasible solution. Eight farmers were chosen to be interviewed in order to explore how they deal with limited labor availability through different solutions, technologies or other practices. This chapter will provide the purpose and research questions, a justification for the chosen research design, data collection and data analysis procedures, researcher subjectivity statement, and approaches implemented to ensure data trustworthiness and transferability. Additionally, general information about each participant is outlined with a description of events during the interviews.

Purpose and Research Questions

Farm labor has decreased without a feasible substitution (Martin, 2017b). Traditionally large farmers were able to hire immigrant laborers at a low wage. As noted in the literature review, there are several reasons why this is changing. By gaining the famer perspective related to the changes recently made to farm labor regulations and availability, Extension agents and agricultural communicators can help educate others on sustainable solutions. The three research questions this qualitative study sought to answer through an instrumentalist lens were:

4. How do farmers perceive manual labor changing as a result of immigration?
5. What professional impact have farmers felt as a result of immigration?
6. How have farmers feasibly dealt with the decrease of immigration in Georgia?

Justification for Research Design

Qualitative research is a broad designation for a research approach that generates, analyzes, and interprets data through non-statistical means (Schwandt, 1997). Grounded theory allows the interviews to have a purpose, because it allows the interviews "to move beyond description and to generate or discover a theory" (Creswell, 2013, p. 83). In order to develop a better idea of how farmers are dealing with farm labor changes, interviews will be conducted with farmers from different crops. Interviews were chosen as the data collection method because they allow for one-on-one time to help build rapport with the individuals, allowing farmers to be more comfortable telling their story. Additionally, interviews provided the researcher an opportunity to shape conversations based on the person being interviewed, increasing trustworthiness.

Interviews were selected as the data collection method to address the research questions based on grounded theory because focus groups might prevent individuals from telling their personal stories on the subject of changes in farm labor in the U.S., because they may be uncomfortable to talk in a small group. In addition, direct observation may prevent the researcher from seeing potential vital information that would otherwise be told by a participant. Semi-structured interviews allowed the researcher to engage in candid conversations with participants while strategically staying on task with the interview guide.

Ensuring Quality of the Research Design

It is vital to establish the trustworthiness of a qualitative research study. Therefore, a system created by Lincoln and Guba (1985) was used. This system includes four key concepts to address the quality of qualitative research; credibility, transferability, dependability, confirmability, and authenticity.

Credibility. Participants of the study must feel the finding of the study reflects their feelings towards their experiences. This can be achieved through prolonged engagement and member checks. The participants will be a part of the development of the findings.

Transferability. The narratives of the participants will not be cut down and any of the information they gave candidly will not be excluded. The interviews will stay rich and include everything the participants willingly said during the interviews.

Dependability. The data will be collected by recordings and then transcribed so it can also be read. The data will be saved onto a cloud drive to ensure the information is never lost. There must be consistency in how the data is concluded.

Confirmability. The study was shaped based on how the participants' motivations and opinions.

Methods

The study used a qualitative approach because it attempted to explore complex variables that cannot be clearly measured, allowing participants to tell stories (Creswell, 2012). Literature on this subject is limited, therefore, the best option was a qualitative approach because it broke down the barriers of multivariant data and opened the door to a method unencumbered by most research limitations.

Subjectivity Statement

The researcher who conducted the interviews and analyzed the data engaged in a semi-structured interview with participants that met the selection criteria. I acknowledge my interest and personal experience regarding farming could affect the interpretation upon the data collected. I have included a summary of my connection to farming and interest in this area.

I grew up on a small farm in West Georgia, and being the eldest, I had the opportunity to take on several responsibilities at the farm. My upbringing gave me first-hand knowledge of how tough it can be to run a cattle farm. Everyone in my family shared in the responsibilities and we had no employees because it is too small. My high school was very large and I had no ties to FFA or 4-H, so I never had the opportunity to be around other kids who had an affinity for agriculture. Agriculture was nowhere near the top of my list when I started thinking about potential careers.

I received my undergraduate degree from Auburn University, majoring in Professional and Public Writing with a minor in sustainability. As I went through my program, I quickly realized my love for agriculture and began researching career options for an English major in this field. That is when I decided to become a grant writer for independent farmers. Graduate school was my next step and I never took a break to work before starting my graduate program. The University of Georgia quickly caught my eye, and I began my graduate program in Agriculture and Environmental Education in Fall of 2018.

After researching potential research ideas, I was drawn to farm labor. Growing up on a farm afforded me insights that most of the general public does not understand. Due to the political climate in the US, there have been a lot of changes to immigration trends. There was very little literature on the subject, and I was inspired to challenge myself and learn along the way. Doing this research study granted me new knowledge of US agriculture and research methods that I will be able to carry on beyond my graduate degree.

Ethical Considerations

To ensure confidentiality with the participants, their identity was left anonymous by giving them a simple alias. Once the interviews were completed and transcribed, the interviews

were labeled based on the alias given and the audiotapes were wiped clean. Any responses that were written down, along with demographic information were labeled based on the alias connected to the participant's interview. The consent forms, and contact information will be kept in a locked file cabinet and destroyed after the study is over.

Data Collection

The interviews were semi structured. This method was utilized because each farmer had a different experience with farm labor and allowed additional questions to be asked that were not part of the developed interview guide. There were eight interviews conducted, two on the farms of the participants and six phone call interviews. Study participants included large farm owners in Georgia, to define a large farm for the purpose of the study, the farm needed to include more than one employee.

Instrumentation

The instrument used for data collection was a semi-structured interview guide (Appendix E). Demographic questions were used to help begin the interview and allowed the participants to get comfortable. The demographic data requested included how they became farmers, farm size, yield and employment size among others. A flowing, natural conversation between the researcher and the participant was encouraged. The interview guide was created to ensure all questions were being answered based on the five characteristics of Diffusion of Innovation; however, the interview guide did not have to be followed exactly, it was open for interpretation from the participant Wholey, Hatry, & Newcomer (2015). mentioned the use of a semi-structured interview system provides reliable and consistent information. The interview guide was crafted to pose a question with probing questions to ensure participants were giving open-ended answers to the questions. The questions in the interview guide were used to investigate participant

experiences with farm labor changes, why those changes occurred, and what they were doing to keep up with crop production.

Sampling Strategy and Participant Eligibility

For the purpose of this study, purposive sampling allowed the researcher to use their own judgement when choosing who would participate in the study. Creswell (1998) suggested purposive sampling as a form of non-probability sampling and often the most effective method of finding participants. The qualifications of farmers interviewed included farm size, knowledge of labor policies and experience with employees on farms. The farm must be large enough that it required employees beyond the farm owner. Most medium to large farms are congregated in Southern Georgia. Moreover, the eight farmers must have had knowledge of labor issues and/or experienced the issue. No qualifying survey was necessary. Dr. Chappell, a horticulture associate professor at the university, provided a list of potential participants that qualified under these conditions based on the relationships he has built with farmers through his extension programs and the Commodity Commission Board participant list was used. The potential participants were then called (Appendix B) to ask if they would be willing to participate in the research, followed by an email (Appendix C) summarizing the voicemail if the potential participant did not answer.

Participants need to understand what immigration policies are in place and how they have changed over the past 10 years. Finally, they should have had experience working with employees on farms. Migrant workers have felt the backlash of less farm labor the most, therefore it is expected farms with these workers would yield the most information. Farmers must be comfortable telling me their experiences so that I could obtain the most authentic data.

Interview Procedure

Participants read and signed a consent and confidentiality form for this study (Appendix D). It outlined what to expect from the interview and that their personal information would remain anonymous. Participants understood that the interview was voluntary and that they did not have to answer questions or could opt out of their interview at any time. Once the interviews were scheduled, the introduction was read so the participants understood the interview expectations. Each interview was audio recorded and notes were taken during the interview. The recording was then transcribed verbatim and analyzed using MAXQDA.

Data Analysis

The method used to analyze the data was grounded theory. “A key idea is that this theory development does not come ‘off the shelf’, but rather is generated or ‘grounded’ in data from participants who have experienced the process” (Creswell, 2007). This framework ensured the conclusions of the study could have more than one interpretation. Creswell (2007) explained the benefits for the researcher that go along with using grounded theory, “The researcher makes decisions about the categories throughout the process, brings questions about the data, and advances personal values, experiences, and priorities” (Creswell, 2007, p. 88). The use of Diffusion of Innovation as the theoretical framework allowed the questions to have a purpose and direction. The main characteristic of a qualitative research study is to show an inductive analysis. An inductive analysis shows the changes as participants answer probing questions.

Potential Risk

Questions included in the interview guide may have been seen as controversial, leading to stress and anxiety. The risks associated with the topic can cause invalidity in the information presented because some individuals may feel uncomfortable talking about potentially illegal

activity. Political opinions can also arise during the interviews; therefore, offense may be taken. In addition, since current employees may be illegal immigrants, the farmers could be worried about discussing the topic. They are breaking the law in some cases when they hire farm laborers.

