The Future of Alternative Agriculture in the Upper Midwest: Key Questions, Opportunities and Constraints

A Collaborative Research Exploration between Common Harvest CSA Farm (Osceola, WI)
&
The Students in Geography 232: People, Agriculture and Environment
Macalester College

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Prologue and Acknowledgements

The following report represents the collective efforts of 26 students co-investigating a series of critical questions related to Community Supported Agriculture (CSA) in Northwestern Wisconsin and the Twin Cities Metro area of Minnesota. During the March-May 2017 period, students in Geography 232 (People Agriculture and the Environment) engaged in a collaborative research exploration with Common Harvest CSA farm in Osceola, WI. Following on three previous years of collaboration, the course instructor and the co-owners of the farm developed a set of research questions that were of mutual interest. The questions identified were as follows:

1) What are the challenges and opportunities for young people entering farming today?
2) If you were to design a curriculum for students and non-students regarding food and farming, what are the key courses or modules you would include?
3) What is the role of agricultural technology in constraining or facilitating alternative agriculture?
4) Given that farm labor shortages are a recurring problem in many areas of the country, what are the major drivers of this problem and how might the situation be ameliorated?

The class was divided into six research groups of three to five students. Research questions 2 and 3 were assigned one research group each, whereas questions 1 and 4 each had two groups. In order to prepare for their exploration of these questions, all students in the class read background materials on the region, soil ecology, farming, and the CSA concept. Common Harvest CSA co-owner Dan Guenther visited the class on April 6 to guest lecture about soil ecology, farming practices and the CSA movement. The class spent a full day on the farm on Saturday, April 8, during which time they received a tour of the area and then moved to the farm to learn about farming practices and the logistics of running a CSA. The six groups then spent the following two weeks collecting and analyzing data for their respective research questions. Students working on the first question interviewed a number of young farmers, especially Macalester alums who had gone into farming. Students exploring the second question examined the academic and gray literature, and spoke extensively with the owners of Common Harvest CSA farm. These working on the third question studied a range of technology issues during their farm visit, examined the academic literature and – in one case – undertook an analysis of social media. Last but not least, those addressing the fourth question relied on information collected in the field as well as reports in the academic literature. The various groups presented their preliminary findings to the farm owners in late April before penning their reports which are each included as sub-chapters in this document. While the quality of the individual reports may vary, together they represent a rich set of insights that were co-produced with the owners of the farm, as well as the various individuals who were interviewed for this project.

None of this would have been possible without the time, energy and intellectual input of the co-owners of Common Harvest CSA farm, Dan Guenther and Margaret Pennings. We are also grateful to the Civic Engagement Center of Macalester College, and especially Paul Schadewald, for providing financial and logistic support for this exercise.

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*Not all student authors chose to publish their findings in this report. Furthermore, some opted to share their findings anonymously as indicated here.

Chapter 1: What are the challenges and opportunities for young people entering farming today?

The Findings of Research Group 1 (Sarah Wescott, Brandy Cheng, Giulia Girgenti & Izzy Ballet)

Sarah Wescott
5/4/17
Alternative Ag Paper

An Office with a View:
Examining the Barriers for Young People Entering into Farming Today

Introduction

Across the United States, family farms are closing up shop and large corporate sized farms are taking their place, in turn drastically changing the rural American landscape. Part of the cause of this agricultural shift are the many barriers in the way of young people who want to enter into the farming community or continue farming like their parents did. These barriers differ depending on if a person grew up in a rural area with access to a farm community and knowledge of farming or they were raised in an urban environment and do not have the same connection and access to the agricultural sector. This paper will focus in on young people who grew up on farms in rural areas and the challenges they face when trying to enter into agriculture. Young people who grew up on farms and are considering taking over their parents' property or have decided to take up an alternative career in another field are included in this group in an effort to show all sides of the story.

With the growing division between food production and consumption it is important now more than ever to understand the issues plaguing our agricultural system and recognize the problem with the loss of family farms. For the purpose of this paper, family farms will be defined as a farm that can be run entirely by the members of the family, eliminating the need to hire outside workers. In addition, these farms are usually less than 500 acres or have less than 200 head of cattle. Family farms are important because of the history they have with the land and the care that they give their environment. It is far more likely that a farmer that owns a small portion of land and a limited number of cattle will take more time to tend the land properly and care for the animals than a farmer that has so much land that he couldn't even drive it all in a

day. Furthermore, the connection that family farms have to their community is vital for rural towns that depend on farming culture to sustain them. The fact that family farms usually exist for multiple generations also incentivizes farmers to care for their land in a way that makes it usable in the long term. Young people play an essential role in this system as they are the ones who must take on their parents' farms, or strike out and start their operation. Without this younger generation the number of corporate sized farms will only continue to grow, and the the loss of the American family farm will ensue.

Methods

The research for this paper was done in the form of a visit to Common Harvest CSA farm in northwest Wisconsin, interviews with young people, and online research. During the visit to the farm I brainstormed ideas with the help of classmates and farmer Dan who gave us a tour and talked to us about current farming issues. Afterwards, I personally completed five interviews to be used by our research group with people between the ages of 20 and 30 years old, all of which are from southeastern Minnesota and grew up in a farming community or on a family farm. This research included both men and women. Two of the interviews were done face to face, and the remaining three were done over the phone. Only four of the interviews are included in this paper. During the conversations I asked about challenges that they faced individually when entering into farming, or barriers that they saw for their peers. In addition, I asked what drew them to farming or what pressures were pulling them away. The goal of the interviews was to identify main themes among the five conversations while gaining insight into the personal lives of people who participate in this community and lifestyle. For this reason, this essay is based far more on qualitative than quantitative evidence. Besides the interviews, I completed online research in order to find more quantitative data to support the qualitative data that I collected myself. Most

of this data consists of statistics about farmers in the United States that illustrates the decline in family farms in the United States as well as the cost of farms in today's day and age. Lastly, I chose to compare this case study to research done in the EU on the topic of young people in farming and literature that has been written on the same topic to give academic support to my argument and data.

Identifying Barriers

While interviewing young people from southeastern Minnesota, I noticed numerous recurring themes and challenges throughout the interviews. These include: a lack of finances, competition with large farms, gender roles within the farming community, and the lack of culture in small town communities. Each of the people I interviewed emphasized a different one of these points and shared their personal connection the issue. For this reason, I will introduce each of the interviewees along side one issue. This will provide a personal anecdote alongside a systemic issue, making them more memorable and comprehensible.

For many young people considering entering into farming, security is a huge issue. Not only are prices continually fluctuating, but there is little room to make extra cash or add to a savings account and increasing farm sizes make it ever more difficult for family farms to stay competitive. During an interview with Brady Norton, a young college student who grew up outside of Plainview, Minnesota on his family's dairy, Brady emphasized his family's struggle to compete with larger farms in the surrounding area. He mentioned that within the next year or so, the Norton family plans to sell their herd of dairy cows, as it is not longer a feasible financial option. For many small dairies, highly volatile milk prices, as shown in Figure 1, have limited their ability to

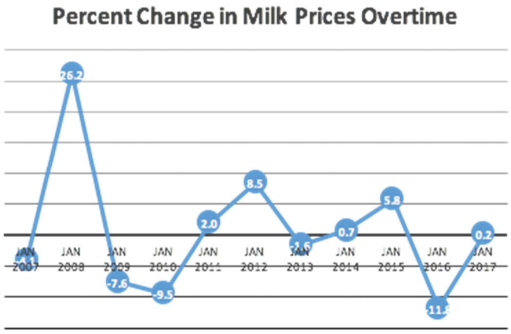

Figure 1: recorded milk price in January from 2007-2017 (Bureau of Labor Statistics)

make money, as they can not compete with larger farms that have higher yields and gain more profits (Bureau of Labor Statistics). This problem won't only impact family farms today, and Brady voiced uncertainty about his ability to make money in the future. He attributed much of this to the growing popularity of large scale farming operations saying, "the prices from five years ago were a lot bigger. You could make a lot more money back then than you can now. Its getting more to the point where there's not a lot of small farms all making money you just have a couple of big ones. It's hard to spread the wealth and compete with those big farms if you don't want to go that route" (Norton, 2017). Brady is not alone in this thinking, and according to the results of the 2012 census of agriculture by the USDA shown in Figure 2, "In 2012, the United States had 2.1 million farms …[this fell] 4.3 percent from the last agricultural Census in 2007" (National Agricultural Statistics Service, 2014). In addition, farms have been getting bigger, going from an average of 418 acres in 2007 to an average of 438 acres in 2012 (National Agricultural Statistics Service, 2014) leaving family farms at a crossroads where they can choose to attempt to keep up with the market, or opt out for a different career choice. The latter is a far more common choice lately.

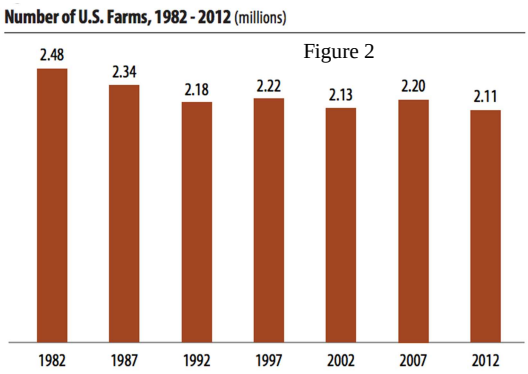

Figure 2

The initial cost of entering into agriculture stood out as another financial barrier for many young people entering into farming today. In an interview with Brian Wolf, a young man living who grew up on his family farm outside of Plainview, Minnesota and is currently living on one of his family's farms raising goats for milk, he pointed out the difficulty of buying into the farming industry. After deciding that he wasn't meant for carpentry, Brian purchased a herd of goats and is caring for them on his own, while using his family's land. However, this has not

come without its challenges, Brian has struggled to afford a larger herd, limiting the profits he can make. He illustrated this saying, “One of the biggest challenges would probably be trying to get a loan. With the goats I got I only bought 80 and I had to basically sign over everything I own just for collateral” (Wolf, 2017). This is not a problem that Brian is facing alone, and everyone that I interviewed brought up the difficulty of paying for land, equipment, and animals when starting a new farm. Brian mentioned the hardships of many of his peers saying, “I know a lot of people that I graduated with that want to get into farming and they can’t because they simply can’t get money or loans to do it” (Wolf, 2017).

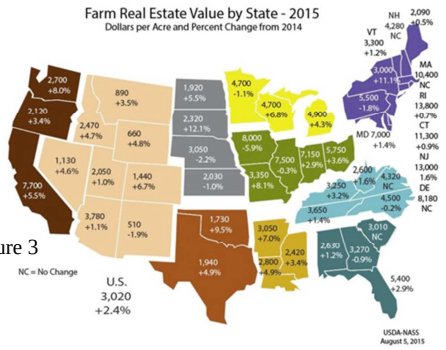

Figure 3

Land is expensive and for those that choose to go to college the debt from college loans is already crippling enough that the cost of land then becomes unbearable. As shown in figure 3, land in the most profitable agricultural areas around the United States, such as Iowa and California, can go for as much as $8,000 per acre (USDA, 2015). For this reason, it is becoming incredibly difficult for young people to enter into the farming community unless they have access to someone else’s land, in the way that Brian did.

Young people who are looking to make more than their parents did, can also not look to farming as a career. While talking with Angalee Schmidt, a 20-year-old who grew up outside Plainview, Minnesota on her parents’ hobby farm and has decided to opt out of farming, she emphasized the limits to success that are found within farming saying “For me there is not enough outcome. [My parents] don’t make as much money as hard work in another area would yield” (Schmidt, 2017). The average income for farmers is less than $50,000 per year, which allows for little luxury (National Agricultural Statistics Service, 2014). Many farmers invest

most of their earnings back into the farm and have little money to spend on other things. The farm is the focus of the family, and life revolves around it. Likewise, a farming lifestyle limits the freedom of farmers to travel and live a life free of responsibilities. Angalee mentioned this challenge saying “I have a need to see the world and experience other things away from the farm. I don’t like being tied down” (Schmidt, 2017). For many young people the rural lifestyle just doesn’t appeal to them. They want to travel and experience other cultures. Cities provide bustling nightlife and pockets of culture that are hard to come by in a rural setting. Young people today want to be a part of the global world, and that just isn’t possible when you live on a farm in the countryside.

Financial issues are not the only factor limiting young farmers, and social barriers also play an important role. During my interview with Ms. Schmidt, the young woman previously mentioned, she reasoned that for her, this has less to do with the financial burdens of starting a new farm and more to do with the limited cultural opportunities found in a small town. Likewise, Schmidt drew attention to the loss of population and culture saying, “I definitely like living in areas with more opportunities. I am always a person that likes to have things going on all the time. If we’re losing businesses, if we’re losing family farms, that means that my friends are going out of business and they’re moving away from the area as well” (Schmidt, 2017). This loss of culture across the culture can be seen in Figure 4, which illuminates the drastic drop in population in rural farming areas in recent years (Cromartie, 2016). Between the years 2010 and 2014 more than 1,300 rural US counties lost population (Cromartie, 2016). People are no longer flocking to the countryside like they

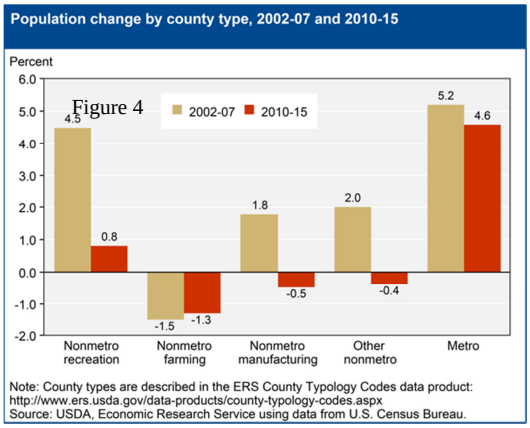

Figure 4

were in the 1800s during the time of the Homestead Act. Instead, they are moving to cityscapes where populations have been steadily increasing by about 2 million per year since 2010 (National Agricultural Statistics Service, 2014).

Strong gender roles in rural communities further affect young women who are thinking about entering into farming. Kallie Baker, a young woman from southeastern Minnesota who grew up on her family's dairy farm outside of Plainview and currently pursuing a degree in animal science with the hopes of changing perceptions of the dairy industry, mentioned this. Ms. Baker pointed out how communities are impacted saying, "There is still a pretty big stigma behind women being involved in farming. Typically, women would be bringing the food out to the men in the field or be doing the bookwork" (Baker, 2017). Across the United States, women make up only 30 percent of farmers and more than 70 percent of these female owned farms are less 200 acres (National Agricultural Statistics Service, 2014). As mentioned earlier, it is difficult for small farms to compete with the much larger corporate farms, and very few of those large farms are owned by women, meaning that they are more likely to be at risk for losing out to the competitors. Within small town cultures, women are not viewed as leaders, and they may not have as much support within the community as a man would. This leaves women with more barriers than men when the list of things to overcome as a young person entering into farming is already plenty long.

All of these challenges point to the commercialization that is occurring within the farming industry and in many ways calls attention to the lose of the family farm in the United States. In the past, young people entered into farming through their parents, and that is becoming a far less feasible option as the market shifts out of their favor and the family farm is going out of business. A recent report done in the EU found many of the same challenges for young people

wanting to enter into farming across the Atlantic, listing increased competition, need for integration, and the loss of attractiveness of the sector as reasons for a loss of young farmers in the industry (Zondag, 2015). In addition, an article titled, "Dynamics of Farmland Ownership and Leasing: Implications for Young and Beginning Farmers" found that many young farmers attempt to scale up at a much faster rate than the older generations, likely in an effort to keep up with the market (Katchova, 2015). Furthermore, many young farmers work another job on the side in order to build up enough funds to make the needed expansions (Katchova, 2015). In the end, the data and the literature both support my findings, and young farmers in southeastern Minnesota seem to be facing the same challenges as other young people considering farming around the country and even across the Atlantic. Farms are getting bigger and with size comes cost. Brady Norton simply put the problem facing farmers today saying, "go big or go home" (Norton, 2017).

Conclusion

Overall the financial burden of starting a farm takes the cake for barriers in the way of young people entering into farming today. Many young people have the passion needed to get into the field, but don't have the resources necessary to make it a reality. Beyond the shortage of money, the inability to compete with large farms, the lack of cultural life in small rural towns, and the strong gender roles that are found in farming communities only add to the list of difficulties for people trying to enter into farming. However, this does not need to be a lost cause; policy solutions are possible. There are many ways that this problem can be approached, but financial help is certainly the most tangible. Increasing access to loans for young people, and especially women, is essential and the government could potentially subsidize land for young people in the way that it subsidizes crops such as corn. We need to initiate programs that provide

scholarships to young farmers to help support the initial costs of starting a farm, in the way that scholarships are provided to young people seeking an education. Programs could help connect young farmers to older ones who are looking to sell their farm in an effort to provide land access. Community is another area where change should be focused, and policies that favor small family businesses would help keep culture in rural areas, avoiding the brain drain. Furthermore, community event planning has the ability to bring people together within their community. No matter what, we need to encourage young people to continue with farming. The family farm is a valuable part of our agricultural system, and we risk losing a lot more passionate farmers if we fail to make change at a policy level.

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Brandy Cheng

Alternative Agriculture Paper

May 4, 2017

The Family Factors Related to Younger Generations Entering Farming

Introduction:

While a lot of young farmers who now are farming in the rural areas grew up in urban environments, there are a large proportion of them inheriting the farms from their families and continue farming for a living. The succession of farms between generations is determined by multiple socio and economic factors. According to Fischer and Burton, the contributing factors can be divided into two basic categories: the first one being farm factors, such as farm size, profitability, location, farm type, etc., and the second one being the farm family factors (Fischer & Burton, 2014). This research paper will study how various family factors would have effects on children entering or continuing farming.

There are an abundance of family factors that could progressively change younger generations' ideas on farming and also influence the elder operators' plans for the future of the farms. The factors that we will be looking at in this paper are as followed: the influence family members have on helping the children recognize their identities, the opportunity for the youngs to practice the skills and techniques required for working in or operating a farm, the previous experience and outcome of the family running a farm, and eventually the other assets that the family owns and their future plan of income. All of the above could affect the children's decision on whether to continue with farming or not.

Methodology:

The research of this paper is based on academic papers from previous studies, and is complemented by interviews with two people who are the representatives of the younger generation. Interviewee 1 is from Minnesota; she grew up with a farming background, and has just started college, majoring in agriculture. Interviewee 2 is also from Minnesota, but she did not grew up with a farming background; she is about to finish her bachelor's degree in communications and marketing. Additionally, I visited a CSA farm in Wisconsin to better understand the physical compositions of a farm, how the farm sustains, and who are the people running the farm.

Findings:

A primary way of family influencing children's decisions is through helping the children constructing their identities and thereby decide on the future paths they want. The identity construction is done explicitly and implicitly. Family explicitly impose influence through their expectations on their children. Parents' opinions of what they want their children grow up to be might be very different than their children's own wills (Fischer & Burton, 2014). A family that Fischer and Burton interview said that they had always been encouraging their kids to do what they wanted to do, and that only if their kids were sufficiently interested in farming, would the farm be passed on to them. In the farming families, there has been a shift from expectations of duty to an emphasis on individual freedom. Another example is then provided by Interviewee 1. Interviewee 1 stated that her parents never expressed the expectations of seeing her continue with farming, and that her parents have always been supporting about her choice of future career (Interviewee 1, 2017). When being asked about her thoughts on what to do after graduating from

college, Interviewee 1 said that she has not been very sure about the next step, that she would consider farming but she is happily open with other choices (Interviewee 1, 2017). Without the expectations from families, farming becomes less of a family tradition but more of an interest, or preference of occupation.