Lastly, because this topic is about immigrants, farmers could lie about the hiring process or other parts of the employment process. To maintain decorum, the researcher kept from voicing an opinion and maintained a neutral perspective. The researchers also practiced responding to questions and opinions they would likely hear during the interviews prior to engagement to ensure they were able to remain neutral.

Interview Descriptions

Results are provided in order of the Diffusion of Innovation characteristics-based questions in the interview guide. With each characteristic, the insights from each participant that commented on the question is given. Interview questions were directly related to the five characteristics of Diffusion of Innovation while also connecting the comments back to the main research questions.

Diffusion of Innovation created the basis of the question to provide an all-inclusive conversation and understand the scope of innovations being used on farms to substitute or alleviate manual labor. Table 1 provided a summation of the demographic data from each participant in order to organize each participant.

Table 1. Participant Demographic Information

Participant	Gender	Crop	Acreage	Extension District	Number of Employees	Types of Employees
Participant 1	Male	Blueberries	600 acres	South-East	10 during off season, 200-250 during season	H-2A migrant workers
Participant 2	Male	Row Crop emphasis on soybeans	2,000 acres	North-West	N/A	Work with contractor with H-2A workers
Participant 3	Male	Peaches	1,700 acres of peaches and 3,000 acres of pecans	South-West	50 fulltime, 150 during season	100 with H-2A, 50 full time locals
Participant 4	Male	Row Crop emphasis on cotton and corn	1,000 acres of peanuts, 1,000 acres of corn, 1,000 acres of cotton	South-West	5 full time	local
Participant 5	Female	Apples	220 acres in orchards, 80 acres for pastures	North-East	50 on weekends, 12 during the week	2 H-2A workers, locals, high schoolers
Participant 6	Female	Tobacco	1,000 acres, mostly rented	South-East	8 full time, various during season	Locals, migrant workers
Participant 7	Male	Pecan	10,000 acres across 6 counties	South-West	10 full time, various during season	Local, migrant workers
Participant 8	Male	Vegetable	1,600 acres	South-West	45	Work with contractor with H-2A workers

There were a total of eight interviews conducted. Two were in person on the farm of the participant. Due to limitations of the study, such as time constraints and long distances, six of the interviews were conducted through phone calls. A female apple orchardist with 12 full time and 50 weekend workers and a male row crop farmer with an emphasis on cotton and corn that has full time workers were hesitant to participate in the interview due to time constraints. A male blueberry grower with 10 full time and 200-250 seasonal workers and a male peach grower that has 50 full time and 150 seasonal workers gave long and thorough answers. The shortest interview was seven and a half minutes, while the longest interview was 48 minutes. Most of the interviews lasted about 20 minutes. A male row crop farmer with an emphasis on soybeans that workers with a contractor with H-2A workers, a male peach grower that has 50 full time and 150 seasonal workers and a female tobacco grower with 8 full time and various numbers of seasonal workers, were willing to give other insights about topics not covered in the interview that they felt were pertinent to farm labor and what can be done to aid farmers such as modified healthcare benefits.

During an in-person interview with a male peach grower that has 50 full time and 150 seasonal workers there were no interruptions. During an in-person interview with a male blueberry grower with 10 full time and 200-250 seasonal workers, the interviewee answered the phone twice. Both of which were his employees asking about broken equipment. During the phone call interviews there were no interruptions. At the beginning of the phone call interview with Participant 4: a male row crop farmers with an emphasis on cotton and corn that has five full time workers, they answered while someone was on the line to let me know they were hanging up and would switch back to our phone call promptly.

Summary

This chapter offered the steps involved in the design, collection, and analysis of the data. To ensure the quality of the research procedures, a subjectivity statement, description of the sampling strategy, details regarding participant eligibility, and the risks involved were mentioned along with details regarding data collection and data analysis. The following chapter will provide the results of the study based on the analysis.

RESULTS

INTRODUCTION

All of the participants had some type of help on the farm, whether it was H-2A employees, full-time locals, part-time locals, or migrant workers. Some of the participants felt they would go out of business without H-2A, but it is also expensive. Participants felt they had to make changes to their farms to meet all of the regulations and invest money to get workers to their farm. Most of them hired local or migrant workers and used different techniques that best fit their farm. Five of the participants specifically mentioned they used locals, five participants mentioned they used H-2A, three participants mentioned they used migrant workers, and one participant hired high school students. Seven participants had a mixture of two or three types of employees.

All of the farmers used some type of farming technology. Examples of technology included GPS tracking on the tractors, drones, and even animatronics. Participants felt technology was an instrumental aspect of keeping their farmers running and evolving to keep up with others. As they continue to produce more with less resources, they consistently look for feasible changes.

To start the interview process, participants were asked to explain why they became a farmer. This gave some background information as to why they farm, what they farm, and provided insight into the type of farm they are operating. Seven of the participants stated they

took over the family farm. A male peach grower that has 50 full time and 150 seasonal workers stated,

> Well, I am fourth generation on our farm, and I have just loved it since I was a kid, you know, and this is kinda one of those deals where, you know, that's all you want to do. Um, tried to get away from it. Um, I actually went to school to be a commercial pilot and did that for a while and my granddad was to the point where he couldn't work anymore and it was, you know, if I didn't stay, my dad couldn't run it by himself. And so I chose to keep farming rather than keep flying.

Another participant had the same type of response. A male pecan grower with 10 full time and various numbers of seasonal workers stated,

> I mean a big part of that is that my dad and my granddad built this, this business. And so it was there for me as an opportunity. I doubt I would've done it if it hadn't been for that, but I did live in D.C. and worked for the government for a couple of years after college. Uh, cause I thought that's what I wanted to do. And I decided to come back and farm, uh, really as a lifestyle thing more than anything. I just, I didn't really enjoy, uh, being cramped up in the office all day, looking at a computer all day. And, uh, and I didn't really enjoy the. Not that it's any less stressful, but I guess it's a different type of stress. Uh, and then what, what was involved with that. So, I enjoy that stress better than that stress.

Many of the participants felt that farming as a profession had many roadblocks in the future as a career unless they inherited the land, crop, and resources that go along with a farm. A male row crop farmer with an emphasis on soybeans that works with a contractor to obtain H-2A workers, a female apple orchardist with 12 full time and 50 weekend workers, and a male pecan

grower with 10 full time and various numbers of seasonal workers all mentioned they started a different career but eventually came back to the farm. A male vegetable grower with 45 workers that works with a contractor to obtain H-2A workers was the only participant that did not mentioned whether it was inherited. He preferred this profession because he would be his own boss and he got to work outside.

Participants were then asked questions specific to the five characteristics of innovation as identified by Rogers (2003). Themes were identified within each area and reported below:

Compatibility

Several of the participants felt it was getting harder to find people to work on the farm and to also get the work done with the resources they were given. A female apple orchardist with 12 full time and 50 weekend workers noted, “it's a lot harder to find workers for us because we are seasonal. We can't offer people full time work. So it's really hard.” Much like this participant, a male blueberry grower with 10 full time and 200-250 seasonal workers, and a male row crop farmer with an emphasis on soybeans that workers with a contractor with H-2A workers specifically noted that they like to use part-time workers because of how busy they are during the picking season, but they have a hard time finding part-time labor. Harvesting seasons for farmers usually last a few months.

Two participants expressed they were not necessarily worried about finding workers, they were more worried about finding quality workers. A male pecan grower with 10 full time and various numbers of seasonal workers stated, “It's just hard to find someone with the work ethic and the skills that we need to hire, that it's not a quantity problem. It's a quality problem.” They felt like they needed people on the farm that understood how crops need to be tended along with

being able to operate the machinery to truly be productive. A male row crop farmer with an emphasis on soybeans that workers with a contractor with H-2A workers stated,

> No, I can use, I mean I could use at least one full time person year-round, but it's such a headache to deal with it. My dad and I just do everything we can do. And then, you know, there's a few things that don't get done that probably should, but the aggravation of having somebody full time that's just not worth the flip that you have to babysit. You wind up spending more time babysitting them than you would if you actually did the work yourself.

Some participants noted it has recently gotten harder to find workers. A male row crop farmer with an emphasis on soybeans that workers with a contractor with H-2A workers and a male pecan grower with 10 full time and various numbers of seasonal workers mentioned that 10 years ago the labor forced started to dwindle. A male peach grower that has 50 full time and 150 seasonal workers stated,

> In 2008 when the economy tanked, um, we had plenty of people all the time and everybody was looking for work and most of them didn't want to work on the farm. And if they worked here, they wouldn't stay long cause they're looking for something else.

Many of the participants felt like the type of workers they get often do not want to work intensive manual labor jobs, so there is a quick turnover of workers. A male peach grower that has 50 full time and 150 seasonal workers also mentioned steps they have taken to keep more full-time workers on their farm,

> [Peaches are] hyper seasonal, but with the two together it…helps us maintain our, our full-time labor. Um, because if we didn't have pecans and I'd have to let most of these people go and it's gotten to where peaches require having the greatest skill and all the

several key positions that you don't want to have to find seasonally. Um, so this is how we now diversify with pecans.

A male vegetable grower with 45 workers that works with a contractor to obtain H-2A workers, a female tobacco grower with eight full time and various numbers of seasonal workers, and a male row crop farmer with an emphasis on cotton and corn that has 5 full time workers felt like their farm was functioning adequately with the amount of workers. None of the farmers felt like it was very successful and most of the participants said the farm was running okay. A female tobacco grower with 8 full time and various numbers of seasonal workers said, “We're running OK right now. We're not struggling.” A female tobacco grower with 8 full time and various numbers of seasonal workers went on to note, “We, we've been blessed. Uh, we have not had any issues trying to get labor.”

Relative Advantage

A male peach grower that has 50 full time and 150 seasonal workers, a male row crop farmer with an emphasis on cotton and corn that has 5 full time workers, a female apple orchardist with 12 full time and 50 weekend workers, and a male vegetable grower with 45 workers and work with a contractor with H-2A workers felt their current adaptions were advantageous over buying new technology. What they had was working, it may not be perfect, but it was enough. They felt it was difficult to innovate with other farmers without using technology as part of their overall plan to become more efficient. A male peach grower that has 50 full time and 150 seasonal workers stated, “We're trying to get better and quicker and we're trying to get more forward and hopefully there's some room in the middle for us.” There are also subthemes within the characteristic, relative advantage to further explore specific facets of what this characteristic looks like on a farm.

Labor

Some of the participants have developed strategies to make up for the lack of labor and to make help more people stay on their farm. A female apple orchardist with 12 full time and 50 weekend workers said, “We do hire a lot of, of high school students on our weekends, but, uh, it takes a lot more work… we have to because we can't get enough adults.” Another example, came from a male pecan grower with 10 full time and various numbers of seasonal workers stated,

> And we, we made the decision that we were going to kind of hire a lot of people and fire a lot of people, but the ones who were good, we were gonna try to, to pay them enough to get them to stay.

One strategy that could be helpful for other farmers was created by a male pecan grower with 10 full time and various numbers of seasonal workers, as he was going through an influx of new employees to weed out people that would not be willing to stay. He developed his own strategy for training workers. He explained it as a playbook for the different jobs on the farm, as they learn new things they add to those playbooks. So whenever he hires a new employee he uses the playbooks as an instruction manual, he mentioned that it helps his employee learn quickly but more importantly, it has taught him how to train workers with no previous experience. Some farmers also started including benefits for some of their workers, as well as paid vacation time. Farmers realized that time wasted is money they are not making, a male peach grower that has 50 full time and 150 seasonal workers stated,

> So every hour they spend up here, not working is a waste, for them it's an hour. They're not with their family, they're not at home. They're in, you know, say a strange place if they're new…So, I want to have more work than I've got people because if I've got more people and I've got work.

Technology

All of the participants felt they were embracing technology on their farms, but the risk and reward economically are a concern for most farmers. A male row crop farmer with an emphasis on cotton and corn that has 5 full time workers mentioned, “You just got to figure out is it number one, is it economic or can you afford it? Cause a lot of this stuff first gets here, so dang expensive over time it comes down.” Due to the price of farming equipment, farmers want to know that their investment will make a profit in a reasonable amount of time. Not only has the technology helped some farmers substitute labor, but there are other advantages such as; smaller carbon footprint, money saved, and less waste. A male row crop farmer with an emphasis on cotton and corn that has 5 full time workers mentioned the benefit of being a seasoned farmer and understanding his farm land well enough that technology is unnecessary,

> Well, I have not quite figured out a drone at the farm level. What can we do with that drone? How's it going to help me make a better crop? Because somebody says, well, it's going to identify the weak spots. I said, well, if you're like me and you've been farming this land for 35 years, I can walk to the weak spot. I know exactly where the weak spot is in every field.

A male peach grower that has 50 full time and 150 seasonal workers, “It's a schoolhouse. I mean it's crazy. Nobody puts packing shed in a schoolhouse. But yes, it's working for us. And at some point, he was comfortable saying, this is me and it's fine. I'm not trying to be dull.”

Another Relative Advantage mentioned was by a male row crop farmer with an emphasis on cotton and corn that has 5 full time workers,

> Yeah, definitely. Oh, it's, our yields have increased. Um, the, um, the carbon footprint is not near as big as it used to be because at one point in time, before we had these genetics in the cotton, um, we would spray cotton for worms probably eight to 10 times a year. Then we had the boll weevil too. We spray that boll weevil eight to 10 times a year. So at one time you're sitting here, we're probably spraying it 20 times a year. So you're spraying a pesticide and you're burning fossil fuel to get it done. Now the technology I might spray a twice a lot of, lot of years. It's only one. So you think about the carbon footprint. I'm not spraying chemicals, chemicals everywhere, right? That that is so much better for the environment.

Furthermore, two participants showed they have a strong understanding of marketing. They emphasized the importance for their farms to have a niche markets. A female apple orchardist with 12 full time and 50 weekend workers went on to mention that they have hayrides, apple picks, and other activities for families during the fall to make money. A male peach grower that has 50 full time and 150 seasonal workers explained the steps they have taken to keep up with other farmers,

> We have a cleaning plant and some processing for pecans. Have a small retail business, um, mail order business…We do it with our name and reputation. Our little niche of being, you know, a family farm and the Georgia peach has a lot, a lot of pull was weak. We were handed up gold mine as far as marketing, but we're looking for, you know, different outlets in a different way to sell peaches. Not through the grocery store. Cause the grocery door. Yeah, peach is a peach Yeah. If I can put Georgia peaches out there, great.

Trialability

As the pool of possible farm workers continues to decrease, farmers are starting to look at new options to take the place of manual labor. A male row crop farmer with an emphasis on cotton and corn that has 5 full time workers explained, “I went from a six-row equipment to 12 row equipment. I've doubled the size of my cotton acres and did not hire a single person.” Farmers are more interested in finding a substitute that is also affordable. A male peach grower that has 50 full time and 150 seasonal workers stated,

> I don't feel like we have that stance where I think we have is a real good idea of a cost benefit. And if we can invest in machine that's going to save us people for making a better product or allow us to generate more throughputs, I like that. Um, we're quick to embrace it.

Participants felt like they should be a high turnover for their investments in farm equipment. So, they normally turn to substitutions for current technology as opposed to new technology. Another example is from a male pecan grower with 10 full time and various numbers of seasonal workers,

> …we have tried to stretch the ones we have further by getting them to work more hours to try to get the same amount done with fewer people. And um, there are a few places where we have turned to equipment, like in the cleaning plant. Um, you know, we've been able to eliminate some of the labor required…

Additionally, a female apple orchardist with 12 full time and 50 weekend workers has started hiring high school students to work on the farm during the weekend, because of their type of farm. They are an agritourism site, so they are busy on the weekends, when high-school

students are available to work. She went on to say, “every new thing we add requires another employee. So that kind of holds us back from expanding because we can't find enough workers.” However, they did go on to explain that they use drones to check on the pastures and animatronics at some of their agritourism spots, so they do not have to pay for someone to talk to the students as they move through explaining, “… we have to because we can't get enough adults.”

On the other hand, a male row crop farmer with an emphasis on cotton and corn that has 5 full time workers explained, “we use pretty much the latest and greatest stuff that we can get our hands on. Um, as far as our seed facility, I mean, you can get robots to do some of that work, but the cost for us is just not worth it.” So, the advantage of the technology they can potentially use on their farm, in any capacity, has to be holistically better than whatever method they are currently using.

Complexity

Very few participants noted the difficulties that come along with adopting new technology, most felt comfortable using technology on their farms. The difficulty for most, is knowing that their investment will provide a return, and some spoke about the policy issues they have faced in the last few years. There are subthemes within this characteristic to further understand the complexity of current farms through the lens of technology and hardships that make farming complex.

Technology

Several of the participants mentioned the technology they felt were the most complex on their farm, but they have also helped their farm’s performance. A female apple orchardist with 12 full time and 50 weekend workers,

> Uh, well, we have a weather station, uh, owned by the university of Georgia at our farm. And, uh, we you utilize that with the information. It feeds to our computers to decide when certain bugs are going to hatch. And then that's when we spray a part of our integrated pest management program. Uh, we use QuickBooks and, uh, all that. My degree is in accounting. So, I do all our books and taxes and all that myself. Um, uh, we have a drone. Uh, my grandson does that so that we can scout check on the cows and things like that with it. Uh, we also use it to make, uh, promotional videos to post on social media.