In terms of implicit influence, the background of the family also could impact the younger generations. Interviewee 2, who has decided on doing farming after graduation, did not grow up in the farm. However, the fact that her mother had came from a background of dairy farming had made the interviewee passionate about farming. She then practiced dairy farming during her highschool years and gained valuable techniques and skills. The interviewee stated that her mother's involvement in dairy farming had been essential in her decision on entering farming and continuing with farming (Interviewee 2, 2017).

The level of farming proficiency that younger generations could reach through helping out in farming could have profound effect on their attitudes toward farming. While some farming families start teaching their children to become farmers very early, other families do not push their children to help or learn about farming. Brandth and Overrein argue that in the previous generation children are more often being asked to help in farming than in the current generation (Brandth & Overrein, 2012). This is partly due to the progress in industrialization in agriculture, and partly due to a shift toward an emphasis of letting children make their own decisions. Children are more likely to take for granted that helping with farming and eventually entering farming would be the right thing to do; and in the future they pick up with farming more easily than the children who had never tried farming. The children who did not spend their childhood helping out at the family farms would have more time and freedom in trying out different

activities that interest them (Brandth & Overrein, 2012). Therefore they eventually have higher possibility in engaging in other occupations. Two of my interviewees have been proficient in operating dairy farms; Interviewee 1 gained experiences through helping out with the family in the family farm, starting from a very young age (Interviewee 1, 2017), while Interviewee 2 chose to participate in farming programs starting from high school (Interviewee 2, 2017). Neither of the two people demonstrated concern about insufficient farming skills in terms of making decision on whether they would like to enter farming or continue with farming or not.

In constructing the children's identities as farmers, a lack of close family relationship could lead to a lack of connections between children's growth and farming practices. Since early socialisation among children are more common and convenient, children are not likely to spend much time in the farm with their families and build close connections between themselves and farming practices (Brandth & Overrein, 2012). If a poor family relationship exists, children could easily be against any opinions proposed by the elders. In this case, the younger generations could grow up with antagonism towards what their parents think is right or what their family does to make a living (Brandth & Overrein, 2012). Eventually, it would lead the younger generations to a mistaken perception of farming, and further a lack of farming practices. A good family relationship between the youngers and the elders is therefore vital.

How the elders and the more experienced people had been operating the farm would affect younger generations' perceptions and expectations about farming. The children in the farming families could sense the stress and satisfaction level of their family running the farms. Therefore, the family's previous farming experience and outcome affect how their children perceive the potential mental costs and benefits of running farms (Fischer & Burton, 2014). Poor

operations of farms could result in children's dissatisfaction and unwillingness with farming as a lifelong career, whereas good and profitable operations would bring forth the young more confidence in really operating the farm in the future. Both Interviewee 1 and Interviewee 2 stated that they would definitely take the operation conditions into considerations. Interviewee 1 mentions that although she likes seeing how farming keeps the family together and that farming is not all about money, it is still important to carefully examine the profitability of a farm (Interviewee 1, 2017). Interviewee 2 believes that good operation of a farm would be highly encouraging, and would also enhance a strong connection between farmers and the farm (Interviewee 2, 2017).

From the perspectives of the elder generations, their decisions on farm successions could as well determine whether their children continue farming or not. The succession plans of family farms specify how and when would the farms be handed to the next operators (Mishra, El-Osta & Shaik, 2010). The wealth that a family farm possesses have significant implications on family farm succession. The amount of possessed wealth, the profitability, and the recent decisions regarding the future development of the farms all influence the decision from the former operators, in this case the elder generations in the family (Mishra, El-Osta & Shaik, 2010). Interestingly, it is shown that the operators would also see what other income sources are available in spite of the farms. The availability of additional income or substitutional income also consist of the factors to consider when making succession plans (Mishra, El-Osta & Shaik, 2010). After all, if family farm and farm succession is the case, it is not solely determined by the younger generations if they would continue farming or not. The financial conditions are crucial in the operators' decisions regarding the successions of the farms.

Conclusion:

There are multiple ways that family factors could influence children's decision on whether they eventually enter or continue with farming or not. Parents' expectations and backgrounds help to construct children's identities and thereby their opinions on farming; poor family relationship would build children's antagonism towards farming; a lack of skills due to limited practices during childhood would impede younger generations' confidence in entering the industry; in addition, low profits or poor operations of the farms from previous operators could intimidate younger generations. With that in mind, we can conclude that the problem of lack of young farmers that the country is facing consists of two subproblems, first of which being the limited number of people willing to enter farming, second of which being the difficulties the young people encounter when trying to enter farming. Therefore, the solutions would need to be made from two different perspectives.

Some possible solutions to increase young people's willingness include community programs that help in building close family relationship and community activities that engage children into farming to accumulate experiences and learn about farming skills. The solution for the difficulties of young people encounter in the process of starting farming would include financial supports such as loans and subsidies. The programs in community level potentially could be more efficient in making progress in creating a more harmonious and encouraging environment compared to state level policies, and more effective in promoting in-family activities. Yet, it is still highly helpful if special loans or subsidies, provided by state level or country level governments, would be more accessible and available for young farmers. Special loans for young farmers are intended to provide help for those who are not as skilled and well

trained in farming; subsidies would be effective in assuring a stable and livable profit for the young farmers and their farms, since economic incentives could be as encouraging as financial barriers being upsetting.

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Giulia Girgenti

People, Agriculture and the Environment

Professor William Moseley

4 May 2017

Not A Young Man's Game: Problem's Young People Face In Entering Farming

Introduction

Every major industry relies on the next generation of leaders, innovators, and workers to carry forth its production and markets into the future. This need is felt acutely in the modern U.S. farming industry, where nearly thirty percent of farmers are over 65, and less than ten percent are under 35 (Bittman 2015). This paper seeks to investigate the barriers young people face in entering the farming industry, especially young people who hail from urban population centers or lack recent family history in farming. Ultimately, while there are many cultural factors affecting an individual's decision to pursue one career path over another, the major tangible barriers impeding new farmers' ability to establish themselves are lack of access to land, capital, and experience in the field.

Methods

The methods involved in this research combined field components and literature review. I collaborated with members of a research team to answer these and other questions relating to the issue of young people and farming. The field components included multiple interviews, some face-to-face and others through various media. The research group also took a trip to a small farm in Osceola, WI, to see alternative agriculture in action. Common Harvest farm is a 54-acre family-run CSA vegetable farm which uses organic practices to grow and distribute fresh produce to markets in the Twin Cities and other parts of Wisconsin.

The literature reviewed for this research included data and statistics from the United States Department of Agriculture (USDA), as well as reports and other publications coming out of the farming industry relating to young people entering the field. There was limited scholarly material that gave a broader overview of young people in farming in the United States, only more specified case studies. Thus, the data and statistics, supported by anecdotes from the interviewees, provides much of the basis for the analysis and conclusions which follow.

Findings, Analysis and Discussion

Interviews and research into the significant barriers that face new and/or young farmers quickly identified three major problems in the industry today. First, it is very difficult to find affordable and productive land as a young farmer, and access to capital to finance land ownership or acquisition is also very limited. Second, a new farmer's lack of experience, whether due to growing up in urban areas or rural non-farming families, often works against them in searching for jobs or positions. Third, training programs like apprenticeships can be socially exclusive, while more accessible degree programs in agricultural studies are not valued in the same way within the industry, making it difficult to get established without prior social connections.

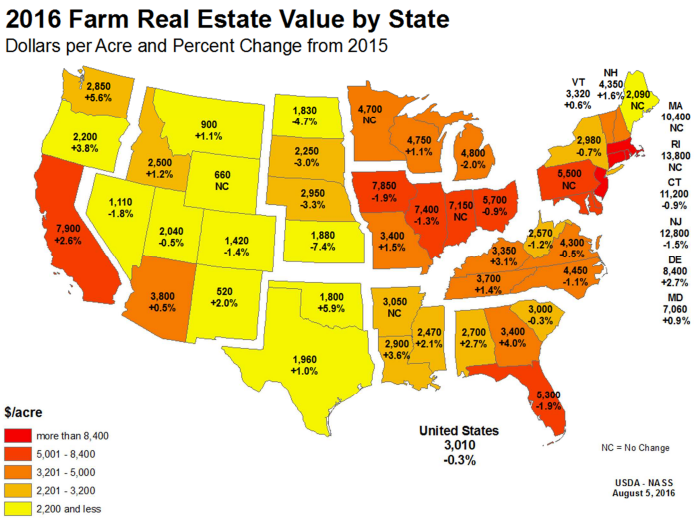

Figure 1: 2016 Farm Real Estate Value by State. Source: National Agricultural Statistics Service 2016a.

The first major barrier for people lacking a background in farming to starting a farm is acquiring land, and having access to capital to start their operations. Between 2002 and 2016, the average

price of farmland more than doubled to $3,010 per acre (National Agricultural Statistics Service 2016b). This, however, is the national average; when this data is symbolized at the state level as shown in Figure 1, it is clear that the most valuable cropland – in the lower Midwest and the Corn Belt – can be as high as $7,850 per acre (National Agricultural Statistics Service 2016a). To buy a farm of a workable size, even comparable to Common Harvest farm, would cost $423,900. Unless they inherit a significant amount of capital with which to acquire land, or inherit land to begin with, it is very difficult for young people to get started in farming. Jon Stensgard, though he did not have much experience farming when he started, had access to his parents' land where they usually hunt, and they turned over several acres of it to be turned into his CSA farm with his cousin (Stensgard 2017).

For young people who don't have established access to land or capital, the first place to turn would be to loans. However, these pathways to resources are seldom clear, as young people who lack assets to offer as collateral for private loans, or may carry a large debt burden from higher education, they are typically not eligible for many private loans. Public loan programs through the USDA come out of the Farm Service Agency (FSA), which offers loan programs that target youth, women, and minorities (Farm Loan Programs n.d.). However, these loan programs have convoluted eligibility requirements that cut out those who may need it the most. In one case, a young farmer was disqualified from an FSA loan for equipment because she was operating on leased land, and in another, the farmer's repayment plan was calculated based on projected income from crop yields, which are highly variable and subject to changes in the market (Shute et al. 2011, 22). FSA's requirements to qualify as a "young farmer" are stringent and arbitrary, requiring a minimum of three years of "managerial experience" that most young people with no background in farming don't have – more on that later – and thus don't qualify

for the loans (Shute et al. 2011, 23). The FSA loan programs need a lot of improvement before they are a reliable source of capital for young people trying to established themselves in the farming industry, and a major aspect of that is achieving land tenure.

The second major barriers that prevent people who lack experience in farming is just that – their lack of experience. Emily Sylvestre is a young woman from Minneapolis who has spent her first year out of college in a ten-month apprenticeship program at a small organic farm, Swallowtail Farm, in Northern Florida. Emily described her trajectory into farming after college:

> I was in college, and I was studying Environmental Studies and climate change, and I ended up taking a class on Land Change Science, and I guess it sort of changed my perspective on environmental issues. […] [Before] I was thinking about it from the perspective of someone who lives in the city, and uses a train […] when I started thinking about it from a humans-interacting-with-landscapes [perspective], […] the way that I was thinking about environmental issues really shifted. […] I realized that I am really interested in food and food systems. (Sylvestre 2017)

Emily did not point to a salient moment when she decided "I want to be a farmer," but she did experience a "hunger for practical, hands-on experience in that field" after graduation (Sylvestre 2017). The most acute barrier she faced when looking for a farming job was her lack of experience:

> It was really hard… There's this expectation that you already have one to two years of experience, which if you didn't grow up farming, you don't have. [..] The vast majority of positions that I found that I thought I had any reasonable chance of getting were like unpaid, like 'internships' where you're basically treated like manual labor. (Sylvestre 2017)

Emily eventually found a position as an apprentice at Swallowtail Farm where she has been living and working since September. According to a 2011 report, seventy-four percent of farmers rank apprenticeships as the most valuable program for young and beginning farmers (Shute et al. 2011, 17). These apprenticeship programs, while highly valued in the industry, are not formally regulated under state labor laws, leading to some of the limited opportunities Emily found which

lacked fair compensation. The National Young Farmers' Coalition (NYFC) offers the recommendation of legalizing apprenticeships – that is, offering an explicit, legal definition within state labor laws – to ensure "a safe work environment and fair compensation," while increasing accessibility in the process (Shute et al. 2011, 36).

A further barrier that Emily has experienced and witnessed at Swallowtail Farm is the tight social organization of farmers, and the difficultly of a new person to establish themselves in those social circles. Emily disclosed to me that she used a website called ATTRA, run by the National Sustainable Agriculture Information Service. Having felt discouraged from interviews she had done for farm jobs for which she did not have enough experience, she turned to ATTRA and found the posting which led her to her current apprenticeship. ATTRA is run by the National Center for Appropriate Technology (NCAT), a private organization whose mission is "helping people by championing small-scale, local and sustainable solutions that reduce poverty, promote healthy communities, and protect natural resources" (National Center for Appropriate Technology n.d.). Emily admits that, after applying for the apprenticeship, she was lucky that the farm owner "took a chance" on her and hired her. She went on to say,

> They like hiring someone who they can vet […] somebody who is already in that social circle, who already knows about the farm or knows somebody who is a friend of somebody on the farm. We had somebody leave for family reasons, nothing to do with the farm, but we had to find a replacement apprentice and that's how we did it. (Sylvestre 2017)

Conclusions and Recommendations

Recommendations: improved loan programs through the next farm bill, great use of sites like ATTRA to connect young people who need experience and farmers who need apprentices.

Being a young farmer with no experience is hard! People who inherit land from their families, gain experience farming by growing up on a farm, or can afford to work with limited pay for a number of years to gain experience have the greatest ability to establish themselves as farmers. The rest of us may not be so lucky.

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Isabelle Ballet
Alternative Agriculture Draft
April 21st, 2017

Urban Farming - A Gateway for Young Farmers

Introduction:

For this research paper I was interested in exploring how does urban farming fit into the larger narrative of agriculture and whether it counters or perpetuates the challenges and opportunities that young people face when entering the rural farming community. It is important to look at urban farming because so many young people are drawn towards engaging with agriculture in this setting. In the past, urban centers and agriculture have not been seen as something that go hand in hand, as arable land in cities is built up to accommodate more space for high rise apartments or future development projects. The rise of urban farming has led to broader conversations around food policy in the United States with the hope that it can improve access to food in cities, build economic opportunities and positively impact the communities in which it is found. Focusing on food access is a large environmental justice issue, as it is often minority communities located in urban centers that lack access whether that is financial capital or adequate transportation to nutritious food such as fresh fruits and vegetables.

One potential reason that urban farming has been so attractive to young people is that it encapsulates a broader social justice component, highlighting civic engagement. Through movements such as farm-to-fork restaurants or unique cooperative communities, sustainable food rhetoric has increasingly been seen as a trendy movement to be a part of and that is one facet that draws youth towards it. In many ways urban farming could also be categorized as a sub-culture with people who want to reform the system while also getting their hands dirty.

Research Methods:

For my research I visited Common harvest Farm in Osceola, WI to understand advantages and challenges to farming and to learn about youth and farming in both the rural and urban context. I also gathered information through editorials from the New York Times Agriculture series. It was difficult to find scholarly sources as urban farming continues to be a new area of study. I conducted an interview with a Macalester alumna, Emily Hanson who helped provide context with how she got involved with urban agriculture in the Twin Cities and her eventual transition towards owning her own farm in Amery, WI. I also interviewed Robin another Macalester Alum who helped establish Stone's Throw Urban Farm. Lastly, I talked with a current Macalester Senior who is interested in getting involved with urban farming in the Twin Cities. Throughout this paper I use all three of these interview to help ground my opinions, I am very thankful for all of their help.

Findings:

A common struggle with farming in both a rural and urban context is developing the financial capital necessary to find land and build up infrastructure. Emily explained that she was able to get involved with urban farming in the Twin Cities soon after graduating because she along with a group of students received a Live It Fund. This allowed them enough money to purchase farming equipment and capital with their individual outlay only being around a few hundred dollars each. Emily credits that they were by no means making a living but that as young college graduates they really didn't need a lot to get by. While being in the city everyone was able to keep other part-time jobs. She also highlighted the fact that since they were working as a group not everything fell onto just one person.

Within the Twin Cities Emily stated how there was lots of interest in the city with people who were “jazzed about sustainable agriculture” but as much as people would show interest it was always a question if people would actually volunteer and regularly show up to purchase produce. City and community interest did not always translate into action and what their urban farm project needed to keep going.

Accessing land is a major barrier for urban agricultural projects despite cities having large holdings of land in vacant lots that would be possible to use. Many of these sites are also either current brownfield or superfund sites, meaning they would be highly expensive to clean of toxic contamination. A lot of the financial capital needed would require urban farmers to partner with non-profits and other large institutions for financial support. Another problem associated with securing land is the challenges with transforming land from past industrial use. Emily said that it is was especially challenging to try and make what they were doing into a viable business model to support their livelihood. What made this especially difficult is that as a group they were unable to secure a land tenure. They did not legally hold the land they were working on and were just serving as tenants. Because their time frame working on the land was subject to whenever they were told to leave it there was no incentive or ability to invest in building up the lots soil or infrastructure. Even planting perennials and other seasonal crops requires knowing that you are going to be on a piece of land for more than a year. The transient nature of property was a very frustrating aspect of urban farming and Emily stated that “ getting kicked off land for development but still nothing has happened with it makes this pretty disheartening, makes it hard to want to build up the soil on lots you would want to be able to.” Another problem they faced was that because they were running their farm as a for profit business, Minneapolis city owned lots were never available to them.

I talked with another Macalester alum, Robin, who was also involved in founding Stones Throw Urban Farm. She has continued to work there since it was established in 2011. Unfortunately, while talking with here I learned that Stones Throw is in a transition stage and I was catching them at a time when they are going to stop farming. Robin said that there are many factors impacting this difficult decisions but that undoubtedly the economics of farming are not easy, there if very little money involved. Currently the farm is working on transitioning eleven of its twelve plots of land, selling equipment and severing neighborhood as well as community ties. They are hoping that the plots of land they have rented and leased can be passed on to neighbors, youth groups and other community development organizations that are interested in continuing the work that they have done. It is still unclear as to how much urban farming will continue in these spaces but they are hoping they can find groups with a vested interest in keeping the land in production.

Robin herself comes from a farming background. Back home in Vermont her family has their own dairy farm. When I told her about my project she quickly said, “I’m not new to farming so I am probably the wrong person to ask.” But I urged her that in fact she probably possesses an even richer analysis of what urban farming means for young people. She explained that the broader challenges with farming is that people have lost connections to the land stemming from colonialism and the removal of native people from their land uprooting so many for generations. She went on to explain how even today farming is a Romanized job one that is seen as encapsulating the rugged American landscape yet we don’t actually take care of our land or our farmers.