In one case with a male blueberry grower with 10 full time and 200-250 seasonal workers, the most complex part of having a farm is managing the crop. In an effort to be as effective as possible, they have worked with the plants and learned the best way to maintain and harvest. He explained the complexity of efficiently growing blueberry bushes,

> You have to prune it right? So you have to start from day one. Once the wood gets old, the boost won't even if it vibrates. It won't. The berries won't fall off. So you'll have to keep new wood there, flimsy wood. So you have to start from day one with the right varieties. Keep the bush pruned, keep the new wood out so you can mechanical pick."

A male peach grower that has 50 full time and 150 seasonal workers explained why it is hard to adopt technologies over manual labor when picking peaches,

> What I need to get is 80 people cutting like this, so that when he comes with a bucket here, that that peaches right here in front of his face, and it's not that here, it's not in there. So I'm making this whole tree in the architecture tree where I can pick it like that and I'm making the wagons and the track middles in my loading dock where I can get the bins to

> and from that guy like that. And I'm making my packing shed where I can get the peaches here like that and I can cool them quickly and I can pack. So everything's done where we can just go a lot faster with the same amount of people. Um, and over the course of time a lot of little decisions add up.

There is more to a successful farm than just adopting technology, he went on to explain where technology might go for peaches, but they are making decisions in other areas of the farm to sell more,

> You know, I get it when, when you start talking about we're going to hedge them and we're going to bring machine in here to pick them. I just get it, I can't see it. Um, and the, the little decisions we're making day in day out, they, they make us more efficient where we can absorb increased labor costs. We're also trying to sell our fruit from more money and aggressively marketing in a way…

Hardships

Technology had evolved quickly in the last few decades, and agricultural innovations can absorb that need for manual labor. A male peach grower that has 50 full time and 150 seasonal workers explained,

> We have machines that, that the, uh, we, the guy in California couldn't fit. We had to go to Holland to get them to log in remotely to our sizer or get in it and try to figure out what's wrong with it. That's pretty, that's just a, I was just like, that's fantastic. I mean, think about it. I know it's, thinks this thing's down and we cannot run without it. And that, I hate that. But this is amazing. This guy in Holland and he's, well you can see he moved with a cursor right there. He's great. Um, so yeah, I don't know what technology is, but I'm using it every chance I get.

He explained how difficult it can be to maintain new farming equipment. There are only a handful of people that have the ability to fix this sizer, but technology allowed a man to fix a machine from thousands of miles away.

Overall, participants felt like they were comfortable using technology, or trusting their employees to incorporate technology onto their farm. A male vegetable grower with 45 workers and work with a contractor with H-2A workers stated, “In general, it’s easy. Uh, but in some cases not, but I will tell you most of the times it is easy. I have people capable of doing that.” However, they use a conservative mindset to make these investments for their farms. Generally, farmers feel like their money needs to be invested in the best possible option for their farm and they want to quickly see a return on their investments if they choose to invest in technology. A male row crop farmer with an emphasis on cotton and corn that has 5 full time workers said,

> I just, uh, all these things sound great, but I'm like, okay, how do we apply it? You know, there's something, I've seen a little stuff about a sprayer, they can see that weed and only put the spray out when it sees that weed. That's pretty cool. Yeah. How much more will we be saving that way?

Another aspect of complexity are the policies and regulations set in place that do not necessarily benefit farmers. A female tobacco grower with 8 full time and various numbers of seasonal workers explained that they used to grow watermelons until one year they could not sell them, they then explained,

> The farmer does not get what the grocery stores are charging. And that's a misconception with a lot people. They go in the grocery stores like, Oh that watermelon was $12 you know…but their thought is that the farmers are getting rich off the produce…But that's not the case. It's the middleman just getting the money.

Some farmers mentioned laws and policies making it harder for them and their workers. A male blueberry grower with 10 full time and 200-250 seasonal workers stated,

> When Georgia passed that law, Georgia passed e-verification law. It scared him. He passed a law that said that it gave the police officer rights to stop him for any reason…So they're still getting insurance, you know, most of them, but it's under a higher category.

A male row crop farmer with an emphasis on cotton and corn that has 5 full time workers, a female tobacco grower with 8 full time and various numbers of seasonal workers and a male blueberry grower with 10 full time and 200-250 seasonal workers all mentioned that current politicians are helping farmers more than past politicians. A male row crop farmer with an emphasis on cotton and corn that has 5 full time workers stated,

> We're in the middle of a farm bill that was passed and we got three more years of it. So before anything changes as far as you know, from my view, um, a farm bill was, nothing's really gonna change until we got another farm bill. Now we just signed phase one of the trade deal. Um, that's policy right there. He can go on and get phase two done in phase three. That's better.

Observability

All of the participants watch other farmers, and what they are using on their farm to understand what types of technology would benefit their farm. A male row crop farmer with an emphasis on soybeans that workers with a contractor with H-2A workers stated, “I would step out there and say all of, I mean everybody's got some kind of issue as far as either labor or technology or whatever.” Six of the other participants did note trade shows or used a specific example of adopting something because of another farmer. A male pecan grower with 10 full

time and various numbers of seasonal workers indicated that observability in the farming industry drives technology adoption. He stated,

> I mean, I can't think of an example right now, but we're definitely, that's one of the great things I like about farming is farmers are kinda in it together, you know? And if I can help somebody, I'm going to do it. And if they can help me, they're usually gonna do it. And, and so I've got a lot of friends in the industry and we talk and, and share what's working and what's not working, you know? And, and I've learned a lot from other farmers, um, about all sorts of things. Yeah. And certainly, technology would be one of them.

A male peach grower that has 50 full time and 150 seasonal workers had a similar response,

> A lot of it is brought to us. Um, you know, with, when I say trade shows, you know, we have one, the vegetable grower's association, where people will display the latest, greatest whatever they got.

A male blueberry grower with 10 full time and 200-250 seasonal workers indicated not only are other farmers learning about new technologies through others, but they also feel like it forces them to invest. He made the point that once someone else has adopted a technology that yields more, then you have to do something similar in order to keep up. He stated,

> Yes. Um, we got grades we got to do, but once somebody, and the grades might say you don't have the grades right now and blueberry says you can have two defects, busted or splits per cup, if there's 300 in there just to, Oh yes. So when somebody gets a new color sorter and they're picking out 99.8 per 99.9% of the greens and you're still picking out by hand, then he just raised the standard. Even though USD is here, every time we do something different, somebody else does something different. They just raise the standard

> so you don't have no choice. You have to go along with the technology. If you produce a better pact for the consumer and, it has given the consumer better quality, better lasting and um, you know, blueberries.

Observability through the lens of manual labor is very similar to technology. A male pecan grower with 10 full time and various numbers of seasonal workers personally know other farmers who work with H-2A workers, they can see the success, however, they still had some hesitations. He stated,

> Now I will say I have a lot of friends, um, who are in the pecan business, but, but who had been in the peach industry in the past. And, and as a result, they're accustomed with the H-2A program and, uh, they use that and love it. I mean they, with without exception, everyone I know who uses H-2A, um, says that, that those folks who come are, are just the, the ideal laborers. Um, they are super grateful to be here and work very hard. And I mean everybody I know uses H-2A is a huge proponent of it. Um, I just really, the big hurdle for me is providing housing. I don't have an obvious way to do that. And um, I might would try it if I had an obvious solution to the housing issue.

There was one participant who explained that they have been reluctant to adopt certain technologies. A female tobacco grower with 8 full time and various numbers of seasonal workers stated,

> That's the case with my husband because when they guidance systems came out for the tractors where they enter their field and all they had to have field names through the FSA office. I've got to label every field. And anyway, when all that first came out and he was shown, you know, what he would do, um, he, he thought it was, it was beneficial. And I

know that the technology is there, that would go even further than what they're looking at right now. I mean, it would go further.

She felt like the family farm could adopt more technology, but sees the reluctance from older generations, compared to younger generations that are starting to work with technology on the farm earlier in their career.

Supplementary Implications

Technology in Perspective

Five participants defined technology as something that was efficient and would make farming easier. A male pecan grower with 10 full time and various numbers of seasonal workers stated, “I mean, I would say technology is anything, that mankind has created to make our own lives better.” A male vegetable grower with 45 workers and work with a contractor with H-2A workers stated**,** “I would say any type of system. That makes things easier or more efficient.” In addition, a male blueberry grower with 10 full time and 200-250 seasonal workers stated, “technology is something that makes the job easier, more convenient or less people.” The basis for many farmers to define technology is efficiency.

Six of the participants felt they were embracing technology on their farm. A male row crop farmer with an emphasis on soybeans that workers with a contractor with H-2A workers stated, “As far as like what we do with row crops and we have bigger equipment that's faster, um, much more productive.” A male blueberry grower with 10 full time and 200-250 seasonal workers noted, “Yes, we've, we've been embraced in the breeding program. Um, we've, we geo-tested all genes within the blueberries so we can, you know, pick out this good gene that makes the Berry firmer and breed it.” Therefore, technology comes in many different forms, for a male row crop farmer with an emphasis on soybeans that workers with a contractor with H-2A

workers it was the farming equipment and for a male blueberry grower with 10 full time and 200-250 seasonal workers it was the crop. They have adopted technologies in other areas, but these were the specific examples these two farmers used to show they have embraced technology.

Looking to the Future

Participants do not see another generation willing to work on a farm. They see government regulations getting stricter, and the changes to farming is paralleled with the decrease of small farms. A male pecan grower with 10 full time and various numbers of seasonal workers stated,

> Well, I would say there is going to continue to be consolidation and farms are gonna continue to get bigger. Um, farm and you're going to have, I think you're going to have two different types of farms out there in the future. You're going to have large consolidated farms that are producing commodity products and then you're going to have smaller farms. And I think it'll be a growing, it'll never be a large segment of agriculture, but if it's been less than 1% in the past, it might get up to five or 10% at some point in the future of, of a rebirth of smaller operations. But all of those smaller operations are, are gonna thrive because of the shift among consumers towards a desire for local food and natural food and quality food. Um, so I do think, I think it's a good thing, you know, a lot of times as farmers who are conventional, we kind of laugh at the organic movement sometimes, but I really think that that movement, because it also includes local food and it includes, um, people want a more humane to use that word in a unusual way, but they want, they want a more humane production, a more human production of food.

Similarly, a male peach grower that has 50 full time and 150 seasonal workers spoke of the difficulties farmers might face in the future as there are changes to regulations and rules. He stated,

> I think there's enough of us in ag that we can stop something that's gonna put us out of business. I think there's going to get more and more difficult. Um, with regulations, food safety, um, chemical use, everything we do, we are over-regulated. Um, and some of that is market driven, like food safety. Um, some of it is government, for the sake of government driven. Um, but it's going to get more and more difficult. My dad objected to the whole idea of food safety 20 years ago.

A male row crop farmer with an emphasis on cotton and corn that has 5 full time workers talked about the overall age of farmers; the age of farmers came up in several of the interviews because most farmers are older. Therefore, participants had a hard time seeing younger generations going into a field that has a pricey start up and upkeep, he stated, “That's pretty scary because you know, the average age of us own up there. Um, uh, I don't know. Um, I will tell you this, the risk reward is really not worth it.”

A male vegetable grower with 45 workers and work to obtain a contractor with H-2A workers noted the use of technology on farms. He felt like farmers would keep updating their practices and that is largely due to the fact that farmers want to produce more, with less people, and technology makes that possible. He stated,

> More and more technology, uh, becoming available and, uh, making easier for us to become more efficient. There is, there is no way, if it was not for technology, we could, uh, do what we're doing today with the amount of people that, four to five days out, like a lot, but it's actually not for, for the jobs we're doing.

Overall, the future of farming seems very bleak for a majority of the participants. The future is unknown so all they can do is speculate based on their personal experiences. The things these farmers are dealing with now varied from interview to interview, but overall, the participants wanted to start seeing more profit based on the amount of input.

Additional Comments

The participants noted the hardships they consistently faced in different aspects of their farm, and sometimes it had nothing to do with technology or farm labor changes. At the conclusion of the interview, participants were asked if they had any additional comments. Most participants were able to come up with other information they had pertaining to farm labor and technology, or something they had dealt with that they felt was difficult because of their jobs. A male peach grower that has 50 full time and 150 seasonal workers posed a very interesting story to articulate what they felt was a huge issue in the farming industry. He shared,

> He said, ma, my wife or sister, um, they were getting ready. They're cooking a ham and they, she cut the ends off the ham and put it in the oven and cooked it. And she asked her, mom said, mom, why don't we cut the ends off ham? She said, that's just what I'm always telling. Let me ask my mama, tell her mom said, mom, why mama would cut the ends off pants? She said, well, that's our way it fit in my oven. Mother would've been cut and he has all my answers 70 years because the first one wouldn't fit in the oven. They still doing it because they hadn't ever thought, why don't we do this? Um, so it takes with age, especially in generational farms, each succeeding generation, all to think critically about why are we doing this? And most things are done for a reason and the right thing. They put some stuff needs updating. I mean, he's thinking about it in 2019 said that we're doing, we did this, and we've done this for years because in 1960 it made sense. But in

> 2019, it doesn't make any sense anymore. Um, and I think we can do a lot of, we can have a lot of positive changes and, and solve some problems. Um, cause our problems are different now than they used to be. You know, and our demand for labor is different than it used to be. Our supply of labor, different than it used to be. So, you always have to keep adapting and it will be different for my children.

A male row crop farmer with an emphasis on soybeans that works with a contractor with H-2A workers mentioned something different from the other participants, "…as far as like a small business owner, you know, healthcare is an issue. Um, that's a big one. In fact of, in fact of all my headaches, that's probably one of the biggest ones." The participants have small businesses, in the form of a farm, therefore healthcare along with other concerns can be an issue.

Summary

The use of grounded theory guided the analysis using the five characteristics of an innovation based on the Theory of Diffusion (Rogers, 2003): complexity, relative advantage, complexity, trialability, and observability. Primary and secondary themes emerged, as well as additional information. All of the participants provided their personal experiences pertaining to farm labor and the use of technology to substitute labor in addition to other concerns.

CHAPTER FIVE

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The biggest incentive for farmers to adopt new technologies is knowing the innovation has optimal benefit (Martin, 2017b). If the technology can improve what they are already doing or make it possible for the farmer to hire less people, while also making it cost effective, then farmers will most likely adopt. Several participants mentioned their main reason for adopting was optimal strategy. The profitability of agricultural products is a major component of adoption (Rehman et al., 2017).

Farmers realize the availability of manual labor is diminishing. The most recent event farmers noted was the 2008 Mortgage Crisis, which increased labor availability for a short time. There were less immigrants coming to the U.S. for work, but more Americans looking for work. Albeit, this crisis was temporary so Americans working on farms quit and found less labor-intensive jobs as the economy recovered. Once there were not enough Americans available for farm work, farmers struggled to find enough employees because as of 2020 there are less immigrants entering the U.S.

Farmers are struggling to find adequate workers for their farms, and it is not just about quantity. Farming has a reputation for being an unskilled career. However, it can require skill and knowledge based on the type of farm, making it difficult for farmers to hire just anyone. Farms that require the most skill, like peaches and blueberries, completely rely on H-2A for their workforce. It is not just about the amount they are hiring through H-2A, these workers understand the art of picking peaches and blueberries. There has not been a picking machine

invented for peaches, specifically because fruit can easily bruise, so having robotic arms picking peaches would damage the fruit making them inadequate for selling to a fresh market (which yields the greatest revenue).

All the farmers but one noted they did not feel the technology for farming was complex. All of the farmers had implemented some sort of technology on their farm and felt comfortable about that choice. They felt comfortable learning to use different equipment. Farmers are more concerned with knowing if the technology will be worth it, financially.

The professional impact on farmers is closely tied to observability. A lot of farmers are willing to adopt something if they see the success of another farm. Conversely, some farmers feel forced into buying technology in order to keep up with production expectations. “With regard to agricultural technology adoption, peer effects can lead to economies of scale lowering transportation costs but can also lead to increased competition and land prices, which can spur dis-adoption" (Rehman et al., 2017, p. 70).

The immigrant hiring process is incredibly complex (Greene, 2018). The complexity of the H-2A system is a deterrent for some farmers because they do not feel it is worth the hassle. Additionally, the cost of H-2A makes it hard for many farmers to use the program. The farmers that did use H-2A were either from larger farms that required more skill to manage the operation or farmers cooperating with other farms or companies that had H-2A workers, this double dipping makes sense because it can help alleviate the cost and give the H-2A workers plenty of work.

There are several different practices that farmers around Georgia have done to feasibly deal with immigration changes. A common strategy was to use what available

workers they can get to work more hours. This strategy is cost effective and workers get paid more, even though they are working more hours (Martin, 2017). This option is easy to incorporate on the farm, if workers are willing to take on more responsibility. Farmers value the H-2A program, but it is not a sustainable option for some farms because income can vary, and farmers may not be able to afford the program.