I asked both Emily and Robin how searching for community within there lives has motivated their choices since college. Emily explained how she feels just as connected to her

community in Amery, Wisconsin as she did when she lived in the Twin Cities and that she doesn't miss the culture of urban life. While, on the other hand Robin expressed how as a young single woman it is especially challenging to leave an urban area and put yourself alone on a landscape since rural America is pretty depopulated. Robin acknowledged that one day she would love to run a farm cooperatively but not with someone who is a sexual partner but instead with people who shared in the work and friendships. She doesn't want to fall into the classic narrative of having a man running the farm and a woman taking care of the kids. Robin acknowledged that her gender has had a large impact on her decision to stay in an urban setting she said she would miss the social connections of her neighborhood if she was to leave.

For my last interview that I conducted I talked with a current Macalester senior who is interested in working in urban farming in the twin cities. She has applied to a number of internships this summer focused on sustainability and food independence initiatives. During her past four years at Macalester she has been involved with helping both Stone's Throw and Frog Town Green. I was curious if she would categorize urban farming as a form of an urban lifestyle choice. She acknowledged that for her that was true and that in her experience in the twin cities she found that she worked with mostly women. She found that the people she worked with were interested in pursuing a sense of community with a communal aspect centered on working hard for a combined goal. It wasn't so much about the farming as it was about being able to independently sustain themselves.

Now thinking about entering into this field she acknowledges that an extremely large challenge is figuring out how to pay the bills. She expressed that there is an expectation that if you don't have enough background farming experience that you are going to work for a while unpaid. She just had to turn down a farming fellowship with Frog Town Green because they

were only able to offer a stipend of $500 dollars for four months something that she could not realistically live off of.

Conclusion

The challenges around entering urban farming for young people are centered on the difficulties of obtaining suitable farming land as well as building up sufficient financial capital. Urban farming is attractive to younger people because it allows youth to continue to explore living in an urban context while pursing an interest in agricultural practices. It is important to acknowledge that urban farming is extremely different from farms like common harvest because of the limited space they are working with. Urban farming is also typically centered on community development and urban beautification projects. It is interesting to think about how as cities become more urbanized will urban farming continue to grow, and take on greater significance in helping to feed urban populations?

In many ways, urban farming is a way to introduce youth to farming practices and foster an interest in pursuing a career in farming. However, in order to get more youth involved fellowships need to be developed that allow young people to farm while also having enough to live off of. There should also be an emphasis on utilizing mentorship programs that give youth guidance, teaching farming techniques with the eventual transition of having them run their on plot of land for a season. Hopefully, urban farming continues to grow and enlightens young people about the possibilities of one day entering into this profession. Maybe they too can move to Amery, WI and establish their own farm just like Emily did.

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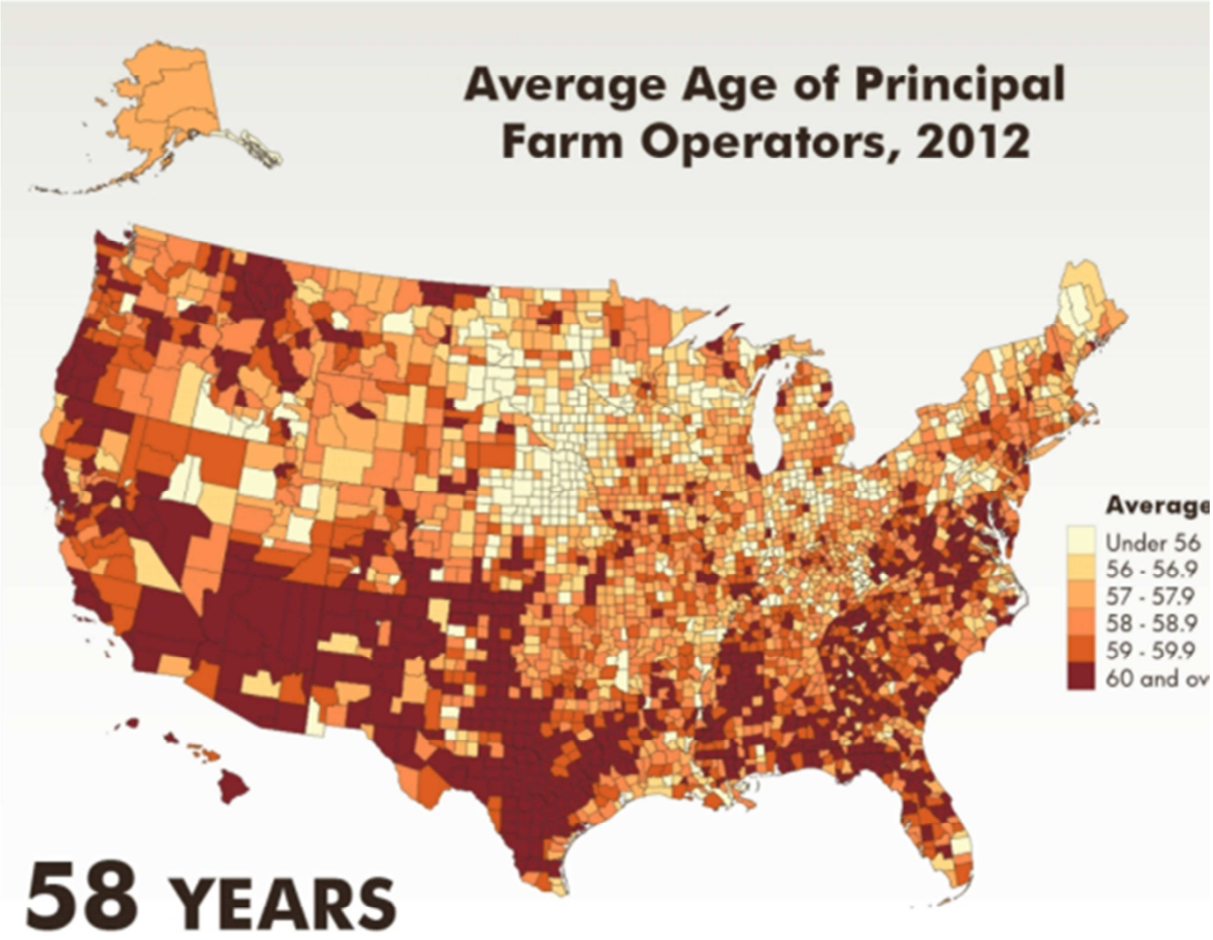
Chapter 2: What are the challenges and opportunities for young people entering farming today?

The Findings of Research Group 2 (Martin Moore, Anonymous*, Phoebe Aguiar & Victoria MacKinnon)



Source: USDA

Martin Moore
People, Agriculture and Environment
Bill Moseley
5/4/2017

Young People, Alternative Agriculture and Education

Introduction:

Young people the world over are currently faced with a myriad of challenges and opportunities when it comes to beginning a life in farming. Many of these challenges and opportunities have to do with educational experiences, or the lack thereof. Today, the quality and types of educational experiences influence their ability *or* disability to enter farming. Although it is important, classroom learning is not the only form of education considered in this investigation. Rather, the term "education" also includes informal learning, experiential learning and generational knowledge.

In this investigation, I aim to examine the various educational challenges and opportunities that young people in the United States face when entering farming. Based off of that information I will then propose where improvements could be made and what solutions could be implemented. One thing becomes clear in this study which is that farming is the best way to learn about farming. With this point in mind, it is important to realize that best way to educate our next generation of farmers is to provide community-support, reduce the risks associated with beginning a career in farming and to introduce alternative agriculture education to children at an early age.

Methods:

A variety of sources were used to gather information to answer this question. Myself and multiple classmates conducted several interviews with farmers and young people from the Upper

Midwest region. These interviews provided a general backdrop to the various challenges that young people are facing today, while also supplying information regarding their personal educational experiences. Additionally, I relied on various academic sources such as peer-reviewed journals and articles that allowed me to supplement evidence from interviews with empirical research and data. Articles from the popular press also proved to be a crucial element of my analysis because they often provided a varied perspective from the majority of the information that I was gathering. Finally, information from the class ***People, Agriculture, and the Environment,*** along with experiences associated with the class, were elemental resources in this investigation.

Findings, Analysis & Discussion:

Educational Challenges Faced by Young People:

The first challenge that young people face when entering farming begins early on in their lives. Even as early as 1971, UNESCO argued that primary school education in rural areas fails in many ways to encourage young students to become interested in agriculture. Most importantly, UNESCO argued that most rural, primary schools in the world fail to connect classroom content to real world applications. In their words "[s]chool instruction tend[s] to be purely academic or theoretical; learning [is] divorced from any real contact with the environment, from prevailing facts of existence and, indeed, from the students' own sphere of experience" (UNESCO, 5). Because of this disconnect, UNESCO asserted that children do not establish a connection with the agriculture near their homes at a very crucial time in their lives. They advanced the thesis that these shortcomings in primary education contributed greatly to young people not being farmers when they grow older. This is still true today.

In addition to the shortcomings of primary school education, perhaps the largest challenge that dissuades young people from farming is the "brain drain," which has its roots in the mid-20th century. After World War II, farming became a much more mechanized process in America. With this mechanization came a decrease in the amount of human labor needed in rural areas. Mechanization also contributed to the consolidation of farms, further decreasing the number of people working on the land and thus reducing labor demand. With few job opportunities, younger people were more likely to move to larger cities where there was a higher possibility of success (Carr & Kefalas, 2009).

This phenomena coincided with President Lyndon B. Johnson signing the Higher Education Act (HEA) of 1965. This act made it possible for millions of low-income and middle-income young people, many of whom were from rural areas, to attend colleges and universities. Because there were low wages and few job opportunities in rural areas, young people chose to go to college. With a college degree, graduates were more likely to stay in urban areas where the job opportunities were more plentiful and the wages were much higher than in rural areas (Carr & Kefalas, 2009).

Near the end of the 20th century, farms had also undergone a transformation into corporate farms. This transformation emphasized the importance of technology and left formerly independent farmers with little agency. Nixon's Secretary of Agriculture, Earl Butz, encouraged farmers to "plant fence row to fence row," suggesting that farmers should take out as many loans as possible in order to buy more land, the best farm technology and to farm marginal areas once designated for pasture and wildlife habitat. This created a surplus in global crop supply that

could not be sustained. The bubble eventually burst in the early 80s, leaving many farmers, and thus rural areas, strapped for cash (Hallsmith & Lietaer, 2011).

This combination of mechanization, easily-accessible higher education, and corporatization has seen numerous consequences. First is the percent change in Americans who are still actively farming. The percentage of Americans who farmed used to be well over 50 percent for much of our nation's history. Now, due to these factors, only 2 percent of Americans operate farms. Moreover, 42% of Midwestern farms earn less than $20,000 a year (Carr & Kefalas, 2009). In a system where higher education is more accessible and rural areas have become a less appealing option, it is a challenge for youth to justify getting into farming.

Although education is increasingly more accessible, it is also difficult for many young people who are interested in smaller-scale, alternative farming to receive a degree that focuses on smaller-scale agriculture. This problem is two-fold in the sense that neither large universities nor small liberal-arts college provide a comprehensive education on how to begin an alternative agriculture career. Firstly, many large land-grant universities only provide courses and degrees in fields such as agronomy or agribusiness, which is heavily focused on large-scale, conventional agriculture. While these degrees do provide knowledge on how to financially manage a farm and how to successfully cultivate crops, they do not necessarily examine alternative agricultural practices. Contrasting this are liberal-arts schools. According to Mike Jacobs, a Mac alum who now owns an organic, community-supported agriculture (CSA) farm, liberal-arts schools provide all of the excitement, passion, and theory that are crucial in entering farming. However, a school like Macalester provides little to no experience in how to actually start, operate and maintain a farm. This leaves youth who are looking to start small-scale farms at a disadvantage when the

majority of colleges and universities cannot provide a comprehensive agricultural education (Mike Jacobs Interview, 4/26/17).

In addition to the failures of the higher education system to educate young people in farming, youth also face the obstacle of gaining enough field-experience necessary to operate an alternative-agriculture enterprise. Mike Jacobs also said that at least six or seven years of hands-on field-work are necessary in order to gain enough knowledge and experience needed to run a farm. This Mac alum went on to say that this need of experience is made very difficult by the fact that there are typically no employment options on small farms between being an entry-level "farm hand" and being an owner/operator of the farm. This means that in order to gain enough experience needed to operate a farm, a young person needs to work for about six or seven years as a farm hand. This problem is compounded by small farms usually paying their farm hands wages that are too low for an average young person to sustain themselves for an extended amount of time. This is especially true when considering that this work is seasonal. In short, low-paying, long-term, entry-level jobs are typically the only options available to a young person who is looking to gain experience in farming. This requisite is often something that many young people are not able to do, and even more often, they are not *willing* to do (Mike Jacobs Interview, 4/26/17).

Educational Opportunities for Young People:

Although the educational challenges facing youth who are interested in farming are numerous, there are a growing number of opportunities and resources available to them. These opportunities target young people of all ages, and with some tweaking, could be crucial

components of educated tomorrow's alternative agriculturalists. Three of these opportunities are FFA, 4-H and the Land Stewardship Project.

FFA, formerly known as "Future Farmers of America," was founded in 1928 as a way to encourage rural young people to stay on their family farms. According to their website, FFA prepares students "for a wide range of careers in agriculture, agribusiness and other agriculture-related occupations" (FFA). Young students who are a part of FFA participate in a three-pronged approach to agricultural education which include a classroom/laboratory component, a service/ experiential learning program, and a student leadership element. Recognizing that agriculture is also important outside of rural areas has sparked FFA to open chapters in urban areas as well. This urban expansion allows high-school aged kids to become familiar with agricultural practices in a way that was not possible before. According to an AgWeek article from 2010, urban/ suburban membership for FFA was at an all time high of 34 percent, marking an important milestone for agricultural education in the United States (Knutson, 2010).

Similar to FFA is 4-H, the nation's largest youth organization which aims to get kids familiar with subjects like "science, health, agriculture and citizenship." 4-H does this by having kids participate in hands-on projects. 4-H specifically has programs that focus on agricultural science topics like biotechnology and forestry that contain academic curricula that are accompanied with a final research project. 4-H boasts almost six million participants around the country. 2.6 million of these members are from rural areas, while 3.4 million are from suburban and urban areas (4-H). The sheer size of this organization is a testament to its effectiveness and ability to educate young people and get them interested in important topics such as agriculture.

Both FFA and 4-H have reputations of historically only focusing on educating youth about conventional agricultural; however I think that in the near future it will be in their best interest to expand their curricula to include alternative agricultural education. This is because the number of small, alternative-agriculture farmers is rapidly growing in the United States. In some states like Maine, the number of young farmers (under the age of 35) has grown by 40 percent in recent years (Mitchell, 2015). Moreover, according the USDA, the organic food market of the United States is now worth more than $39 billion and local food sales rose to $12 billion in 2014 (USDA, 2016). Both of these agricultural segments are crucial to reviving rural areas economically. FFA and 4-H have much to gain from expanding their educational breadth to include alternative agriculture so that these economies may grow even more, and so that the next generation is better prepared to enter farming.

While FFA and 4-H are effective organizations at getting young students interested and prepared for farming in the future, the Land Stewardship Project (among other organizations) is doing its part to help young people start and plan their farms. The Land Stewardship Project (LSP) is a non-profit organization dedicated to "foster an ethic of stewardship for farmland, to promote sustainable agriculture and to develop healthy communities" (Land Stewardship Project). LSP facilitates programs such as the "Farm Dreams Workshops" that helps people of all ages inexpensively:

1. "Assess their resources skills, and motivations for farming.
2. Learn about important things to consider when starting to farm.
3. Write down their farm vision.
4. Develop an educational plan.
5. Learn about training opportunities and support networks.
6. Talk to an experienced farmer about their path into farming."

The Land Stewardship Project also is a part of the "Farm Beginnings Collaborative" which is a program that unites farmers and farming organizations from all over the country. The

Farm Beginnings Collaborative is comprised of ten different farmer and farmer support organizations that all work together to share information with the goal of increasing "the number of beginning farmers who are building food and farm economies that are green, fair, and healthy" (Farm Beginnings Collaborative). Both of these programs are crucial resources for a young person who is looking to get into farming.

Furthermore, an effective experiential-opportunity utilized by some alternative agriculturalists, specifically Community Supported Agriculture (CSA) based farmers, is to allow experienced farm-hands to take over late-season management of their farm. This project begins with the farm-hands planning, marketing and budgeting the Fall Share at the CSA. Typically, the Fall share attracts a fewer number of shareholders meaning that the amount of work the farm-hands will have to do is less, and thus more manageable for beginners. Once the shareholders have financed the Fall share, the operation is entirely run by the farm-hands with the only input from the owners being a small amount of mentorship. A small portion of the profits go to the owners of the farm while the farmhands are allowed to keep the rest. Mike Jacobs has implemented this system on his farm says that it is a win-win-win for the farmhands, the shareholders, and himself as the owner of the farm. This is because the farmhands gain essential experience, the shareholders still receive local and fresh food for a longer portion of the year, and make money from doing little work (Mike Jacobs Interview, 4/26/17). This could be an effective technique used by small farmers on a broader scale to provide young people with the support and experience needed to enter farming.

It is my personal opinion that larger, political reform will not occur until local, grassroots initiatives that support alternative agriculture take hold all across America. Improving

pre-existing education systems to expand their focus on alternative agricultural practices, combined with creating more experiential opportunities and community support within alternative agriculture operations are crucial elements to this bottom-up approach. I strongly believe that this could be the impetus for national-level change for things such as the Farm Bill, which currently does not do enough to support alternative agriculture or young people entering farming. Changing our priorities and ideals at the local level has the potential to dismantle the larger-scale educational obstacles that young people face today and have faced for years.

Conclusion:

Today's young people will soon be faced with the task of managing the world's food supply. This challenge will require a group of young people who have received a sufficient education in order to complete it. Currently, the intersection of education and agriculture leaves some things to be desired. Specifically, these shortcomings include an educational system that heavily favors industrial agriculture, does not promote an interest in agriculture from an early age, and does not foster hands-on, experiential education. Yet, there are many systems and organizations that could be improved and other programs that could be implemented so that these previous shortcomings may be remediated. Once we establish an interest in alternative agriculture at a young age, provide support and reduce risk along the way and make sure experience is at the core of what is being taught, national-level political reform will follow.

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Perceptions of Agriculture: Challenges and Opportunities for Young Farmers

Introduction

There are many challenges facing young farmers, but there are also plenty of opportunities. What exactly those challenges and opportunities are was the overarching research question our group focused on. This topic is increasingly relevant as the majority of farmers are older and will soon be looking to the younger generations to start running the farms. We need to encourage more young people to take up an interest in farming, or else rely on even fewer corporations controlling greater swathes of land to continue to produce our food. While economic factors, education, and policy play a huge role in the decisions into becoming a farmer or not, there are also important social factors at work.

In this paper, I plan to explore the perceptions we hold of agriculture, and what impacts those stereotypes have. In particular, I will examine how these cultural notions can shape the decisions that people make, and how this is especially problematic for young farmers. I focus on three challenges that affected young farmers; first, long-held public perceptions of food and farming, second, the uncertainty in the future of farming, and third, the tensions within the agricultural community. Finally, I conclude with a look at opportunities for young farmers to cultivate a new image of what it means to be a farmer.