Technology adoption has become a norm for farms. All the farmers interviewed had some sort of technology on their farm to make production easier and more efficient. Farmers now rely on those technologies to get work finished in a feasible amount of time. However, the total potential benefits are only realized after the technology is adopted and used, so trialability has the potential to allow farmers to realize the possible benefits (Ugochkwu & Phillips, 2018, p. 369).

H-2A is an expensive program; all the regulations add up to thousands of dollars. Therefore, some farmers have finessed the system and double-dipped with a contractor to allow H-2A farmers to work on a few farmers or mills so they can pay less and get the required busy work done during the picking season. For most farmers, this is the only way they can accomplish responsibilities during the busy season because they cannot find locals, they cannot afford their own H-2A contract and they feel the issues are beyond their control.

Farmers that participate in the H-2A program wholly rely on this program for the success of their farm. However, H-2A costs are a major reason why farmers are so reluctant to adopt the program. Even when farmers observe their peers' success, farmers do not want to invest the money when cheaper options are available. The H-2A program is too expensive for most farmers. It may be an option for some, but it does not solve the problem for many of the farmers.

Implications

Based on the conclusions, there is no feasible option for farmers right now. Farmers have been able to provide temporary relief to labor shortages but have not solved broader labor problems. Back in the 80's farmers had no problem finding workers for the farm, but in the current political climate, immigrants are scared to come into the U.S. and that hurts farmers.

The findings imply that as available farm labor continues to decrease there needs to be more research to understand why and how this is happening. More importantly, sustainable solutions need to be created that can permanently alleviate the declining numbers of available labor. Further research in this area can help other researchers, educators, and Extension agents. A public understanding of the climate around farming can encourage more groups, like nonprofits, to work with farmers as they seek other solutions. Also, further research in the needs of workers can help to understand what other resources are required for farmers to participate in the H-2A program.

The policy for immigrant worker visas needs to be reformed to better serve the farmers and workers responsible for the contracts. Based on results from this study, farmers rely on H-2A but still feel like reform is necessary. As farm labor availability continues to decrease, the implications on food safety, availability, and access will be impacted. The reform of the H-2A program could allow farmers to use the program more, instead of going "under the table."

Farmers are going to continue to have trouble finding manual laborers, and it is likely that small farmers could reach a point where they are unable to continue operating. This lack of labor can also deter potential farmers from going into the profession because they can see the hardships going on now, with no known solution(s). This could also allow corporate farms to purchase smaller, family-run farms, which impacts rural communities.

Recommendations for Practice

The purpose of this study was to understand farm labor and how availability of labor is affecting farmers both personally and professionally. The results from this study cannot be generalized because it was a qualitative study and small sampled population size. The recommendations are presented in several different capacities that are pertinent to farmers and others affected by the decrease in labor, such as extension agents and policy makers.

The following recommendations are presented for Extension agents. Extension Specialists need to create a fact sheet for extension agents that includes information about immigration and farming to help them better understand why farmers are choosing certain labor substitutions. The fact sheet will better prepare extension agents to teach and work with farmers that struggle with finding labor. Extension Specialists can also create a webinar series that is an overview of how extension agents can specifically help farmers with the labor changes in the U.S. As Extension Agents learn how immigration effects farmers, they will require consistent updates on the changes to U.S. immigration policy, where the immigrants are going (e.g. Texas and California) so researchers can create annual newsletters that include all the pertinent information on immigration, so County Extension Agents understand changes and learn how to help farmers regarding this subject area.

Once Extension Agents have this understanding of farm labor and immigration, they should start to create educational programs for farmers. Extension agents should create in-person workshops that teach farmers about labor substitution options based on farm type, to make sure the information presented in the program is compatible (Rogers, 2003). Not all counties in Georgia or the U.S. grow all farm commodities so Extension Agents can make this

workshop series based on the needs of farmers in their community. The workshop series could focus on the different options for each crop, whether it is technology based or manual labor, and teach farmers how to use the technology and what to expect by using different options through demonstrations (Pigg, 1983).

Extension Agents could also teach farmers about the hiring process and how to scope out the best options for their farms. Also, Extension Agents could create H-2A workshops that teach farmers to understand the expectations, properly fill out the paperwork, walk farmers through the process, and keep up with program expectations. This can help to combat the complexities farmers face when trying to tackle the H-2A program (Rogers, 2003). Again, this workshop series should be based on the need of individual communities and/or commodities, so Extension Agents should do a needs assessment with local farmers and learn why type of H-2A workers they have. If a community does not have many farmers that utilize H-2A, then the workshop series could start with a synopsis of the program and go deeper as the series progresses. It is important that this workshop go beyond the workshops because farmers will be faced with hurdles that Extension Agents can help with (e.g. issues with paperwork, H-2A worker problems) if there is an unforeseen situation, it is important that the farmer has the resources they need.

The following recommendations are presented for policy reform because the results show that farmers who use the program rely heavily on H-2A, but it is expensive. H-2A should have resources for farmers to use that will ease the financial burden of this program. The requirements to have H-2A workers is equitable but putting all of the responsibility of those requirements on farmers is not. Farmers have to prove there is a need for an immigrant workforce on their farm and that shows that H-2A is their only option other than selling the farm. So, there needs to be a

governmental assistance program to pay for housing of workers, and transportation. Financial compensation for these two expensive requirements will make it much easier on the farmer. Farmers are required to post job listings in their area, to proves that there are no Americans looking for manual labor work. If farmers are willing to go through the H-2A program then there should be no need for this step. Enrollment in expensive program proves that the farmer needs workers. Farmers are willing to work with locals and prefer it. The choice of H-2A is also about the quality of workers, and immigrant workers work hard on farms. Several farmers made comments about the quality of the people hired from the H-2A program, they felt like they could not find that type of dedication within the local labor pool. Taking out the step to prove there is no one to hire locally, can also help in the complexity of the program (Rogers, 2003).

Since farmers use contractors to apply for H-2A workers, the H-2A program needs to expand employers' access to multiple employers. This will allow farmers to work together with a smaller number of workers, this saves the farmer money while also giving the workforce plenty of work to do. Just two farmers working together cuts the costs in half for each farmer, which is much more sustainable. Farmers will continue to rely on the H-2A program because there is now an increased relative advantage to the program (Rogers, 2003). Right now, they can use almost any other practice, technology or illegal workers, at a fraction of the price.

H-2A workers should also participate in the payroll tax system, allowing Americans and program workers to be more closely related. This tax system could be determined by the money that the H-2A workers provide the U.S. economy, so the tax would be small. This practice can easily be implemented into the program now and give huge relief to struggling farmers. The money collected from those taxes could then be distributed among farmers that aide in the expenses of housing and transportation (Martin, 2017a).

The annual Ag Expo could have a panel of speakers focusing on new technologies and recommendations for resources that substitute labor on a farm. This is a practice applicable to observability, because farmers can hear first-hand experiences to aid in the decision to adopt (Rogers, 2003). The panel can focus on new technologies (e.g. a new GPS system for tractors to spread fertilizer) and once the information is presented, the panel can have a question and answer session so the audience can ask questions, give/get advice, and hear testimonials from farmers that have used that technology. This platform would also allow researchers to evaluate the current practices that are popular for farmers to further research and understand farm labor as it continues to decrease. Not only will this allow farmers to learn about technologies, but they can hear the opinions of their fellow farmers.

Farm equipment companies can provide a demo field in some of their locations. This will give farmers the opportunity to see if the technology would work with the farming style they use. Farmers can have a first-hand trial with some of the technologies that could be big investments for them and feel assured that the equipment is user friendly (Rogers, 2003). Most farmers did not feel like technology was too complex to learn, but they noted having trouble imagining how certain technologies fit into their farm. Using the technology, even in a controlled environment, allows the farmer to better imagine how it could fit into their existing practices. If there is a software application for certain farming technologies, then the software can have a trial period. This recommendation cannot work for all types of equipment or software.

The recommendations above for researcher, educator, extension agents, policy makers, and farmers reflect the findings from this study through the five characteristics of Diffusion of Innovation (Rogers, 2003). The recommendations created assume that, based on the literature, there will be benefits for parties involved in farming. Implementation and use of effective

teaching methods for the public and extension agents can increase the success of other labor substituting methods in the future.

Recommendations for Future Research

The study provided qualitative insight into struggles that farmers face with labor and labor alternatives. This research focused on Georgia farmers to provide results relevant for researchers to further explore. The current literature called for research studies that can capture generalizable results while also using other research methods studies to further explore different facets of farm labor and agriculture. The conclusions and implications are based on the results of this study, which also identified some gaps for further research.

Recommendations for future qualitative research include a qualitative study using interviews or focus groups that focuses on the labor changes for each type of commodity. The research could focus on the specific need of the type of crop a farmer grows. This type of study could offer a new perspective on the issues around farm labor, and how it is perceived by a specific demographic.

In addition, a quantitative study of technology as a substitute for workers could provide an approximate number of workers that can be substituted by certain technologies. This type of study could be especially beneficial to farmers because they rely heavily on cost efficiency of technology. Additionally, a quantitative study of what percentage of farmers are using private and public insurance and compare the different types of insurance available to farmers, could also be beneficial for farmers.

Additional qualitative studies could also be conducted based on the type of farm. The types of farming require very different technologies and practices. Based on the studies previously conducted, organic farms have been researched, but not directly studied for the

manual labor that goes along with organic farming. The same can be said for conventional farming.

An exploratory study that seeks to determine the mechanical requirement for a peach picking machine would also be useful. Much like blueberries, they are hard to pick with a machine, so farmers require manual labor.

Lastly, here are some recommendations for future evaluations. An evaluation for Extension agents to measure their understanding of immigration and farm labor. This study would provide a foundation for creating the fact sheet for agents to use as they familiarize themselves with farm labor and immigration.

The above recommendations for extension agents, policy makers, and farmers reflect the findings from this study using the five characteristics of Diffusion of Innovation. The recommendations assume there will be benefits to educators, extension agents, farmers, and workers when adopted. The recommendations for future research reflect other gaps in the literature that were not fulfilled by this study. Additionally, the recommendations for future research are an important aspect of this study because the pool of research needs generalizable results.

REFERENCES

Brown, P., Hart, G., Small, B., & de Oca Munguia, O. M. (2016). Agents for diffusion of agricultural innovations for environmental outcomes. *Land Use Policy*, *55*, 318–326. https://doi-org.proxy-remote.galib.uga.edu/10.1016/j.landusepol.2016.04.017

Burawoy, M. (1976). The functions and reproduction of migrant labor: Comparative material from southern Africa and the United States. *American Journal of Sociology*, *81*(5), 1050–1087. https://doi.org/10.1086/226185

Carter, E. L. (2019, August 21). Our farmers need a better labor program. Retrieved from https://thehill.com/blogs/congress-blog/labor/458201-our-farmers-need-a-better-labor-program?fbclid=IwAR0raMWlAvd3N1AwQAqXYEY21hdqJMpOPGNI7MRP-JQTcryN2Q0e59zfRXM

Charlton, D., & Taylor, J. E. (2016). A declining farm workforce: Analysis of panel data from rural mexico. *American Journal of Agricultural Economics*, *98*(4), 1158. https://doi.org/10.1093/ajae/aaw018

Cortés, P., & Tessada, J. (2011). Low-skilled immigration and the labor supply of highly skilled women. *American Economic Journal.Applied Economics, 3*(3), 88-123. doi: http://dx.doi.org.proxy-remote.galib.uga.edu/10.1257/app.3.3.88

Cord, L. (n.d.) A study of rural poverty in Mexico. Retrieved from https://siteresources.worldbank.org/INTMEXICO/Resources/A_Study_of_Rural_Poverty_in_Mexico.pdf

Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches* (3rd ed.). United States: Sage Publications.

Creswell, J. W., & Creswell, J. W. (2013). *Qualitative inquiry & research design : choosing among five approaches*. SAGE Publications. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=cat06564a&AN=uga.9940072053902959&site=eds-live

Dan, V., Osterheider, A., & Raupp, J. (2019). The diffusion of innovations in agricultural circles: An explorative study on alternative antimicrobial agents. *Science Communication*, *41*(1), 3–37. https://doi-org.proxy-remote.galib.uga.edu/10.1177/1075547018819159

de Brauw, A. (2017). Does immigration reduce wages? *Cato Journal, 37*(3), 473-480. Retrieved from http://proxy-remote.galib.uga.edu:80/login?url=https://search-proquest-com.proxy-remote.galib.uga.edu/docview/1944208585?accountid=14537

Dicicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, *40*(4), 314–321. doi: 10.1111/j.1365-2929.2006.02418.x

Farm Labor. (n.d.). Retrieved from https://www.ers.usda.gov/topics/farm-economy/farm-labor/

Filindra, A. (2014). The emergence of the "temporary Mexican": American agriculture, the US congress, and the 1920 hearings on the temporary admission of illiterate Mexican laborers. *Latin American Research Review, 49*(3), 85-102,288,291. Retrieved from http://proxy-remote.galib.uga.edu:80/login?url=https://search-proquest-com.proxy-remote.galib.uga.edu/docview/1619869805?accountid=14537

Goetz, S. J., Partridge, M. D., & Stephens, H. M. (2018). The economic status of rural America in the President Trump era and beyond. *Applied Economic Perspectives and Policy*, *40*(1), 97–118. https://doi.org/https://academic.oup.com/aepp

Greene, J. (2018). Confronting immigration enforcement under trump: A reign of terror for immigrant communities. *Social Justice, 45*(1), 83-97,132. Retrieved from http://proxy-

remote.galib.uga.edu:80/login?url=https://search-proquest-com.proxy-remote.galib.uga.edu/docview/2184398561?accountid=14537

Guba, E.G. & Lincoln, Y. (1985). *Naturalist Inquiry*. Newbury Park, CA: Sage Publications.

Gurman, H. (2017). A collapsing division: Border and interior enforcement in the US deportation system. *American Quarterly, 69*(2), 371-395. doi: http://dx.doi.org.proxy-remote.galib.uga.edu/10.1353/aq.2017.0032

Hanson, G., Liu, C., & McIntosh, C. (2017). The rise and fall of U.S. low-skilled immigration. National Bureau of Economic Research. *Social Science Premium Collection.* Retrieved from http://proxy-remote.galib.uga.edu:80/login?url=https://search-proquest-com.proxy-remote.galib.uga.edu/docview/2139447254?accountid=14537

How much does the program cost? (n.d.). Retrieved from https://usafarmlabor.com/what-are-the-costs-and-when-do-i-pay/

H-2A: Temporary agricultural employment of foreign workers. (n.d.). Retrieved from https://www.dol.gov/agencies/whd/agriculture/h2a

Kevin Sieff, A. G. (2019, February 21). With fewer undocumented workers to hire, U.S. farmers are fueling a surge in the number of legal guest workers. Retrieved from https://www.washingtonpost.com/world/the_americas/with-fewer-undocumented-workers-to-hire-us-farmers-are-fueling-a-surge-in-the-number-of-legal-guest-workers/2019/02/21/2b066876-1e5f-11e9-a759-2b8541bbbe20_story.html

Martin, P. L. (2013). Migration and US agricultural competitiveness. *Migration Letters, 10*(2), 159-179. Retrieved from http://proxy-remote.galib.uga.edu:80/login?url=https://search-proquest-com.proxy-remote.galib.uga.edu/docview/1466008849?accountid=14537

Martin, P. L. (2017a). Election of donald trump and migration. *Migration Letters, 14*(1), 161-171. Retrieved from http://proxy-remote.galib.uga.edu:80/login?url=https://search-proquest-com.proxy-remote.galib.uga.edu/docview/2028852923?accountid=14537

Martin, P. (2017b). Immigration policy and agriculture: Possible directions for the future. *Journal on Migration and Human Security, 5*(2) Retrieved from http://proxy-remote.galib.uga.edu:80/login?url=https://search-proquest-com.proxy-remote.galib.uga.edu/docview/1886918586?accountid=14537

Martin, P. (2017c). Trump, immigration, and agriculture. *Choices: The Magazine of Food, Farm and Resource Issues (Online)*, (1). Retrieved from http://proxy-remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsgao&AN=edsgcl.498998093&site=eds-live

McArthur, C., & Edelman, S. (n.d.). The 2008 housing crisis. Retrieved from https://www.americanprogress.org/issues/economy/reports/2017/04/13/430424/2008-housing-crisis/

Paret, M. (2014). Legality and exploitation: Immigration enforcement and the US migrant labor system. *Latino Studies, 12*(4), 503-526. doi: http://dx.doi.org.proxy-remote.galib.uga.edu/10.1057/lst.2014.53

Pigg, K. (2983). Shades of Seaman Knapp. *Journal of Extension, 21*(4). Retrieved from https://joe.org/joe/1983july/a1.php

Strauss, A. L., & Corbin, J. M. (1998). Basics of qualitative research: techniques and procedures for developing grounded theory. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Retrieved

from http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=COMP2323046930&site=eds-live

Rogers, E. M. (2003). *Diffusion of Innovation*. (5th ed.) New York: The Free Press. (Original work published 1995)

Suh, D. H. (2015). Declining energy intensity in the U.S. agricultural sector: Implications for factor substitution and technological change. *Sustainability, 7*(10), 13192-13205. doi: http://dx.doi.org.proxy-remote.galib.uga.edu/10.3390/su71013192

Taylor, J. E., Charlton, D., & Yúnez-Naude, A. (2012). The end of farm labor abundance. *Applied Economic Perspectives & Policy*, *34*(4), 587. https://doi.org/10.1093/aepp/pps036

Terry, W. (2014). Solving labor problems and building capacity in sustainable agriculture through volunteer tourism. *Annals of Tourism Research*, *49*, 94–107. https://doi-org.proxy-remote.galib.uga.edu/10.1016/j.annals.2014.09.001

Ugochukwu, A. I., & Phillips, P. W. B. (2017). Technology adoption by agricultural producers: A review of the literature. *Innovation, Technology, and Knowledge Management from Agriscience to Agribusiness*, 361–377. doi: 10.1007/978-3-319-67958-7_17

Wholey, J. S., Hatry, H. P., & Newcomer, K.E. (2015). Conducting semi-structed interviews, (3rd ed.) *Handbook of practical program evaluation*. San Francisco, Ca: Jossey Bass.