Research Methods

When writing this paper I used a number of methods to further my inquiries into the topic. These included conducting interviews both by phone and via email, as well as drawing

from interviews collected by the larger research group. I also looked at popular press such as blog posts and magazine/newspaper articles. I also used scholarly articles, and demographic information was drawn primarily from the 2012 Census of Agriculture. More hands-on experience was gained by a visit to Common Harvest farm, and related discussions both at the farm and in the classroom.

Findings, Analysis, Discussion

In America, fewer people are participating directly in the agricultural system. Only about 1% of people in the United States are farmers. About 70% of all farm operators (primary, second, third) are men, and much of the farming population is older, with the national average age of farmers being 58.3, and only 15.8% of principal operators on farms are less than 45 years of age (USDA NASS, 2014). Of 2,204,792 of principal operators in 2007 census information, 34,706 (1.57%) were Native American, 11,214 (0.51%) were Asian, and 30,599 (1.39%) were African-American. In 2012, of 2,109,303 principle operators, 37,851 (1.79%) were Native American, 13,669 (0.65%) were Asian, and 33,371 (1.58%) were African-American. It should be noted that while the number of non-white farmers has indeed increased, the percentage change we see is also due to the fact that the number of principal operators overall has decreased. The total number of farm operators (principal, second, third) declined about 3% between 2007 and 2012, from 3,281,534 in 2007 to 3,180,074 in 2012, according to the 2012 Census of Agriculture (USDA NASS, 2014). The ongoing trend of fewer people being involved in farming has led to what the author of *The Social Risks of Agriculture: Americans Speak Out on Food*, *Farming, and the Environment* calls the "irony of social and agricultural interdependence." Wimberly says that this irony is becoming more evident, "while the public—the total society of consumers and

voters—has become proportionately more dependent on a smaller percentage who farm, agricultural interests have become more dependent upon favorable public perceptions and support from the nonfarm electorate" (Wimberly, 2002).

So, how does society view agriculture? For a quick glimpse, I ran a Google image search on the term “farmer” and unsurprisingly, the images that appeared were similar to the demographics of American farmers.Of the first 50 pictures, 43 of the main subjects were men and 38 showed white farmers. Only 4 photographs had more than one person in the frame. The brimmed hats and farming implements provided context, and usually the backdrop was a field and clear skies. Another factor which was interesting, especially for the context of this paper, was that of those 50 photographs, perhaps 10 of the people shown were young farmers, even though I was trying to be as generous as possible. The results of the Google image search, along with the census information and a literature review of both academic and popular sources, helped me settle on three main societal challenges to young farmers.

Challenge I: Public Perceptions of Food and Farming

There are a myriad of opinions out there about food, and we are bombarded with choices every time we walk into a supermarket. Most people are not buying directly from farmers anymore, which creates a loss of connection to the land. Instead, people get a plethora of options on brightly colored packages. Terms such as organic, local, fair-trade, non-GMO, gluten-free, and all-natural are ubiquitous on store shelves, but what those terms say on the package and what consumers believe they mean are often two different things. Often, it is taken for granted that when a product is stamped with the seal of approval, then it embraces all the philosophical ideals of the term of which it is labelled. One person responded in a Facebook poll that there is a

misconception “that organically grown food is not fertilized or treated with pesticides. I consult for both, and I am constantly educating the consumer in this truth” (Birt, 2013). The theme of disconnection to food, and to knowing what food actually means, came up in my interviews as well. One farmer I spoke to said that he was once asked if he had meat without DNA, which as he rightly pointed out “makes up everything about the cow.” With so many choices vying for our attention, pushed by the food industry and health experts in a bid for our support, it is no wonder that consumers are often misled by the meaning of their food. “The single biggest nutrition problem we have in America is that the consumer really isn't sure what they should or shouldn't do. And everyone is focused on what is in their best interest to tell people” (Wechsler, 2016).

The current agricultural system is set up to the benefit of food industry, who have a vested interest in making sure people eat the processed foods that come swathed in bright colors and pretty packaging (Wechsler, 2016). Wendell Berry puts it well when he writes “in the food industry—as in any other industry—the overriding concerns are not quality and health, but volume and price” (Berry, 1999). While this system is difficult to enter into as a young farmer because of the start up costs, it can be even more challenging to try and work outside that standardized system. For young farmers wanting to break free of the traditional mold of agriculture, they have to work against the food industry and consumer preferences for the convenience of processed food.

Beyond the confusion about what to buy, there are misconceptions about the farmers themselves. A survey conducted by North Dakota State University found that people generally have positive associations with farming, but there are nonetheless still plenty of negative perceptions about farming as well (Wachenheim & Rathge, 2000). A theme that came up

frequently from a Facebook survey asking farmers about misconceptions of agriculture was the idea that farmers don't care at all about the land or their animals (Birt, 2013). One person I interviewed strongly disagrees, saying: "I have watched so many farmers stay up well past dark making sure crops get harvested or a sick animal cared for; farmers invest so much for their animals...so that they are healthy and producing high quality food for the consumers." Another misconception that seemed fairly common was the idea that farming was idyllic, a simpler way of life. One person responded with a misconception she encountered "that farmers live an easy life...driving around all day in new pickups" another respondent commented "agriculture is just farming and that since my husband farms, he 'stays at home' all day" (Birt, 2013). Public misconceptions such as these are troubling because agriculture is so foundational to society, and they may dissuade people from learning more about farming, regardless of whether or not they have any intentions of becoming farmers themselves.

It will take a long time to change how society views food and farming, but change can start at the local level. Young farmers, especially those interested in pursuing alternative agriculture, have to work to find their own niche in the market and create a way of farming that suits them. Once they do overcome those barriers, they can establish rewarding and meaningful relationships within their community. Doing so will allow them to dismantle the misconceptions about food and farming by getting to know their customers (as opposed to consumers). In this way, young farmers can reconnect people back to the soil where their food comes from.

Challenge II: Questioning the Future of Farming

A second challenge for young people questioning whether or not they should take up farming is the uncertainty of long-term viability and success. One reason for this is simply the

amount of work it takes to run a farm, and the lack of guaranteed profits at the end. I questioned a friend who lives adjacent to a farm why she would not want to become a farmer herself, she replied “I don’t have the expertise or the patience for it. Or the money. A lot of time and thought and planning goes into running an efficient farm...it’s more than a full time job!” Another person who grew up on a hobby farm but has decided not to continue farming said “Hard work is very important, but for me there’s not enough outcome, there’s not enough good that comes out of it, [my parents] don’t make as much money...it’s also very hard for them to get away from the farm.”

Another pressure is for people to go to college and earn a degree. While some of the people interviewed planned on going back into farming after college, others decided to go into different fields entirely or earned a degree in a field related to agriculture but opted not to continue into farming. One person I interviewed said that he didn’t really know anyone personally who had gone off to college and come back to farming. Some of this pressure might be tied to misconceptions of farmers as being uneducated, and wanting to break from that perception. One person who was asked what the biggest misconception about farmers was responded “That we are all uneducated, slow witted bumpkins. I hate that!” (Birt. 2013). That frustration might drive people who grew up on farms away towards other things, and it might keep people who did not grow up farming away from the field in the first place.

Both the amount of work and the pressure to go into other specialties has contributed to the erosion of rural culture. Increasingly, people are moving away from rural areas towards the cities. Often, they are looking for new economic opportunities, or trying to find a social atmosphere which is lacking in their hometowns. Young people from rural areas feel this

especially keenly, and must decide between continuing on with what their parents and grandparents did for a living, or seeking out a different path for themselves.

While there is a lot of uncertainty in the future of farming, especially in terms of economic sustainability, there is also an opportunity for young farmers to create new communities. As one small farmer puts it, "it's more about the relationships than the rutabagas" (Wechsler, 2016). Young people have a chance to revitalize rural communities. One way in which it might be useful to direct public policy is to support more experiential education for people who want to start farming, as well as other loan repayment options for people who earn a college degree and decide to enter farming.

Challenge III: Tensions in the Agricultural Community

A third challenge facing farmers is tensions in the agricultural community. Alternative agriculture has been gaining traction as a way for people to enter into agriculture, whether it is do to economic reasons of not needing to purchase as much land and equipment, or for ethical and environmental beliefs. However, there aren't always easy relations between the already established agricultural community and new people moving in. Some of this comes from the perception of young farmers by other farmers. One person I talked to said that "some young farmers are considered naive and unlikely to succeed due to their youth. Others are considered useful due to their energy, strength, and resilience that would tend to decline with age. It depends on who you ask, what position they hold, and perhaps how successful their operation is." Other reasons for the tension arise from the fact that there is a perception that small farmers aren't always considered real farmers (Ikerd, 2000). When we went to visit Common Harvest CSA, one

of the most interesting things that I learned was that some of the other farmers from the area did not consider it an actual farm, going as far as to refer to them as "gardeners."

For farmers, especially young farmers, looking to get into alternative agriculture, ensuring community participation is key. One farmer I spoke with advised that new farmers "find someone to learn from, who has been in the business a long time." Even if the types of farming the mentor and mentee practice are different, there is still a lot that can be learned and shared by helping out on other farms. Not only does this help new farmers gain experience, but it also helps establish a more closely-knit agricultural community.

Additional Findings

In this paper I wanted to draw out some of the major cultural perceptions surrounding farming and how they can particularly impact young people. However, there is still plenty of research to be done. Going back to the Google image search, one thing which stood out was the conspicuous lack of multiple people in the photograph (only 4 images of 50 showed more than a single subject). While this could just be a result of how photographs are taken or of search preference for a single farmer, I think it speaks more to how society views farmers as independent and innovative. Yet, with every picture depicting a sole farmer capable of handling anything on their own, we make invisible the family that live on the farm, the farm labourers that tend the field, and the people who support the farm. In other words, we remove the farmer from the community, and once again create a divide between where and from whom we get our food, and where we as consumers buy it.

Conclusion

If we want to change our perceptions about farming, then we need to start at the local level. It is a near impossibility that cultural norms regarding food and farming will change overnight, however, we must plant the seeds somewhere. As the older generation hands the reins to incoming young farmers, there is an opportunity to start shifting some of those societal viewpoints. We can encourage consumers to become more involved and invested in where they get their food, hopefully dispelling any lingering misconceptions they have. We can revitalize agricultural areas so that people don't feel the need to escape to the city, and we can work to support those who do want to go into farming. We can expand our views of what a farm looks like beyond the realm of traditional agriculture. Most of all, we can place an emphasis on community, and on coming together over shared learning and good food.

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Group 1B

Alternative Agriculture Rough Draft

Introduction

The United States has an agricultural sector worth $136.7 billion, and a $992 billion food and related industries sector that relies on these agricultural outputs (Ag and Food Sectors and the Economy). Not only does agriculture represent a significant portion of our economy, but it is an industry that every single citizen relies on. Food is a necessity, and so are the people who keep the country supplied but fewer young people are pursuing a profession in agriculture (Bittman 2015). The objective of this paper is to explore the economic opportunities and challenges facing young people entering farming today, specifically within the context of alternative agriculture in the Northern Midwest region.

Agriculture in the northern midwestern regions has undergone several major shifts as a result of shifts in technology and market as well as social and political shifts. In the early 1900's, agriculture shifted from smaller, usually family owned, operations that produced a variety of crops and livestock to sell on the market and for their subsistence (Ikerd 1990). Farms stayed in the family and few young people pursued education or careers outside of the farming community.Beginning in the mid-1900's, agriculture began to shift to a more industrialized system of production that intensified and expanded the production of commodity crops, notably corn in the upper midwest (Ikerd 1990). Livestock production moved off other farms and has since mostly become concentrated into large feedlots, adopting a structure similar to the industrialization of crop production (Moseley 2014). This shift enabled fewer farmers to produce more food, decreasing the number of farms but increasing the size of farms (Feenstra). At the same time, agriculture was becoming industrialized, young people started moving away from rural areas (Bittman 2015). Fewer young people taking over farms means that the average age of farmers has been steadily increasing, as of 2012 the average age was 58.3(Farm Demographics 2014). The 2012 Census

found that only six percent of farm operators are under the age of 35, indicating a need for young people to re-enter farming as the older population ages out (Farm Demographics 2014).

These changes in the type and scale of crop production drastically changed the production model of the American farm as well as the focus of agricultural policy (Moseley 2014). Under the current Farm Bill, the federal government heavily subsidizes commodity crop production, crops like corn, wheat, rice, and soybeans, providing incentive and insurance for farmers to continue this method of production (ERS Policy-Related Research). The intention of these subsidies is to keep food prices low while protecting farmers by setting price floors and making payouts to stabilize farmers' income. These programs also provided qualifying farmers with loans or other assistance to subsidies other inputs such as machinery or additional land purchases (Glauber, Effland 2016). The support of industrial agricultural production has been heavily criticized for creating environmental and social problems, due to the heavy use of costly inputs to sustain a system of maximum output that requires significant resources use (Horrigan, Lawrence, Walker 2002).

A result of these critiques is the alternative agriculture movement that is "more responsive to natural cycles and biological interactions that conventional farming systems (Horrigan et. al 2002). Systems of alternative agriculture use production methods that work to promote soil health, reduce water use, and maximize the efficiency of inputs (Sustainable Agriculture). In addition to farming practices, alternative agriculture is regularly accompanied by a philosophy of stewardship for natural and human resources (Feenstra).

Methods:

To answer my research question, I used a variety of methods to gather the necessary information. I relied on interviews with young farmers from the northern midwest, concentrated in Minnesota or Wisconsin. From these interviews, I was able to obtain information specific to the area about the financial realities facing young people pursuing farming. The interviews also gave me important background information and context about how and why these people entered farming as well as their approach to agriculture. I also used information I found in academic sources such as peer-reviewed journals, textbooks

and other academic articles and texts to supplement my analysis. Along with the academic sources, I relied on popular media sources, such as magazine and newspaper articles, to further inform my research. In addition to these sources, I was able to apply my knowledge and the information gathered through the People, Agriculture and Environment course from lecture, discussion, and required readings.

Findings, Analysis and Discussion:

Challenges:

The most prominent economic constraint for young people hoping to enter the farming world is the high start-up costs of a farm. A farm requires a significant portion of viable land, which can be out of reach for many young farms who do not have the capital or familial connection to obtain land one young farmer said in an interview. The average value of cropland in the upper midwest is almost $5,000 per acre, as of 2015 (Farmland Value Guide). To purchase a farm of 150 acres, the size of one interviewee's farm, it would have cost upwards of $500,000. The only way they were able to obtain their land was because it was already in the family. Another problem associated with obtaining land, is the conglomeration and commercialization of agriculture, which has limited the amount of available and affordable land in areas of high agricultural production, like the Northern Midwest (Glauber, Effland 2016).

In addition to the prohibitive cost of land, the cost of procuring and maintaining infrastructure and inputs can be challenging for young farmers. Depending on the needed inputs, such as tractors, greenhouses, irrigation, a small farm could spend about $100,000 in the first few years simply to outfit the operation said one farmer. Another young farmer had to take out additional loans to purchase a flock of sheep and the required fencing, on top of the money they already borrowed to purchase land. Farms also require a significant amount of labor, which has been traditionally provided by the farmers family, but some young farmers, like my interviewee's, do not have a family working with them or if they do it is a spouse. This need for additional labor means additional wages for an outsider workers, adding to the cost of operating a farm.

A farm requires a considerable amount of upfront money, and many young people do not have that amount of capital available to them. It can be especially difficult for smaller, alternative farms to secure private loans because banks are more likely to provide loans to large industrial farms. Banks are more familiar and comfortable with the finances of large farms and can view smaller operations as hobby farms, a struggle one young farmer discussed. Not only are private loans hard to acquire for these smaller, diversified farming operations but it can be difficult for younger farmers to get approved for loans. Young people often do not have an established credit record or a stable income, which lenders look for as an indicator of a person's ability to afford to make the payments on the loan (Elmerraji 2016). Often younger individuals do not have the necessary collateral such as a house or car that can act as insurance on a loan making investors more willing (Elmerraji 2016). In addition, many young people today are already significantly in debt, many young adults already have significant debt from student loans, that further dissuades lenders (Luhby 2013). Not only are private loans difficult to acquire, but young farmers pursuing alternative agriculture often do not qualify for loans provided available through governmental agricultural agencies, like the Farm Service Agency (Farm Loan Programs). Young farmers do not qualify because of the size and type of farm they are pursuing are often excluded or receive minimal support from loan programs. They are also excluded because they, themselves, do not qualify because they are not college educated, do not have adequate experience farming or navigating bureaucratic institutions and can be excluded for the same financial reasons that bar them from private loans (Farm Loan Programs). To acquire the necessary capital young farmers must often rely on grants or loans from private individuals or groups, like family members or organizations that cater to alternative farms or younger people entering farming.

If a farmer is able to afford the start-up costs, growing the right crops and finding a profitable market is another hurdle that many young farmers are faced with. According to one young farmer, it might take a number of years for farms to become "efficient and profitable from the maturing markets the farmers have developed". Not only does it take time to grow produce or raise livestock for the market, but farmers must be adept at finding or aware of where customers are and how to reach them. Farmers must

find markets that do not increase expenses, one farmer cited high transportation costs as being especially damaging to profits. Additionally, farmers are operating in markets that can experience substantial fluctuations in price or demand of a product, which can destabilize their income (Glauber, Effland 2016). One young farmer found it challenging to market their farm because of the time needed to maintain the farm and their lack of marketing experience. To supplement their income until their farm is profitable, it is not uncommon for these young farmers to be employed outside of the farm, taking additional time away from maintaining and marketing the farm (Farm Demographics 2014).

Unlike industrial agriculture, these smaller, alternative farms are not growing the same crops or on the same scale leaving them out of government support or insurance programs that help other, more commercialized, farmers stabilize their income (Glauber, Effland 2016). Producer support programs in the current Farm Bill includes crop insurance that provides compensation for losses due to natural event and price decline. As well as a variety of subsidies that are intended to offset costs of inputs, operation and purposefully low commodity prices. What is problematic about these programs for alternative farmers, is that subsidy and insurance programs are intended for producers growing program crops or livestock, such as corn, wheat, soybeans, cotton and dairy cows (Glauber, Effland 2016). The payouts from these programs are also proportional to the production of these crops, meaning that the majority of these payments go to already profitable commercial farms (Sumner 2007) (Riedl 2007). Not only are alternative farmers left out of programs that protect their income but these programs promote agricultural practices and producers that make it difficult for young people entering farming (Riedl 2007).

Opportunities:

There are significant economic barriers facing young people entering agriculture today, but there are economic opportunities to be found when pursuing a career in farming. Systems of alternative agriculture, in general, use fewer, costly inputs than industrial agriculture (National Research Council 2010). Organically growing a range of crops intermixed with animal productions allows alternative farms to use organic material produced on their farms as inputs instead of costly, petroleum-based chemicals used in industrial agriculture. Additionally, there are high machinery and labor costs when farming on the

large industrial scale making production costs high that can be lowered in alternative systems (National Research Council 2010). One young farmer also emphasized the importance of thrifty practices, such as buying used, and reusing materials and conserving resources like water and soil, that can help reduce costs.

There is a growing market for sustainable agriculture products where alternatively produced food is becoming competitive with conventionally produced food (Ikerd 2). Consumer concern about the quality and safety of commercially produced food has rapidly grown markets of food products that are consciously produced (National Research Council 2010). These emerging niche markets present a range of income opportunities for these farmers. These opportunities include selling produce at farmers' markets, becoming a member of a co-op, contracts with local stores and restaurants as well as community supported agriculture programs (CSAs) (Feenstra). Alternative farms also have a more diversified crop or animal production, making them more ecologically and economically resilient to change. Farmers are able to diversify their income stream to adapt to markets making their farm less susceptible to the price fluctuations (Feenstra).

The growing popularity of alternative agriculture is also creating a wider community of like-minded people, giving young farmers alternative avenues for support. Young farmers have increasing access to tools, like the internet and social media platforms, that help them build networks of support within and outside of their communities. Some farmers are even using internet sites that use crowdfunding, raising money for a project by eliciting small donations from a large number of people, to fund projects (Prive 2012). One of the farmers interviewed was able to put a new roof on their barn using the crowdfunding website Kickstarter.

Recommendations and Conclusion:

As the federal government is preparing its' newest installment of The Farm Bill, the subsidy and insurance programs should be adjusted to include a wider variety of crops in the payment plans and to better accommodate farming on different scales instead of only on the industrial scale. This would mean decoupling payment and production, so the largest farms no longer receive the most assistance, which

would open up more funds for smaller operations. In addition, federal loan programs, like the FSA, should also be restructured to be more accepting of different farming models and of the changing demographics in farming. Loan programs should target young people and minorities entering agriculture with a preference given to those pursuing alternative agricultural practices (Volkmer 1998). There should be more funding directed toward educational and training programs to get and keep young people interested in farming and to help them navigate the financial side of farming by familiarizing them with loan and other grant programs. Outside of the government, it is important for communities to continue supporting alternative agriculture and the young farmers who make these alternative systems possible.

There are distinctive financial opportunities and challenges facing young people entering the world of alternative farming today in the Northern Midwest. Farming is not recognized as the most economically profitable of business ventures, but it is possible for young people to make a living in the growing field of alternative agriculture. It can be prohibitively expensive to start a farm but alternative farms have lower start-up and maintenance costs. By farming on an alternative scale young farmers are often economically disadvantaged by the focus on large commercial food production in political and economic institutions. However, young farmers using alternative practices are able to participate in the rapidly growing markets and communities willing to support them and purchase their products. For young people entering agriculture today in the Northern Midwest, they are expanding into new, viable markets using cost effective methods of production but will still face economic constraints keeping them out of the agricultural sector.

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Harvesting the Next Generation of U.S. Farmers:

Policy Perspectives on the Opportunities and Challenges for Youth in Agriculture

Introduction

The American farmer is aging fast. Today, the average farmer in the U.S. hovers at the brink of retirement at 58 years old, while only 6 percent of farmers are under the age of 35 (USDA, 2015). Almost universally, few young people see a future for themselves in agriculture and fail to see it as a viable or prestigious profession throughout the country. Even when young people are interested in pursuing farming, many hurdles exist before a beginning farm can generate a living wage. The inherent difficulties of farming, from the manual labor involved to living in a more isolated environment, combined with the undue amount of hardship to start a successful farm today, means many pursue other occupations instead. Until more substantive economic opportunities in rural areas become available through farming, young U.S. citizens will continue to choose other occupations and concentrate in cities, exacerbating the abandonment of rural America and the U.S. farmland over the last century (World Bank, 2009).

An agricultural sector without young people is a growing concern for a number of reasons. While some argue that a lack of new farmers may threaten future food security, a more pressing concern is the acceleration of the corporatization of American farmland (FAO, 2011; Proctor et al., 2012). As more farmland becomes industrialized, more young potential farmers are being pushed out of the market while the environmental impact from unsustainable farming practices will continue to grow. Investing in programs and policies directed at young people in

rural areas is therefore key to boosting rural economies, ensuring job security for potential farmers, and enhancing the role of small farms in the U.S. agricultural landscape.

There are workable solutions to overcome the challenges faced by young women and men entering agriculture that have been adopted in countries elsewhere. By analyzing these varied approaches, this paper will seek to examine the avenues that the U.S. government can take at a policy level to incentivize more young people to become farmers and make it a more accessible profession for future generations. With the upcoming update on the U.S. Farm Bill approaching in 2018, the time is ripe to examine what steps the U.S. government can potentially take to address this problem productively. This paper will begin by providing an overview of the methodology used before diving into the five main challenges facing young potential farmers today, namely education, inadequate access to land, insufficient financial assistance, barriers to entering markets, and active involvement in crafting policy legislation. It will then conclude with a number of policy recommendations with the overall goal of adjusting current policies that will encourage more young people to take up the task of farming in the future.

Methodology

A variety of research methods were utilized to provide a comprehensive snapshot of the array of policies put forward today that aim to engage youth in agriculture. Academic papers published by leading experts and researchers in the field provided an overview of the historical trends and societal factors that have contributed to the aging U.S. farmer population. In addition to these academic journal articles, policy papers offered valuable context by sharing the dialogue taking place today amongst policy makers. These ranged from reports published by multilateral organizations such as the Food and Agriculture Organization of the UN and World Bank to policy proposals published by governments of individual countries and collective bodies such as

the European Union. Furthermore, examples of congressional legislation backed by U.S. representatives were evaluated to see how policy has materialized in the American political landscape.

Finally, research was supplemented by interviews conducted with young farmers in order to incorporate their personal perspectives, building on geography's long tradition of field work. These interviews were conducted in person, over the phone, and over email. In addition, a visit to Common Harvest Farms in Osceola, Wisconsin provided an in-depth introduction to both the advantages and challenges of operating a small scale farm in the U.S. today, a model the majority of young farmers today are drawn to. These interviews focused on learning why and how these individuals chose to go into farming and what their attitudes were towards government assistance for young people. In addition, feedback on specific policies were also discussed, as well as suggestions for what the federal government could offer in the future to better equip young people with the tools needed to succeed in farming.

Findings, Analysis and Discussion

The first primary challenge preventing young people from considering a career in farming is American youth's overall insufficient access to agricultural information and concepts. Over the last century, education has increasingly been geared to reflect the national economy's seismic shift towards jobs based on manufacturing and the service industry (White, 2012). In 1870, almost 70 percent of the American labor force worked in agriculture. By 2000, after a century that saw the Industrial Revolution, population booms, and a new era of urbanization and globalization, barely 2 percent did (USDA, 2015). More often than not, school curriculum is not relevant to living in a rural context. Agricultural-based curriculums have either disappeared or are outdated or inadequate (FAO/UNESCO, 2003). A livelihood in agriculture is generally not

seen as a worthwhile venture, particularly in urban settings. Students are encouraged to aim for careers with minimal manual labor, undervaluing the marketing and business acumen needed to succeed in farming today. These attitudes negatively influence the aspirations of would-be farmers, diminishing agrarian lifestyles as relics of the past. Excluded from school lesson plans, agricultural knowledge and farming know-how are by and large passed on from parents to their children. Without direct exposure to farming, information on how to operate a farm is difficult to come by. A student raised in an urban environment has little incentive to learn about agriculture. This lack of knowledge creates a barrier to working in agriculture later in life.

The challenges related to education are complex. Some government have responded by creating university programs that focus on agricultural research and establish connections with the farming community. Such programs have proven beneficial for the agricultural sector in countries such as Brazil, India, Malaysia and China (Blackie et al., 2010). Access to tertiary agricultural education can be enhanced through scholarships, which can be funded by public and private partnerships (Paisley, 2012). In addition to production techniques, young farmers need access to valuable information about financing their farms and markets. Rural youth report a lack of training in areas such as leadership and business management, and suggest the need for apprenticeship opportunities and hands-on learning experiences (Bennell, 2007). Wide-scale adaptations of engaging programs could prove enormously beneficial to reaching America's youth and connecting their education to agriculture.

The second challenge holding youth back from farming is severely limited access to land. Land is prohibitively expensive, especially for young professionals. Farmland prices have risen steadily since the 1980s; most notably, prices have doubled in just ten years from 2004 to 2014 (USAID, 2015). Many young would-be farmers simply cannot afford to buy or even lease this

land. Average costs, depending on region, can hover around $7,000 for an acre of land (USDA, 2015). Even for a relatively small farm, this sum is out of reach of a young professional's budget. Beginning farmers must also invest an additional average of $300,000 for equipment, while also factoring in taxes, crop insurance, fuel, supplies, and housing, all of which shave profit margins further (White, 2012). As such, inheriting family-owned property is the principal way of obtaining land today. Even this avenue presents its own challenges though. Since life expectancy has increased, land transfer often happens at a later age, and young people have to wait years before inheriting land (FAO, 2011).

Loans assisting youth's acquisition of land are sorely needed. As one young farmer explained, "starting a farm is incredibly resource intensive...If you don't have an angel investor (like I did with my parents), or inherit the land (I rent from my parents and will eventually inherit the land), you will have to get a loan." Loans meant for youth purchasing land have proven beneficial in overcoming this hurdle. Examples exist in both Mexico and France, where youth receive advice and training while drafting business plans to gain access to loans to purchase land. Furthermore, the tax code in France was altered to encourage certain land transactions to take place more frequently. A law in favor of young farmers was approved in 2010 mandating a tax when agricultural land is sold for non-agricultural purposes; the money obtained from this tax goes to a fund dedicated to investment and future loans in young farmers (FAO, 2011).

Another option is to give older community members incentives to transfer at least part of their land to younger generations. The EU Rural Development Policy (2007–2013) proposes two measures to facilitate the intergenerational transfer of land. The first encourages setting aside funds for farmers under the age of 40 to start up their own farming businesses; the second promotes early retirement of farmers over the age of 55 through grants. Though a relatively new

policy, this strategy has shown early signs of success. By 2010, 17,000 European farmers received roughly 22,000 hectares of farmland; meanwhile, another 36,000 young farmers received support to start up their own farms. This strategy has the advantage of addressing issues at both ends of the age spectrum simultaneously.

Intimately related to land access, the third challenge many young farmers face is inadequate access to financial services and capital. Most financial service providers (FSPs) are reluctant to provide services to rural youth due to riskiness involved in starting a small-scale farm and young people's lack of collateral (Atkinson et al., 2012). The USDA is taking steps to rectify this by redirecting some of its funding towards supporting beginning farmers through the Farm Service Agency (FSA). 30.5 percent of direct farm loans in 2009 went to beginning farmers, while 53.3 percent did in 2015 (USDA, 2015). However, the USDA is limited in this strategy because it cannot reliably depend on an increase in funding - only Congress has the power to raise its budget. In addition, it remains notoriously difficult to obtain a public loan through the FSA. When one young farmer was asked if he'd ever taken advantage of a government loan, he said, "I am familiar with government loan programs, but I know they are extremely complex and difficult for people with small, unconventional farm dreams." Before releasing funds to youth, many FSPs ask for loan guarantees, such as formal land titles, steady employment, personal guarantors, or collateral, all assets that youth typically do not possess (Atkinson et al., 2012). One farmer interviewed reported a successful experience applying for a loan from the FSA, but mentioned that "your experience can really depend on who your individual loan officer is," indicating that navigating the complicated loan process can vary from case to case.

Youth therefore often rely informal sources (such as family and friends) to obtain access to financial services. For example, one young farmer interviewed named Emily Hanson, a graduate of Macalester College, received funding through a Live It! Grant from her college as an initial investment in an urban farming project, minimizing her own personal costs. However, not all individuals qualify, or are ever even made aware of, such unconventional loans. Promoting financial services catered to youth and start-up funding opportunities can help remedy this issue. An example of this can be seen through the Canadian Government's $75 million public-private investment fund created in spring 2011 for the Future of Agriculture (Fonds d'investissement pour la relève agricole, or FIRA). FIRA's mission is to support young people starting agriculture businesses in Quebec. In addition, loans for agricultural activities in Canada do not have to be paid back for three years; other countries, such as France and Greece, have even more generous payback periods of five years for similar loan structures (FAO, 2011). This reduces pressure on youth and gives them time to establish their business.

The fourth challenge involves limited access to markets. Market access for farmers simply refers to a capability to deliver and sell produce. Access to markets for youth is becoming more difficult due to the growing influence of supermarkets and the rigorous standards of their supply chains (van Schalkwyk et al., 2012). New quality and safety standards are difficult and expensive for smaller farms to keep up with. Local markets are traditionally more accessible, however, national and local markets are beginning to imitate international standards (UNCDF, 2012). What's more, beginning farmers do not have a large range of contacts and buyers to diversify their networks. This problem is compounded by their limited geographic reach, as it becomes costly to transport produce over large distances. A possible solution involves the integration and expansion of Information and Communications Technology (ICT) tools. The EU,

for instance, has a number of online website services that connect small-scale farmers directly with consumers interested in purchasing their products (World Bank, 2015). This facilitates the limitations of geography and space, making markets more tight-knit and malleable.

The fifth challenge is youth's limited involvement in identifying effective policy measures. Too often, young people's voices are not taken into account during the legislative process and their needs are not being met as a result. One model for such engagement can be found in The European Council of Young Farmers (Conseil Européen des Jeunes Agriculteurs, or CEJA), created in 1958. Today, CEJA comprises 30 European member organizations from 23 EU Member States. CEJA's main objective is to promote a younger and more innovative agricultural sector across the EU. It raises the awareness among European decision-makers and calls for measures (such as the creation of loans) to help protect young farmers. A similar council could be established in the U.S. to accomplish similar goals.

Currently, none of these challenges are being addressed by Congress today. The primary piece of legislation on the matter is known as The Young Farmer Success Act, introduced in March 2017. If passed, the bill would offer a path to student loan forgiveness for students who commit to a decade in farming. A loan forgiveness program already exists for young people entering professions that benefit society—such as nursing, teaching, and nonprofit work. This bill would simply add farming to this list. While this bill seems to be a step in the right direction by directly targeting young graduates, it does not go far enough to ease the financial burdens of farming. Emily Hanson, the former student from Macalester, offered that while student debt can be, "a huge limitation on young people getting into farming, I think there's a bigger elephant in the room." Meanwhile, another farmer responded that forgiving student loans is just "one small piece of the puzzle", suggesting that more comprehensive, radical reforms will be needed as a

real solution. The proposed loan-program would be available for only a small portion of the population, that is, college educated young professionals who already express an interest in farming. If young farmers were more heavily involved in the policymaking process, action could begin to be taken on these issues to shape a market that is more open to small-scale agricultural initiatives. Such action could in turn create a virtuous cycle that encourages more young people to enter the agricultural sector once again, shifting the landscape of farming today.

Conclusions

Improving these five challenges would increase youth's future involvement in farming. These challenges are complex and interconnected. There is a distinct need to organize and bring youth together to work on these setbacks. If youth-specific projects and programs were designed in collaboration with the next generation of farmers, they could provide young people with the extra incentive needed to enter the agricultural sector. The first challenge of education will require the introduction of varied training approaches so that youth can get involved at an early age and obtain the skills to navigate a modern agricultural sector. In addition, the provision of scholarships, at least partially funded by public institutions, can facilitate access to higher agricultural education. Departments of education and local schools should work with a range of rural stakeholders, other departments, the private sector, and NGOs to identify context-specific solutions. It is also apparent that providing more funding for grants and loans would help tackle the second and third challenges of access to land and capital. The young farmers interviewed unanimously agreed that making loans more accessible to smaller, unconventional farms is critical. Though the USDA cannot increase its own funding independently, efforts should be made to lobby Congress to allocate more funding. This funding could be created through a similar tax plan as France's, in which a tax break is granted to those selling to young farmers. As

tax breaks have traditionally proven to be easier to pass through a gridlocked Congress, strong bipartisan support could be gathered for such a measure.

Finally, bringing youth together in a formal coalition would create numerous opportunities to achieve greater access to economic markets and participation in major policy decisions. The U.S. government could set up an organization (along the lines of the EU's CEJA) to advocate on behalf of youth across all of these varied challenges. These issues could be tackled collectively, ensuring the greatest odds of producing gains on behalf of beginning small-scale farms. While The Young Farmer Success Act is an encouraging first step in the right direction linking farming with public service, the reintroduction of youth to farming will require collective action to reorganize the agricultural landscape to make room for the next generation of farmers. Advocating for young farmers will necessitate a move towards communities embracing homegrown, sustainable livelihoods and practices in an agrarian America that young people want to work and live in.

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Chapter 3: If you were to design a curriculum for students and non-students regarding food and farming, what are the key courses or modules you would include?

The Findings of Research Group 3 (Betsy Schein, Kit Anderson, Henry McCarthy, Anonymous*, Ally Milenkovic)

Addressing Food and Agriculture Issues through Community Conversation

Betsy Schein

Introduction

In an age of increasingly long commodity chains and industrial agriculture, food and agriculture education is becoming more important and more necessary as people and communities become distanced from their oft obscured food sources. Working under the broader question of, *"If you were to design a curriculum for students and non-[traditional] students regarding food and farming, what are the key courses or modules you would include?"* this paper is seeking to answer the sub question of, "*What should be included in a course for non-traditional students that addresses and challenges misconceptions and common narratives regarding farming, rural life, and food production & consumption?*" The importance of designing this curriculum and ones like it is that it is intended to counteract the trend of unconscious consumption and biases that can lead to negative outcomes for those working in food production, living in food-producing areas/communities or consuming foods they do not completely understand. The course is designed for non-traditional students like families, neighborhood groups, retirees, etc. and will not be offered in a traditional education system (like a college or high school) but instead in a location and manner that is accessible because it should be available for anyone who is responsible for how they and their families consume food and how their communities interact with food-producers. Based on research and the most pervasive narratives and conceptions the four topics and corresponding goals that will addressed in this paper are:

Course Topic:	Course Goal:
Commodity Chains, Sustainability, and Health	Understand the fossil fuel reliance of industrial agriculture and health impacts of food growing and processing methods
Ethical Consumption- What does organic even mean?	Define and understand the pros and cons of labels and food trends like organic and local
Misconceptions about Farming and Rurality	Discover, define, and address misconceptions and conventional narratives surrounding farming and rurality
Community building through food	Identify and suggest community building food efforts such as CSA, urban farming, etc. by understand local specificities and needs regarding food access and consumption

The first three topics and goals will be designed to incorporate and build up to the final and most important goal of community based action and collaboration towards a community building effort to influence consumption patterns.

Research Methods

In order to design a curriculum addressing food and agriculture issues in the US, I consulted different types of sources for various kinds of information. The original inspiration and research for this topic is rooted in a family run Community Supported Agriculture (CSA) farm located in Wisconsin and the two farmers who run it, Dan and Margaret. However, in addition to speaking with Dan and Margaret and touring their farm, I met with another farmer on a large dairy Concentrated Animal Feeding Operation (CAFO) also located in Wisconsin, consulted academic literature, and read publications from the popular press. All of these different types of sources were necessary for the research supporting the designing of the curriculum because it is vital that the curriculum be informed by those who are currently experiencing food and agriculture issues, experts who study them in depth, and the common and pervasive thoughts and

ideas surrounding food production and consumption. Multiple perspectives are useful in this context because the scope and topic of this paper are so broad. By drawing from multiple different types of sources, I hope that this paper and the curriculum designed within are able to address the issues both broadly and in a well-informed manner.