APPENDIX A

IRB APPROVAL

UNIVERSITY OF GEORGIA

Tucker Hall, Room 212
310 E. Campus Rd.
Athens, Georgia 30602
TEL 706-542-3199 | FAX 706-542-5638
IRB@uga.edu
http://research.uga.edu/hso/irb/

Human Research Protection Program

EXEMPT DETERMINATION

January 29, 2020

Dear Alexa Lamm:

On 1/29/2020, the Human Subjects Office reviewed the following submission:

Title of Study:	A qualitative study of farm labor changes in Georgia
Investigator:	Alexa Lamm
Co-Investigator:	Kami Kent
IRB ID:	PROJECT00001269
Review Category:	Exempt 2ii

We have determined that the proposed research is Exempt. The research activities may begin 1/29/2020.

Since this study was determined to be exempt, please be aware that not all future modifications will require review by the IRB. For more information please see Appendix C of the Exempt Research Policy (https://research.uga.edu/docs/policies/compliance/hso/IRB-Exempt-Review.pdf). As noted in Section C.2., you can simply notify us of modifications that will not require review via the "Add Public Comment" activity.

A progress report will be requested prior to 1/28/2025. Before or within 30 days of the progress report due date, please submit a progress report or study closure request. Submit a progress report by navigating to the active study and selecting Progress Report. The study may be closed by selecting Create Version and choosing Close Study as the submission purpose.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Sincerely,

Jennifer Freeman, IRB Analyst
Human Subjects Office, University of Georgia

APPENDIX B

INTEREST PHONE CALL OR VOICEMAIL

"Hello, *[name of potential participant]*, my name is Kami Kent. I am a graduate student at the University of Georgia. I was hoping to interview you in person for my thesis on farm labor changes in Georgia. The interview will be about 45 minutes long and completely voluntary. If you are interested in setting up a date, or would like to know more about the study, please give me a call back."

APPENDIX C

FOLLOW-UP INTEREST EMAIL

Subject: Interview for my Student Thesis

Greetings,

My name is Kami Kent and I am a graduate student at UGA. I am writing my thesis about farm labor changes and I would like to do an in-person interview with you. If a phone call interview is more convenient, we can set up a time to do that as well. It will be completely anonymous, and I can travel to wherever you need me to.

The interview will take about 45 minutes. We can meet during first two weekends of November or I can come during the week, whatever works best for your schedule.

Thank you for taking the time to read through this, if you have any questions just let me know. You can also call me anytime at 770-328-9740.

Thank you,

Kami Kent
Agricultural and Environmental Education, UGA
770-328-9740
kak16236@uga.edu

APPENDIX D

PARTICIPANT CONSENT FORM

I am asking you to participate in a research study titled "A qualitative analysis of farm labor changes". I will describe this study to you and answer any of your questions. This study is being led by Kami Kent, University of Georgia. The **Faculty Advisor for this study is** Alexa Lamm, Agricultural and Environmental Education, University of Georgia.

What the study is about
The purpose of this research is to understand how larger farmers in Georgia were dealing with changes to farm labor. Ten farmers were chosen to be interviewed in order to explore how they deal with labor shortages without spending money.

What we will ask you to do
I will ask you to answer the questions I provide with your own personal experiences.

Time duration
45 minutes

Risks and discomforts

- **Emotional risks involved because some of the questions may be uncomfortable to answer.**

Benefits
There are no direct benefits to participating in this study, but you will help other researchers to understand why and how to combat the decrease of farm labor in Georgia. We hope to learn more about what the options are that farmers are using to make up for less employees.

Long-term use of data
The audio files will be destroyed after they have been transcribed. The personal information, along with transcript will be kept in a locked filing cabinet for 2 years, after which will be destroyed. This information will not be used for further studies.

Consent Form

Audio/Video Recording
An audio recording device will be used so that the interview can be fully transcribed, meaning the interview will be converted into a script.
Please sign below if you are willing to have this interview audio recorded. You may still participate in this study if you are not willing to have the interview recorded.

☐ **I do not want to have this interview audio recorded.**
☐ **I am willing to have this interview audio recorded:**

Signed: _____
Date: _____

Privacy/Confidentiality/Data Security.

- de-identify data with identifiers, so no real names will be used.
- The signed consent form will be kept locked up for 2 years before they are destroyed.
- Only Kami Kent will have access to the consent forms.

Taking part is voluntary
Your involvement is voluntary, you may refuse to participate before the study begins, discontinue at any time, or skip any questions that may make you feel uncomfortable, with no penalty to you.

If you have questions
Explain how the participant can contact you with questions or concerns. A standard statement follows:
The main researcher conducting this study is Kami Kent, a graduate student at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact Kami Kent at kak16236@uga.edu.
If you have any complaints or questions about your rights as a research volunteer, contact the IRB at 706-542-3199 or by email at IRB@uga.edu

Statement of Consent

I have read the above information and have received answers to any questions I asked. I consent to take part in the study.

Your Signature_____ Date_____

Your Name (printed)_____

Signature of person obtaining consent_____ Date_____

Printed name of person obtaining consent_____

This consent form will be kept by the researcher for two years beyond the end of the study.

APPENDIX E

INTERVIEW GUIDE

Thank you for agreeing to participate in this interview. Your responses will be used to inform future research related to how we deal with changes in farm labor in the United States. There is no risk associated with participating in this study. The interview is expected to take approximately 45 minutes, but we encourage you to share as much information as you are comfortable with, this is only an estimated time. Your personal identity and location will remain confidential, but your responses will be used in combination with others to add to the body of knowledge in this study. Please answer any questions based on your own personal experiences and not what you have learned from others. I will be recording this session and it will be transcribed. Do you mind if I turn on the recorder (begin audio recording). You are allowed to skip any questions that you do not want to answer, and you may also withdraw from this study at any time without penalty. I will now ask you some questions and record the session. Do you consent to participate in this interview?

- *[Demographic.]* Could you please start by describing the type of farm you operate?
    - Probe: What do you farm?
    - Probe: How much land do you use?
    - Probe: What made you become a farmer? How long have you been doing this?
- *[Demographic.]* Please describe the types of employees on your farm.
    - Probe: How many people do you employ?

  - Probe: What is their work status?
  - Probe: Do they work with other farmers during your off season? (Are they migrant farmers?)
- What issues have you or other farmers you know had related to obtaining the manual labor needed to keep your farm running?
  - Probe: Presence of a migrant workforce?
  - Probe: New legislation/policies related to an agricultural workforce?
- *[Compatibility.]* How do you feel your operation is functioning, based on the people and equipment you have available?
  - Probe: What has changed in the last few years?
- *[Trialability.]* What have you tried to do to alleviate the need for manual labor?
  - Probe: Please describe any new techniques or technologies you have adopted?
- *[Relative Advantage.]* What makes your changes advantageous over manual labor?
  - Probe: How is this change impacting your farm operation?
- Please define what technology means?
  - How are you using technology?
  - Do you feel that you are embracing technology?
- Please describe any new techniques or technologies you are aware of that could alleviate the need for manual labor that you have not adopted.
- *[Complexity.] Probe:* Please describe how easy or difficult the new technology is to use in place of manual labor
  - Why have you chosen not to use them?

- *[Observability.]* What new technologies or approaches have seen other farms use to reduce the need for manual labor?
    - *Probe: How did observing someone else using a new approach impact what you thought of it?*
- What do you see happening to farms and farmers in the future?
    - How will policy effect farming?
    - How will technology effect farming?

Thank you for your answers.

I have one last question:

- This is a time for you to share anything else you would like to about th3e migrant workforce, labor issues you have personally experience or those you have witnessed others dealing with. Is there anything else you would like to share?

Thank you again for taking the time to participate in this interview and for providing your own personal experiences. Your input is appreciated. I will leave you with a blank copy of the informed consent statement. If you have any further questions after the conclusion of this interview, please feel free to contact me through my email. Thank you.