Findings and Curriculum

Before diving into the topics and goals for this curriculum I would like to first flesh out the details of the program so that it can be understood why the courses are designed, who the courses are designed for, and how they will meet the needs of the intended students. As specified earlier, the program is designed for non-traditional students meaning, in this case, that the course is not meant to be taught in a traditional educational institution to enrolled students. It is instead designed for adults like people who cook for their families, work full time jobs, are concerned about their community, are interested in the food they eat, or are interested in agriculture. Because the target group of students could be such a diverse group with limited overlap in availability, the course is to be offered in the evenings or on weekends within the communities it is relevant to so that people with day jobs and children can still attend. Ideally the curriculum would be offered within already existing community buildings such as local libraries or community centers. The location would help the curriculum integrate into the community, build upon existing resources, and likely attract more students because of its centrality and having been already established as a meeting place.

I. Commodity Chains, Sustainability, and Health

One topic that this course will address is sustainability in food consumption by specifically looking at commodity chains and fossil fuel consumption as well as industrial

agriculture's impact on climate change. Some people may be concerned about the impact their food has on the environment but do not know exactly how to identify that impact or how to choose more sustainable foods. There are many aspects to take into consideration when thinking about sustainability like soil, water, fossil fuel usage, and wildlife impact of agriculture and processing (Horrigan, Lawrence, & Walker, 2002). Conventional, industrial agriculture contributes to climate change in part because it is reliant on just a few monocultures and is no longer connected to the natural environmental cycle that used to define agrarian lives and is highly mechanized and reliant on fossil fuels (Manning, 2004). To analyze the impact of industrial agriculture on the environment in this curriculum, the course director/teacher will host discussions based on short assigned readings or movies. The discussion is designed to foster interaction between community members and show that there can be different understandings of issues that affect the same people. Ideally, not only would issues of sustainability be brought up but also issues of health and local specificities like discussion about the kinds of food grown near that area. The goal of addressing sustainability in agriculture and food consumption is to not only gain a deeper understanding of industrial agriculture, its reliance on fossil fuels, and contributions to climate change but to introduce and brainstorm methods of eating more sustainably like eating products with shorter commodity chains (local) or products that do not rely on pesticide usage.

II. Ethical Consumption- What does organic even mean?

Having brought up consuming food from alternative agriculture instead of industrial processed food, the next topic to cover in this curriculum addresses food labels and trends in alternative agriculture and food consumption. From my visit with a school group to Dan and Margaret's CSA farm in Wisconsin and in talking with the farmers, it became evident that most

of my peers and consumers in general do not actually know what terms like “organic”, “CSA”, or “fair-trade” really mean. Lots of ideas get thrown about but it is hard to pin down a definition. In reality, consumers should be wary of labels like organic because they are not all that sustainable and healthy while CSAs have been shown to be effective community builders (Guthman, 2003; Sharp, 2002).The goal of this part of the curriculum that covers food trends and alternative agriculture would be to help each student more fully grasp the meanings of those labels and what the benefits are. In order to do that the course would invite in farmers and producers from different kinds of backgrounds, ideally all local, to talk about their own practices and then have a question and answer. Having CSA farmers, organic farmers, urban food initiative leaders, and local farmers all talking together with a group of neighbors would not only address any misconceptions but would also build community. During my visit to Common Harvest Farm, Margaret spoke a lot about the community aspect of their farm and how that plays into their larger goals for food and sustainability. This aspect of the course would hope to use and build upon existing community resources and connects to address ambiguity surrounding alternative agriculture and food choices.

III. Misconceptions about Farming and Rurality

In visiting the two very different farms, both in Wisconsin, it became evident that there are some commonly held misconceptions surrounding the realities of agriculture, farming, and rural life. According to the CAFO dairy farmer, many people consider her job easy due to its rural setting and ask her if her life is slow and relaxing. Dan, the CSA farmer, had a slightly different experience but some of their neighbors who were not farmers did not like some of the seemingly disruptive agricultural practices like driving a tractor down the road and other industrial farmers he knew considered him a ‘gardener’ or hobby farmer. In both cases, there

were blatant misunderstandings and the farmers were clearly very hard working and their farms were their entire livelihoods, not just a hobby. Dan also had some concerns that other, industrial farms had little regard to for the close interactions between nature and farming especially in regards to the life cycle of soils. For the health of the farm and the quality of the crops it is important that the soils are cared for. While caring for the soil may be complex and challenging it is part of a 'dynamic biological process' that is part of caring for the land and not exploiting it ("Common Harvest Farm - About the Farmers," 2012). For people living in rural and semi-rural areas, there can be a divide present between the food producers and consumers (Sharp, 2002) and often a lack of understanding and communication between the two groups as seen sometimes between Dan and his neighbors. Through discussion and workshopping, the goal of this topic within the curriculum would be to have current producers and farmers, of different types, sit down with other members of their surrounding communities and discuss what they think the issues may be in their specific communities and brainstorm possible solutions and ways of working together like farm-to-table or CSA for example.

IV. Community building through food

One overarching topic and theme throughout this curriculum that should be effectively addressed would be the idea of community building through food. Reconnecting people to the food they eat, especially connecting communities to food is often mentioned as an important part of creating a sustainable, ethical, and healthful food and agriculture system that is more equitable and environmentally sound (Campbell, 2004)**.** The curriculum ought to be locally based, specifically designed for that particular area, and utilize the food and community resources within the local scale. In order to address the idea of community building with food, in the last part of the course, the members of the curriculum, who by this point have gotten to know each

other and gotten to know about food and agriculture in their community, will be able to tour a local farm with a farmer who spoke with them earlier and eat a meal together prepared communally in the location of either their classroom or the host farm much like I experienced on both Dan and Margaret's farm and the dairy farm. The goal of exploring the topic of community building through food is to actually successfully and creatively demonstrate that it is possible and effective in their community with the current resources, or-if it happens to be the case- with some considerable effort to create resources and connections to initiate change and incite thought.

Conclusion

There is a demonstrated need for food and agriculture related education beyond that of traditional education institutions and pathways. Misconceptions and a lack of understanding are pervasive amongst consumers and producers regarding food labels, origin, health impacts, sustainability, and farming. This paper outlines a curriculum designed to effectively address these kinds of issues, specific to each community, in such a way that is useful and feasible within the community. By using and building upon existing community connections, the curriculum in this paper is designed to answer the research questions of, "What should be included in a course for non-traditional students that addresses and challenges misconceptions and common narratives regarding farming, rural life, and food production & consumption?" through topics designed to achieve goals aimed at more fully understanding food and agriculture. The key aspects of this course are that it is designed for non-traditional students, is offered in such a way that it is specific and tailored to its setting, and involves both the producers and consumers of food products. The overarching goal of community building through food education is not an uncommon goal of food programs throughout the US but hopefully this unique approach to food

and agriculture education is effective in fostering fruitful communication and community building through the methods added to the table (seen in the introduction) bellow:

Course Topic:	**Course Method:**	**Course Goal:**
Commodity Chains, Sustainability, and Health	Community conversations involving different farmers, consumers, and those who work with/process food	Understand the fossil fuel reliance of industrial agriculture and health impacts of food growing and processing methods
Ethical Consumption- What does organic even mean?	Community conversations involving different farmers, consumers, and those who work with/process food	Define and understand the pros and cons of labels and food trends like organic and local
Misconceptions about Farming and Rurality	Community conversations involving different farmers, consumers, and those who work with/process food	Discover, define, and address misconceptions and conventional narratives surrounding farming and rurality
Community building through food	Community gathering and idea sharing based on new and previously held knowledge on food, agriculture, and community initiatives	Identify and suggest community building food efforts such as CSA, urban farming, etc. by understand local specificities and needs regarding food access and consumption

Through community collaboration and the forging of relationships through communication, the end goal of community building could ultimately be achieved through this curriculum. In addition, the overarching theme of challenging consumption behaviors through increased education about food and agriculture is also addressed an well incorporated into the community and accessibility aspects of this course.

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Agriculture and Environmentalism: Industrial vs. Agrarian Systems

Kit Anderson

Introduction

“Environmentalism begins at the breakfast table”

The United States in 2017 is filled with deeply industrialized productions. Sectors like manufacturing, healthcare, and transportation are being pushed to greater and greater profits through capitalist priorities and technological advancements. Agriculture, another dominant industry, is no exception. In the past century, agriculture in the United States has transformed from largely agrarian, diversified, integrated systems to industrialized, monocultured empires. The purpose of this chapter is to investigate the environmental implications of this transformation, in terms of the implications for soil health, biodiversity, and overarching narratives between the industrial and agrarian systems. The overarching question of this assignment is “If you were to design a curriculum for students and non-traditional students regarding food and farming, what are the key courses or modules you would include?” More specifically, I am to investigate the differing impacts of industrialism and agrarianism through answering the question “What should a course about the environmental and agriculture be taught about?”. With that question, I hope to design a curriculum with the ultimate purpose of convincing students that agriculture and human activities in the sector have a much deeper effect on the environment than is conventionally thought, and that developing a consciousness about this connection is one of the best ways for personal and communal environmentalism to take root.

Part 1: Research Methods

The research methods of this chapter are somewhat unconventional, as the purpose is not just to research conclusions, but to turn those conclusions into a curriculum. For this reason, the methods occur in two distinct spheres. First, in the information gathering stage for the different modules, methods were fairly conventional. The basis for this exploration was a visit to Common Harvest Farm in Somerset, Wisconsin, where Farmers Dan and Margaret Guenther run a Community Supported Agriculture (CSA) program in a distinctly agrarian manner. After the initial visit and interviews with Dan and Margaret, I supplemented my research with academic journals, popular press news articles, and books that cover the topics of agrarianism vs. industrialism. This variety of sources is important to the theme of the course, as it attempts to connect academic considerations of agriculture and environmentalism to personal realities and then to tie both into the actual happenings on American farms. After gathering this information, my second set of methods involved converting material and data into an adaptable and versatile curriculum that properly evaluates both systems, with the overarching goal of recoupling human, environmental, and agricultural activities.

Part 2: The Course Format

Core Elements

The format of this course is based on modules, in the aim of making it versatile to different learning settings. In each interpretation, there are several elements that will stay the same. These include the overarching question of the environmental impact of

agriculture and industrial vs. agrarian systems, the emphasis on evaluating narratives, and the geographically driven analysis. Each of these core elements is essential to the integrity of the course as a whole. Particularly, the geographically driven analysis is important, as human environment geography addresses a framework of inextricably coupled human-environment interactions, and an emphasis on not just the proximate but the ultimate causes of environmental issues. This framework is essential to achieving the overall goal of the course, which is to convince students that human agricultural activities and the environment are much more connected than conventionally accepted, and that what we eat and how we grow it has deep and dramatic impacts on our environment.

Modules

The next element of this course is what gives it the flexibility to adapt to different teachers, students, and situations. The modules of the course can be selected by the teachers or by the teachers and students, to determine what best suits the moment of learning. The only restriction I would place on this is on a guarantee the first module, overarching narratives, is present in each iteration of the course, as it is foundational to the analysis and evolution of thought that the curriculum hopes to achieve. Finally, the component of experiential learning is highly adaptable, and can include internships, field trips, interviews, research, volunteering, and whatever else the teacher deems will help to internalize the curriculum. This way, the framework of this course can be taught to college students in a classroom, sixth graders in a summer camp, or adult students in a

library, with each group receiving what they need to achieve personal growth throughout the program.

Part 3: The Curriculum

The following sample curriculum outline is based on what I consider to be the most relevant modules of this ecological and political moment- Overarching narratives, soil stewardship, and biodiversity. Below, I will give a basic consideration of each of these elements in terms of how they could be taught within the course.

Module	***Objective***
Overarching Narratives	Encourage critical thinking about commonly accepted narratives (domestically and abroad)
Soil Health and Stewardship	Convince students of the importance soil health beyond being a niche concept, as both a key environmental component and indicator
Biodiversity	Make strong connections between agriculture and popular environmentalism topics, with template for expansion
Possible Extensions: Social Justice, Water/Air Pollution, Health, Animal Welfare, Energy and Climate Change	Go further!

First Module: Overarching Philosophies

Source of image: Oatman-Stanford, 2012

The narratives between industrial and agrarian agriculture immediately make clear the differences between the two methods. Much of industrial agriculture is justified through commercial narratives like "feeding the world", "better living through chemistry" and "DDT is good for me" (Shiva 2012). The continued domination of industrial agriculture is dependent on the currently prevalent attitude that the more industrialized a food production system is, the more 'modern' it is, the better it is. This prevalence is the results of years of agribusiness corporations lobbying government agencies and officials, buying out educational institutions, and flooding the media (Kimbrell 2002).

The purpose of agrarian agriculture is entirely different. Traditionally, agrarianism is based on the idea that rural society is superior to urban society, and that the only occupation that offers total independence and self-sufficiency. However, this definition has evolved over time and space, and particularly in an agricultural context can take on meaning that is both more practical and less exclusive. For example, Farmer Dan Guenther of Common Harvest Farm in Somerset Wisconsin, considers agrarianism to be "Trying to live (your) life so that it reflects the natural ecosystem (you) are a part of". This involves following the rhythms of nature and an intimate connection to the land, and is the philosophical foundation of all of the environmentally friendly practices and methodologies that are found throughout agrarian operations.

Second Module: Soil Stewardship

"A nation that destroys its soil destroys itself"

-Franklin D. Roosevelt

At first glance, soil health seems like more of a niche particularity of environmentalism rather than a defining and integral concept. However, this is not the case. Soil health, defined as the capacity of soil to function as a vital ecosystem, is the essential starting point not just for agricultural practices, but also for healthy ecosystems, the maintenance and enhancement of water and air quality, and the health and productivity of plants and animals (Doran 2000). It is literally at the foundation of a majority of popular environmental issues discussed today; pollution, global warming, desertification, pollution, loss of biodiversity, and others (Rinkesh 2012). Furthermore, agriculture is the largest drain on soil health in the United States, resulting in entire fields like Sustainable Agriculture revolving around determining the impact that different agricultural practices have on soil health.

Industrial agriculture practices pose three primary threats to soil health: erosion, depletion, and contamination. Erosion, or the movement of soil by water, wind, or gravity, is fundamentally a natural process. However, practices like industrial tillage and the absence of cover crops have taken soil erosion to an anthropogenic level, of around 7 tons per acre per year (Sullivan 2004). It is tempting to consider the causes of soil erosion to be largely exogenous - caused by rainfall, wind, or drought. However, while these are the direct causes of erosion, the context in which the rain and wind are occurring, determined by land management practices, also matters deeply (Mannion 1995). This dual importance can be illustrated most simply through consideration of

shifting rates of erosion in the last 100 years. Agrarian practices like agroforestry, alley cropping, diversified fields, and cover crops all grew out of centuries of optimal soil management concerns, but have been overthrown by more immediately profitable industrial methods. Simple methods like covering fields with either seasonal crops or decaying organic matters can do much to reduce erosion.

The depletion of soil refers to the depletions of the vast nutritional reserves that were built up in the US for millions of years, and the rate at which we are running through those reserves. Industrial practices like tilling and tiling (two different things) flush nutrients through the soil without being fully utilized, leaving vacuums in place that must be filled by synthetic fertilizers, and polluting waterways and lands by disrupting the balance of nutrients in natural systems (Sanford 2013).

Third Module: Biodiversity

I chose to include biodiversity as a module in this sample course because it is a particularly appropriate state on which to discuss the environmental concerns of agriculture. The suitability of including biodiversity in this course is the result of several factors. First, biodiversity concerns capture the some of the strongest public sentiments and actions, because it is such and easy issue to be marketed charismatically and emotionally. Second, biodiversity is deeply impacted by agricultural practices, and the impact includes several other important environmental considerations like pollution and erosion. Finally, biodiversity contains two extremely important dimensions of agricultural concerns. First is the actual biodiversity within an agricultural system, in terms of what

products are being produced on what land, and second is the impact of agricultural practices on natural biodiversity in the world surrounding a farm.

Agricultural biodiversity, or agrobiodiversity, is essential to the health of an ecosystem, and one of the most important tenants of agrarian farming. The idea of a monoculture was created by industrial agriculture, in which expedience has trumped considerations of long term consequences. Some ideas of polycultures that could be discussed are the reductions of disease in diversely cropped fields (Duan 2009), the symbiotic relationship that different plants can have (typically, a conventional farm crop like corn paired with a nitrogen- fixating legume like peanuts), or the natural obstacles that polycultures present to pests and erosion. In terms of the biodiversity of a surrounding environmental system, polycultures and reconciliation ecology are important jumping off points for considerations of pollution, habitat loss, and resource consumption that modern agricultural practices can entail.

Part 4: Conclusion and Additional Themes

The purpose of this curriculum is to present an adaptable and experientially based learning framework to consider the important connections between agricultural concerns and environmental concerns, specifically on the grounds of the differing impacts of industrial vs. agrarian systems of production. In this chapter, I chose to consider overarching narratives, soil stewardship, and biodiversity to explore grounds on which human, environmental, and agricultural issues can be reconnected. Furthermore, I would like this course to provide a starting point for question dominant narratives of modern agriculture, and to encourage students to stop and think about what they have been told for many years. Finally, I would like this course to show the

viability of agrarian methods in a modern system. All of these themes and more have great opportunities for expansion, including on the issues of environmental justice, health, energy consumption and climate change, or animal welfare. Each of these topics is full of information and opportunity for a student to truly address what it means to be a consumer in our current agricultural and environmental system.

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GEOG/ENVI 232

Prof. Bill Moseley

Implementing Urban Agriculture Education in the United States

Introduction:

Agriculture is one of the most dominant industries in the United States both economically and in terms of land use. But what does the general public know about agriculture and its many forms and stories? It is likely that most people living in the United States could tell you fairly little about domestic agricultural practices let alone agriculture on an international scale. While having knowledge of agricultural practices may seem trivial to the uninformed consumer, understanding the story behind a plate of food is a step in the right direction to solving issues of food security, malnutrition, and more. Cities, suburbs, and rural towns across the United States face serious problems such as food deserts (which the USDA defines as an area "vapid of fresh fruit, vegetables, and other healthful whole foods, usually found in impoverished areas.") or obesity and an improved understanding of how food is produced is critical to alleviating these challenges (Gallagher, 2011). The best way to elevate Americans' knowledge of food and agriculture as well as the problems that stem from these is by improving the education system through increased discussion and coursework about proper nutrition, sustainable farming practices, and agriculture around the world.

This essay addresses a particular part of agricultural education: urban agriculture. As the world's population becomes increasingly concentrated in urban areas, city inhabitants must be

educated in urban agricultural practices. In the United States and internationally urban agriculture is already well established, but who benefits from these practices and to what extent do they benefit? When implementing urban agriculture in a city or community, it is important to first address the needs of marginalized peoples and communities who may not have access to fresh produce or nutritional food. As it stands, urban agriculture in the United States is noticeably white, but more often than not it is minority communities that have the greatest need for healthy, fresh food (Alcala, 2015). Community gardens, urban farms, and cooperatives have the ability to combat food insecurities but the proper implementation of urban agriculture is paramount. So the primary question arises, how can urban agriculture be successfully established so that it serves the communities that need it most? The simple answer is through education, but every city is unique and urban agriculture must be approached on a case-by-case basis. The hope is that through broad courses on urban agriculture, students of all ages will be able to apply what they have learned to their respective cities and communities. The following pages outline what an urban agriculture module would look like and how structurally based issues such as food deserts in marginalized communities can be addressed and combatted by practicing urban agriculture.

Research Methods

Acknowledged above, urban agriculture is a broad topic that is highly varied and for this reason it can be difficult to design a detailed curriculum, which can be applied to any social, economic, or geographical situation. Collecting information through an array of research methods mimics the variability of urban agriculture and offers the best approach to understanding these practices at a broad scale. The following outline of an alternative agriculture module has been constructed using an assortment of resources which include but are not limited

to academic articles, specific case studies, blogs, urban farming websites, and podcasts. Resources such as farm websites help build a framework of understanding of urban agriculture. This framework supports more specific articles, case studies, or opinion pieces on certain aspects of urban agriculture. Beginning with simple texts and videos on urban farming and graduating to articles that tackle complex issues facing urban agriculture, it is possible to garner an understanding of this form of alternative agriculture that encompasses the practice as a whole while paying attention to place-specific nuances that may arise. While not all resources translated to a direct citation in this essay, each source informs the broader writing of this paper.

Findings, Analysis, and Discussion:

Students eager to learn about urban agriculture may enter a course such as this one with some preexisting knowledge of the practices and processes while others may have simply seen community gardens in their city and wanted to learn more. To accommodate all participants it is important to start with the basics of urban agriculture. What does urban agriculture entail? What do community members interested in starting a farm need to know about rules and regulations? What are the different types of urban agriculture? While definitions of urban agriculture vary by place and organization, urban agriculture is, at a general scale, an alternative form of (intensive) food production that aims to cut down on industrial agriculture processes by growing and distributing food within an urban area (University of California, 2017). With a heavy focus on minimized transportation of cultivated food, urban agriculture is a highly localized practice and for this reason a single city may have dozens of community gardens, beehives, or even chicken coops. By cutting down on transportation, communities not save money through urban farming but also create sustainable means of accessing fresh produce that may not have existed before.

The improved access to healthy food that comes with urban agriculture is one reason that the implementation of community farms and gardens is a common means of combatting food deserts (urbanfarming.org, 2012). Urban farming has the ability to bridge the gap between areas of concentrated poverty and the often-high cost of fresh fruits and vegetables. A common misconception is that food deserts are areas where people do not have access to any food whatsoever but more often these spaces have ample fast food options but no viable suppliers of foods with high nutritional values (Gallagher, 2011). The reason that urban agriculture has the ability to alleviate these problems is because more often than not urban farms and neighborhood gardens allow community members to regularly go home with fresh produce paying through work on the farm. As urban agriculture has grown in popularity, municipal governments have become aware of the many benefits of this alternative to conventional agriculture. Across the United States many state and local governments have passed legislation to establish urban agriculture in cities and towns. Governments and communities have worked fairly harmoniously to create policies that benefit the communities taking part in urban agriculture. One policy strategy that has proved to be quite popular throughout cities in the United States is the creation of incentive programs (Bridges and Shinkle, 2017). These programs vary from one urban place to another but all operate on the notion that many communities already have interest in urban agriculture and an incentive program encourages people even more to set up gardens, compost piles, and farmers markets. Cities see the widespread adoption of urban agriculture as a benefit to the metropolis because a network of community farms creates and enhances local food systems (Tornaghi, 2014).

It is clear that cities and communities alike are energetic about urban agriculture and its many benefits to society. Advocators for urban agriculture promote community gardens and

farms through a narrative of sustainability, equity, and access to healthy foods, but why is it that many marginalized communities continue to lack the consistent sources of proper nutrition that they desperately need? Sure, many impoverished communities in the United States have improved their local food systems by engaging in urban agriculture but the fact remains that this form of alternative agriculture continues to be dominated by the white middle class (Slocum, 2006). Many proponents of urban agriculture are the same people who encourage others to buy local and to steer away from highly processed foods. The problem with this is that many of these people are in economic situations that allow them to choose between food that is cheap but unhealthy and expensive but healthy.

Since produce from urban farms is oftentimes free to community members who assist in the growing process, what are the challenges that face urban farming in marginalized communities? Why is it that communities of color have fewer farms than predominantly white communities that are usually more affluent? The sad reality is that the systems of oppression that put marginalized communities in disadvantaged positions in the first place also act on these communities' ability to set up urban agriculture (Ramírez, 2014). Natasha Bowens, founder of The Color of Food, a directory for farmers of color, says that minority farmers consistently wait for financial support from the government. Conversely, more affluent, commonly white-dominated communities do not struggle as much to find funding to adopt urban agriculture. In fact, "When it comes to funding, black farmers receive about one-third or less than what other farmers receive" which often leads to the loss of land for these farmers of color (Bello, 2013).

Unfortunately, funding is not the only issue for poorer communities when it comes to implementing urban agriculture. In neighborhoods experiencing rapid gentrification, urban farms can actually be promoters of further gentrification. This phenomenon has been especially

noticeable in cities such as Washington DC, whose white population spiked 31 percent in the first ten years of the 21st century (Massey, 2017). A garden intended for neighborhood revitalization or beautification might receive funding to be built in a disadvantaged neighborhood, but if said neighborhood is going through the process of gentrification, the members of the community garden may tend to be new arrivals that do not suffer from food insecurity. While these people are likely well intentioned in joining a community garden or farm, in cities such as Washington DC the urban farm has become a tool that displaces needy communities rather than uplifting them and combatting food insecurity.

In designing a module for urban agriculture, it is critical to ensure that students are taught to recognize these processes and systems of oppression that inhibit marginalized communities from achieving food security. Important, too, for students to understand is that while general challenges such as funding and zoning exist across space, every city is unique and the challenges that one community faces may be starkly different from another community. Teaching urban agriculture using a holistic approach, it is possible for students to develop a base of knowledge about urban agriculture that can be applied more specifically to students' own local communities. This type of module would also include a section that reviews existing legislature on urban agriculture in the United States. The reason for including legislature case studies and for outlining successful urban agriculture policies is so students taking the course who might live in areas lacking government assistance for urban farms can work with others to enact legislation that incentivizes communities to set up gardens and farms (Reynolds, 2015). While an urban agriculture module would certainly discuss the challenges to urban agriculture at length, the overall objective of a module such as this one would be to empower and excite participants to set up urban agriculture in their communities.

The proposed course on urban agriculture would be structured into three modules. The three modules are outlined in the table at the end of this section (it should be noted that the topics and themes covered in each module would become more complex or challenging as the course progresses). By dividing the course into three sections and starting with the basics of urban agriculture, students would be able to take one, two, or all three modules and learn about urban agriculture at different levels. For those simply interested in learning about urban agriculture, the first section of the course would suffice, but for students more interested in getting involved and understanding urban agriculture in greater depth, full completion of the course would be recommended. The modules taught at community centers would be a combined lecture and dialogue format which would allow students to learn from and engage with their instructor. Ideally these courses would be taught in person in major metropolitan areas (with case studies and legislation lectures more specific to that city), but this module could also be available in an online form so people living outside of big cities who had interest in alternative agriculture could still receive information necessary for setting up urban agriculture in their communities. Offering this free course at community centers in cities as well as online, students could learn about urban agriculture in person or remotely. After completion of the three modules, students would be encouraged to get involved in urban farming whether that means joining local gardens and farms or proposing new policies and legislation.

TOPIC	GOAL
What is urban agriculture and what does it entail?	• Introduce and explain the various types and practices
What are the benefits and challenges of implementing urban agriculture?	• Outline urban agriculture's ability to fight against food deserts, improve nutrition, and bring communities together • Address issues surrounding funding,

	space, and membership
Urban agriculture today and tomorrow	• Introduce places where urban agriculture has been successfully implemented • Explore the challenges facing existing urban agriculture systems • Speculate about and plan for the future of urban agriculture

Conclusion:

The world population is becoming increasingly urbanized and with burgeoning city populations across the country and world come questions about food equity, access, and justice. Demographers, academics, and everyday city-dwellers have debated about the best way to feed a growing population and the jury is still out on the single best way to feed everyone, if there even is a best way. One form of non-traditional agriculture that could offer some answers to the questions surrounding a growing population, which has proved to be successful in providing fresh food for city dwellers and improving food security for marginalized communities, is urban agriculture. Urban agriculture is widely practiced but the intensity with which it is practiced could be improved. A proposed course on urban agriculture would tackle the pros and cons of urban agriculture and ultimately equip students with the necessary knowledge to implement urban agriculture systems in a conscious way. Mentioned earlier in this essay, urban farms and gardens – generally thought of as great relievers of food injustice, can actually perpetuate issues such as gentrification. It is the hope that a course such as this one would educate students to a level where they would be able to recognize the proper setting for urban agriculture and implement these systems in ways that benefit and uplift marginalized communities.

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How to enter alternative agriculture careers without familial ties or an industrial agribusiness education: A liberal arts curriculum

People, Agriculture and the Environment. Spring 2017

Anonymous

Introduction

This section will focus on how young people pursuing a liberal arts education can be encouraged and prepared towards farming as a career in the modern world without a traditional agribusiness education or family heritage. This is increasingly becoming an issue in the farming industry in the USA, because a greater proportion of farming is reliant on large scale systems run as big business either by agribusiness graduates or by those who have learned over a lifetime of working with their family, leading to fewer farms, bigger farms, and a reduction in farming as an industry per capita (Lobao and Meyer, 2001). This industry shift thus restricts the diversity of access opportunities for farming to the preferred method for the growing sector: agribusiness. Dan and Margaret Guenther, two CSA farmers from Common Harvest Farm in Wisconsin, believe that one possibility for students who do want to enter agriculture without a big business approach is to embrace small farm culture through internships and a liberal arts education based on philosophy and communication (personal contact, 2017; Dan Guenther, 2005). I aim to explore how this can be envisioned in a diverse and experience-driven curriculum to prepare college-aged students to prepare for careers in modern alternative agriculture by answering the sub-question: "*What liberal arts curriculum best enables entrance into alternative agriculture careers without familial ties or an industrial agribusiness education?*"

Research Methods

I have little personal experience in agricultural education, so I decided to spend as much time as I could learning directly from those who could share more experienced viewpoints: Dan and Margaret Guenther. I engaged in conversation several times with each of them and asked relevant questions to understand how the industry interacts with education and how they think an ideal curriculum would look. I also examined academic research and review papers regarding farming and education to broaden my perspective. However, I have tried to stick with the opinions of the farmers as my primary source of information, because this project could not be completed in enough time for me to accurately analyse enough literature fairly, to give me an accurate, widespread overview on the subject.

Findings, Analysis and Discussion

Dan and Margaret's Story: CSA culture as alternative agriculture

My first points of reference are the viewpoints of Margaret and Dan Guenther (personal contact, 2017). They gave me plenty of insight into how students can be well prepared to enter their realm of alternative agriculture in the form of Community Supported Agriculture (CSA), through telling me their story of entering it themselves. The main hurdle for them to enter farming without agribusiness industry and familial ties was how to begin in a flooded market. They did this by starting at a very small scale — growing food for friends and family. This worked off of a

subscription economy framework, where they have reliable income on prepaid plans from people who share a mutual trust. In fact, trust and small scale focus are two of the main traits which allowed them to enter the agricultural industry. Especially given their context in the ‘80s farm crises, where local economies of rural towns plummeted following the loss of farms to a greater national market, their CSA provided a secure local route to produce, which invited a community interest in their business, so each member played a much larger role with regards to local economic stability than with a traditional national market.

The culture which CSAs generated at this time varied greatly from the simple capitalist consumer attitudes towards large scale industrial farming. Dan and Margaret refer to this culture as “more than just veg”, meaning that members of CSA farms cared further than just the produce; they cared about the wellbeing of the farmers, the stability of their local economy, the complexity of ethical initiatives taking place over just the letter of the law regarding labels like organic and GM-free. This cultural shift amongst CSAs compared to traditional networks gave them an appreciation for the diversity of disciplines which alternative agriculture draws on — past the technical proficiency and economical organisation which lies at the centre of agribusiness education for large scale agriculture operations.

What one should understand to enter alternative agriculture

Dan and Margaret answered questions regarding the specifics of what a student should aim to accomplish during their formal education to prepare them for alternative agriculture, thus what areas of study a curriculum should aim to address. We started this by discussing the most

important lessons to learn regarding CSAs. They proposed the following lessons, for which I have summarised explanations:

CSA farms are easier to begin than industrial operations.

Many forms of alternative agriculture can be much more accessible to first-time farmers than big business operations. In Dan and Margaret's case, their CSA farm took much less capital to start up from scratch, predominantly due to the comparatively small amount of land, technology and workforce power required as opposed to industrial-scale farms.

Alternative Agriculture works on a range of diverse and unique economic systems.

Whilst commercial agriculture can easily be pocketed into the traditional economic systems widely studied in agribusiness degrees, alternative agriculture, as its name suggests, can be organised in many different unconventional manners. For example, CSA agriculture, which commonly works on a seasonal membership framework, provides a guaranteed income at the start of each farming year, which makes things possible that are not typically practiced in the dynamic supply business models of conventional farms. Likewise, although without guaranteed income, many organic operators incorporate totally different pricing due to unique price elasticities of demand, depending on their target market (Dimitri and Greene, 2000; Lin *et al.*, 2009).

Adequate experience on multiple farms is necessary to make a career choice.

Curriculums need to include adequate theoretical frameworks, practical experience and academic diversity. Margaret and I concluded that the most important way for a student to achieve this is to

have plenty of practical experience in the field they would like to enter. Therefore, interning at a farm should be one of the most important modules in any curriculum.

In "*Community Supported Agriculture as Public Education: Networked Communities of Practice Building Alternative Agrifood Systems*", Robert Wight (2015) examines a number of possible internship routes that students can take. One of these is the Turner Farm internship program in Ohio. The students there train for about 8-9 months, covered by a stipend, working activities such as managing their own field, running a farmers market and managing the farm's on-site market. The students are trained to operate mechanical and animal-driven plowing and cultivating equipment, to keep detailed records for organic certifications, plan for the entire season and follow Good Agricultural Practices (GAP) and Good Handling Practices (GHP). This is a particularly well-run internship program, since the students are guided through all the basics from starting seeds to building fences to more complex theory regarding farming practicalities.

In more controlled studies, students who participated in organic agricultural experiences whilst studying agricultural sciences increased interest in sustainable agriculture careers, understanding of sustainable agriculture and desire to pursue research in those topics (Grossman *et al.*, 2010). One critique of such programs in this study was that they seem to greatly improve understanding of how real farming relates to lab work, but do not so much for the reverse; how lab work is relevant to farming communities. Reeve (*et al*., 2014), describes how Utah State University has taken this theory on to campus, creating a student-run CSA farm to promote experiential learning for every newcomer to their pre-requisite-less intro to organic farming class, held every semester and summer. Regardless of how this experience occurs, it is fundamental to a student's progression through their education.

Students should understand misconceptions, public opinion and agricultural history.

Margaret was keen to discuss misconceptions about alternative agriculture that should be addressed within an education, whether theoretically or at a farm internship. These include idealism about small scale farming being easier, due to less land or a smaller workforce, and CSA models being an easy market due to guaranteed income or popular interest. However, through working on a small farm or studying them, one may realise that small scale farming is still farming; it requires a full commitment of physical labour every day. Additionally, CSAs frequently run into difficulties providing adequate engagement with their community and encouraging their members to actually cook all the produce they buy (or ration their shares accordingly). Students should also study policies related to traditional and alternative agriculture to understand agricultural history, market context and how labels like 'organic' are vastly misunderstood to mean ethical, small-scale and chemical-free, which are often not true.

Conclusion: The Curriculum

From the information I have gathered, these courses and experiences should prepare and inspire students attending liberal arts colleges to enter a career in sustainable alternative agriculture. They are organised with a learning theme on the left, corresponding to course suggestions and brief explanations for each.

Theme	**Course/Experience Suggestions and Benefits**
History, Theory	● Agricultural History

	○ Understanding farming in a US context ● Sustainable Behaviour ○ Psychological, philosophical and economic insight ● Economics of Agriculture ○ Overview of different business models
Communication	● English Language Course ○ Practice creativity in communication ● Business Communications ○ Learn methods of marketing and communicating with members/clients/customers
Natural Sciences	● Basic Physics ○ Mechanical fundamentals ● General Chemistry ○ Understanding of pH and reactivity ● Basic Biology ○ Understanding of cells and life systems ● Soil Ecology ○ Understand Soil biology ○ Understand local environmental impact
Impact Sciences	● Agricultural Geography ○ Understand the social impacts of agriculture and scaling perspectives ● Physical Geography ○ Understanding larger systems than just soil ecology ● Environmental Science ○ Understand environmental impacts at larger scales.

Experience	● 3+ Seasonal Internships on 2+ farms ○ Livestock Experience ○ Traditional and Alternative crop/land management ○ Marketing Practice ○ Diversity of experiences ○ Practice managing theories in real life

Whilst the issues regarding the inaccessibility of farming mentioned in this paper may continue to hold prevalence against the ease of starting an agricultural career, this curriculum can be used as a guideline to encourage those who wish to pursue a life in alternative agriculture to prepare themselves optimally for the transition.

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GEOG/ENVI 232

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"Agrarianism Cannot Occur in Isolation":

Educating Community-Supported Agriculture Farm Members

Introduction

As long as human beings continue requiring calories, protein, and nutrients to survive, the relevance of food to any and every person on earth will be indisputable. When humans shifted from a lifestyle of hunting and gathering food to one based on agriculture, human- facilitated food production became relevant to everyone. The connections between people and food systems are deep, intimate, dynamic, and remarkably complex. However, the growth of industrial agriculture and increased food processing has physically and intellectually distanced the average person from the production of the food that they consume on a daily basis. Relative to the beginnings of agriculture, far fewer people grow the food that they themselves consume, and people understand less about farming and from where their daily meals originate.

The question to which my research group is responding directly addresses the (rather generalized) intellectual distancing of people from food systems. It suggests the ability of education to close that gap, presenting a form of agriculture often referred to as alternative agriculture that departs from the ubiquitous industrial system (Cox. et. al., 2008). The question reads: *If you were to design a curriculum for students and non-students regarding food and farming, what are the key courses of modules you would include?* My individual sub-question that I have developed focuses on a specific example of alternative agriculture known as community-supported agriculture (CSA). It reads: *What can local farmers and community*

leaders teach CSA members (and potential members) to encourage a deeper understanding of the food that they consume, and what is the best way to do so? Answering this question requires an exploration of the true meaning of CSA, an understanding of the structures of CSA programs, and a consideration of the means of educating CSA members.

Research Methods

In this research project, I approach my subquestion in three different ways. The bulk of this project is grounded in a particular place, a CSA farm that operates here as a sort of case study. The specific farm is Common Harvest Farm in Osceola, WI, owned by farmers Dan and Margaret Guenther. Data were collected from a lecture and question-and-answer section led by Dan, from informal interviews of Dan and Margaret conducted in a group setting on the farm, and from observations of the farm itself. The Guenthers aided in the development of my group's research question and so have been an integral part of this research from the start. Their insights, opinions, and questions proved invaluable to my work. An analysis of the forms and literature that Common Harvest members receive upon signing up with the farm complements the data collection from the farm.

This reflection on Common Harvest Farm is supported by a brief analysis of the literature surrounding community-supported agriculture and food systems education in general. Finally, a brief review of the web pages of several other CSA farms in the Upper Midwest area round out the discussion.

Findings, Analysis, and Discussion

1. CSA means more than boxes of produce

Throughout our time spent with Dan and Margaret, the topic of the actual fruits, vegetables, and herbs that CSA members receive each week of the growing season did not come up often. Instead, conversation revolved around topics such as soil ecology, CSA structure and logistics, and energy inputs on the farm among many others. The discussion of energy usage on the farm was enlightening for me personally. Margaret explained that the farm installed solar panels three years ago that provide all of the electricity for the farm (personal communication, April 8, 2017). She said that, after the farm successfully implemented solar power, she told the members that "their greens just got greener when we flipped the switch". I am a member of another nearby CSA farm, and must admit that I had been one of those people who primarily thought of the farm as the static thing that filled my cardboard box up with kale and tomatoes every week. Margaret's words encouraged me to think about the aspects of the farm besides the plants that play important roles in the responsible production of my produce.

The Guenthers emphasized the importance of agrarianism, which relates to but extends beyond the simple production of food. The community aspect of local agriculture, land stewardship and environmental justice, the efficient recycling of energy and nutrients, and sustainability in a broad sense all contribute to their understanding of agrarianism (D. Guenther, personal communication, April 6, 2017). They described their approach to agriculture as friendly, to the environment, to the farm's members, and to the farm itself (M. Guenther, personal communication, April 8, 2017). These aspects add value to the food that they grow and encompass the spirit of CSA. For example, within the farm's membership contract, the Benefits of Membership are listed. Only two of the seven benefits mention produce, and they are listed as

the last two entries; the others include “direct access to the farmland and farmers who grow your food”, “you will help protect local farmland”, and “you have a personal involvement in a local effort to protect and enhance the environment”.

Other CSA farms echo the idea that CSA encompasses a holistic approach to agrarianism that extends beyond food production. Buttermilk Farms CSA & Folk School Retreat cites their mission as “restoring health and vitality to people, animals, plants, and the earth” (Philadelphia Community Farm, 2017). Similarly, Clover Bee Farm states on their website, “We farm to create a CSA that serves your health, cares for the land and creates connectivity” (2017). Research by Everson (2015) regarding informal learning in CSA showed that many individuals that joined a CSA did not expect a learning experience about alternative agriculture but nevertheless learned quite a bit. The farmers with which the researcher spoke expressed enthusiasm in sharing their knowledge about vegetables and about their farm and the values that motivate its practices. The concept of holism clearly matters to the farmers that support CSA, and as such are important for other people who wish to support CSA to know about and understand.

2. CSA means mutual trust

An important aspect of CSA for members to recognize is that CSA is a trusting relationship between farm and consumer. The farmers and members strive to understand and respect each other’s values and desires, and in doing so develop a sense of community. In Dan’s eyes, this two-party direct relationship rejects any need for a third party like an organic certification board to serve as a type of middleman in a conversation about trust (D. Guenther, personal communication, April 6, 2017). As a result, Dan does not consider it an issue that Common Harvest is not certified as an organic farm. Other CSA farms, including Clover Bee, are proud of their organic certifications and consider them important for communicating to

others that they are committed to sustainable growing practices. Opinions vary in terms of how meaningful a label of "organic" is and what the definition of the word actually is. I would argue that there is not necessarily a correct answer. More important than having concrete facts to share with CSA members is encouraging them to think critically about their relationships to the farm and the food systems in society and reflect on where trust is operating.

3. Members work too

The relationship between a CSA farm and its members extends beyond a solely capitalist interaction of a consumer paying a producer for a good. Along with the financial payment, members invest in the farm with the act of paying for a season of food upfront, sharing the risk of unsuccessful harvests with the farmer and with each other (M. Guenther, personal communication, April 8, 2017). Some farms encourage or require members to spend several hours each year working on the farm, pulling weeds or harvesting as a way to both connect with the farmland and help the farmers during busy times; one notable example gives members the option to pay extra for their shares in order to "opt out" of this work (Schnell, 2007).

During a "community conversation" hosted by Common Harvest, Margaret shared with the members in attendance that this past year was the first in which the farm did not sell all of their shares and finances would be challenging (M. Guenther, personal communication, April 8, 2017). Margaret explained that the members wanted to learn how they could help in the situation. In response, Common Harvest included a message in the next newsletter that called on current members to spread the word about their program and recruit new members to help support the farm. Bringing up these requests and requirements in advance with members can help establish honesty and clarity in the relationship in ways that benefit the farm. It is important to remember that this experience may not be universal. Janssen (2010) cites high member

turnover rates and a member perception of CSA as a purely economic activity as factors that can frustrate and exhaust CSA farmers. Nevertheless, it is at least a connection that CSA farmers wish for. Overall, the second and third findings of this section connect to a quote from Dan that serves as the title of this paper: “agrarianism cannot exist in isolation” (D. Guenther, personal communication, April 8, 2017). Only through communication and interdependence can agrarianism thrive.

4. Connections to educational theory

In hearing the Guenthers discuss their views of agrarianism and hopes for those who are interested in alternative agriculture, the concept of social and emotional learning came to mind. The Collaborative for Academic, Social, and Emotional Learning defines social and emotional learning (SEL) as “the process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary” to achieve five core competencies (2017). These competencies are displayed in the figure shown. They include topics related to the self (in red), topics related to connections with others (in blue), and responsible decision-making. SEL is a pedagogical framework that was originally designed for primary and secondary education in a school context and is most commonly employed in that way.

https://blog.remind.com/building-relationships-through-social-and-emotional-learning/

SEL can be viewed more generally as an approach to education of all types that promotes knowledge and skill development at the individual and communal levels, and looks at how those

developments affect decision-making and action. This approach could readily serve as an educational model that reflects and complements the agrarian model of food production. It sets us up to think about the individual motivations for deeper understandings of food systems, the locations of the individual in larger social contexts such as those food systems, and the agency (or lack thereof) when it comes to choosing how to engage with food and food production. One could even think of SEL as an agrarian model applied to education. The deliberate use of a pedagogical framework in educating CSA members would guide the educators, whether they be farmers or community members, to consider all three of these aspects of agrarianism.

Conclusion

Finally, we can put the pieces together and answer the research question posed in the introduction: *What can local farmers and community leaders teach CSA members (and potential members) to encourage a deeper understanding of the food that they consume, and what is the best way to do so?* The learning setting for this type of educational experience must be informal and comfortable. A lecture would be inappropriate for communicating desires for active engagement and open dialogue. As such, a course on CSA should look more like an informative discussion group. It is important for the CSA course to be accessible to any and all people who are interested in CSA and agrarianism. Therefore, a central, urban location (perhaps a community center or library) would accommodate those living in cities who do not have access to personal transportation. Ideally, a class would involve a visit to the farm, with coordinated transportation for everyone. CSA is often associated with middle- and upper-class families (Schnell, 2007). Making knowledge about CSA and agrarianism accessible to working-class individuals and families as well is a way to challenge that class barrier.

The informal, co-constructed nature of this learning experience is not suited for a highly structured pre-planned curriculum, but it would be wise for the educators (the farmers and/or leading community members) to have an idea of the important topics to address and the goals associated with those three topics. These topics and goals, generated with the help of the findings presented above, are:

Topic	**Goals**
The meaning of CSA	- Understand a holistic view of food production & land stewardship - Reflect on past and present (dis)connections with food systems
Mutual trust in CSA	- Begin to build trust with farmers - Consider compatibility between farming practices and personal food values
Member's roles in CSA	- Understand risks and economics of CSA - Plan to get involved at the farm itself if possible

As previously discusses, SEL serves as a useful lens through which to think about and teach these topics and connecting goals. Educators can encourage those in the class to reflect on how these topics relate to the self, connections with others, and responsible decision-making.

The subject of education regarding community-supported agriculture is an important one, and requires further discussion and study. On the academic end, a formal survey of CSA members regarding their motivations and desires for agricultural knowledge, akin to that of Cox et. al. (2008) but including a more diverse sample size representing multiple farms, would shed light on future hopes for alternative agriculture education. A questionnaire designed for those who do not express interest in becoming a CSA member, or those who were members but chose to move away from CSA, could also be enlightening. Grassroots efforts for informal research and community education on CSA also have great potential. We have many options available to us for further understanding what people know, don't know, and want to know about alternative agriculture, and the educational tools to refine and spread the narratives surrounding it.

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Chapter 4: What is the role of agricultural technology in constraining or facilitating alternative agriculture?

The Findings of Research Group 4 (Katie Jolly, Eliza Pessereau, Stephanie Martinez, Emma Maxtutis & Hazel Chew)

Katie Jolly
5/2/2017

With a little help from your friends: Community building through social media for alternative agriculture in the Upper Midwest

1. Introduction

Consumer interest over the past few decades has prompted the growth an alternative agriculture movement. The meaning of alternative agriculture is debated in the literature, but for this paper I define it as "characterized by a short production and distribution, integrating dimensions of spatial, economic, and social proximity" (Barbera & Dagnes, 2016). In essence: short and small. Although this movement began decades ago, it has seen a resurgence with the emphasis lessening "food miles" for environmental and social sustainability (Macias, 2008). Alternative agriculture has been commercialized into alternative food networks (AFNs). In this paper, I will focus on four types of alternative agriculture: urban farms, community supported agriculture (CSA), farmers markets, and community gardens.

Within the broad category of alternative agriculture and food networks, there has been a tendency in recent scholarship to distinguish civic food networks (CFNs) from Short Food Chains (SFCs) Short food chains focus more on environmental sustainability, while civic food networks take social sustainability into account more overtly, emphasizing the role that citizens play in reshaping and reforming the food system through active participation in their own network (Bos & Owen, 2016). When discussing AFNs broadly, the importance of community often comes up. Customers are referred to as members and success is measured through trust rather than the number of transactions. (Pennings, personal correspondence, 2017).

This paper will argue that dynamic platforms online facilitate community building for AFNs but that SFNs and CFNs use the platforms slightly differently. Additionally, I will argue that social media has changed importance of localness for communities around AFNs. I will first discuss the numbers of AFNs using websites, Facebook, Instagram, and Twitter. Then, I will discuss the different usage patterns within those platforms, distinguishing commercial from community-building efforts. I then will conclude by discussing further research and suggestions for alternative agriculture enterprises.

2. Methods

For this study, I used a mixed-methods approach based on a study of community building through online media in the UK (Bos & Owen, 2016). I conducted one semi-structured interview with Margaret Pennings from Common Harvest Farm, a CSA in Osceola, WI to get more in-depth information about technology use for AFN ventures in the Upper-Midwest.

In addition, I conducted a short study of AFNs in Minnesota to quantitatively explore their social media usage patterns. I semi-randomly collected a list of 47 alternative agriculture ventures[1]. Figure 1 below is a table of the breakdown of venture types. I used the Minnesota Grown directory of CSAs and farmers markets and Gardening Matters' directory of community gardens to select my sample. To collect a list of urban farms in the area, I searched "urban farm" on Google maps. For each venture listed, I collected data on their internet usage. Figure 2 below shows the type of data for each online platform.

Figure 1: Alternative Food Network types

Type	Number	Orientation
Community Supported Agriculture	11	CFN
Farmers Market	14	AFN
Community Garden	14	CFN
Urban Farm	10	AFN

[1] I am a strong proponent of open data, so would be more than happy to share my data and code that I used to analyze it with anyone who is interested. My email address is kjolly@macalester.edu.

Figure 2: Types of data collected for each venture

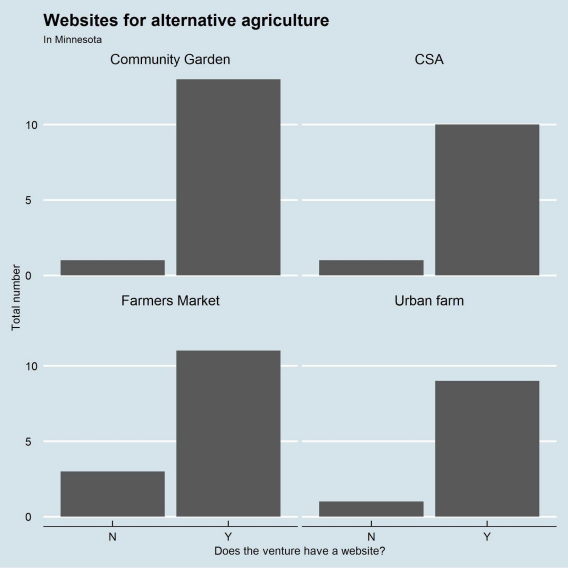
Website	**Facebook**	**Instagram**	**Twitter**
Do they have a website?	*Do they have a public Facebook page?*	*Do they have an Instagram account?*	*Do they have a Twitter account?*
	How many followers do they have?	*How many followers do they have?*	*How many followers do they have?*
	How many likes do they have?	*How many people are they following?*	*How many people are they following?*
	When did they create their page?	*How many times have they posted?*	*How many times have they tweeted?*
	How many check-ins do they have?		

3. Analysis

3.1 Websites

At first glance, there are some very interesting a telling patterns about social media usage for different types of alternative agriculture. Most ventures have websites, but there's a higher number of ventures without websites in the farmers market category, as pictured in Figure 3 below.

Figure 3: Websites

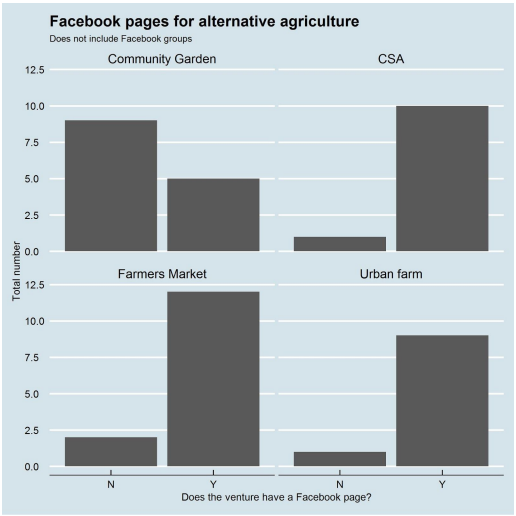


Many farmers markets are run through local government, and thus often did not usually have a website of their own. Usually, they had a featured page on the local government website. Sometimes the market was just an event on the calendar with little extra information (typically only day, time, and location). In those cases, I did not count that as a web page. Community gardens were also often a page on another website, such as a community network website. Because the nature of community gardens is such that people want more information like pricing and rules, so more space is necessary. Websites can be thought of as the first line of online presence. In a UK study, a CSA representative said that websites are "like a permanent shop front" (Bos & Owen, 2016). In the age of interactive media, though, websites are often not enough. They are one-sided and thus prevent dialogue.

3.2 Facebook

A platform like Facebook facilitates community-building in alternative food networks because it allows for and promotes dialogue on the page. It is also multidimensional in the ways people can contribute to the page, with both passive and active options. To contribute passively, people can "like" or "follow" a page to see updates on their timeline. More actively, people can "check-in" to a location or tag the business in a post of their own. Community members can also post a comment on the page, which is more informal and comfortable than sending an email or calling for many young people (a major demographic for alternative food networks). Figure 4 below is the breakdown of Facebook use.

Figure 4: Facebook

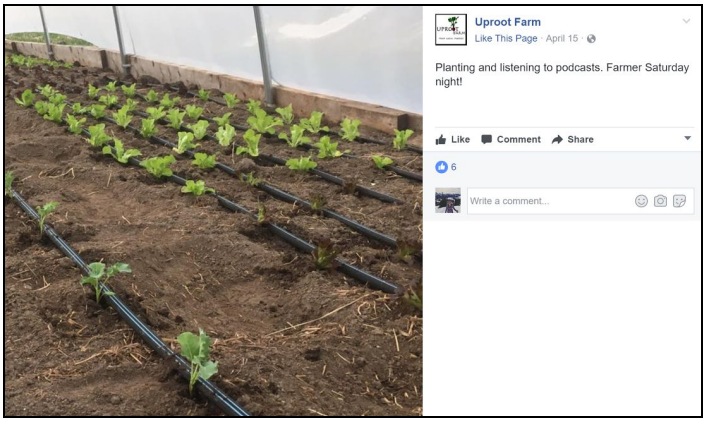


Community gardens are hyper-local forms of alternative agriculture, meaning that members of the garden almost always live in the immediate vicinity. They are often advertised via word of mouth or other community forums. Facebook in that case is not always necessary and that feeling comes through clearly in the large number of community gardens that don't have a Facebook page (but do have websites). They also might rely more on closed groups where only members can see posts and share thoughts.

Common Harvest Farm (a CSA) has been thinking about creating a private Facebook group for their members. Through community conversations, multiple members had expressed interest in a Facebook page for the CSA. It started to gain traction when one member volunteered to be the moderator for the group. "The discussion around this was about people being able to share ideas and pictures of what they were doing with the vegetables they got from the farm each week. It is going to be closed so that it is more about our community and specific to the members experience of being part of Common Harvest Farm" (Pennings, personal correspondence, 2017). The Facebook group will be an extension of their existing community, rather than a platform to extend the size of the community.

Other enterprises use Facebook to expand their network and in doing so, challenge the meaning of localness for alternative agriculture. Of the CSAs I used in my study, only one did not have a public Facebook page (Common Harvest was not included in the study). Uproot Farm is a CSA located in Princeton, MN. Their posts are mostly commentary about the farm and farmers, rather than promotional (Figure 5 below). CSAs tend to use their Facebook pages primarily for commentary, with occasional

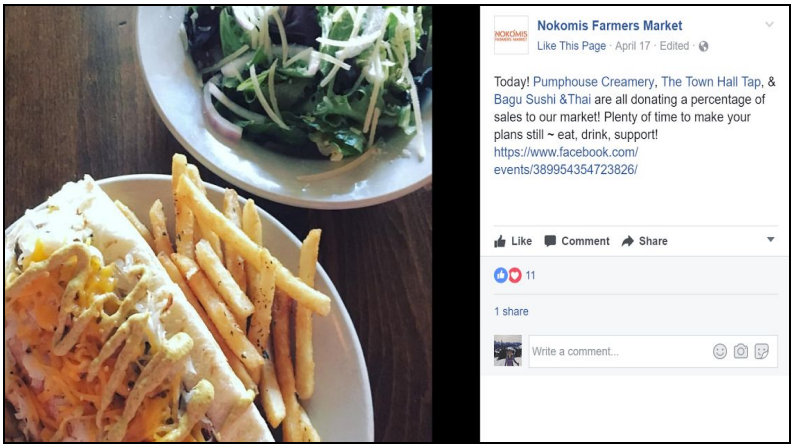
Figure 5: A post on Uproot Farm's public Facebook page



promotional posts featuring links to sign-up for shares. On the other hand, enterprises in the Farmers Market category tend to use Facebook for almost exclusively promotional purposes. This is likely because Farmers Markets don't foster the same community that a CFN like a CSA would. Farmers markets as an entity emphasize the shortness of the food chain, rather than community. The individual vendors are separate actors, and as such they may have their own social media accounts and behave more like CFNs.

Markets use Facebook to disseminate information quickly in an informal way. They often share popular press articles or customer testimonial. The Nokomis Farmers Market in Minneapolis is one such market. They often post articles about their market and share information about vendors (reference Figure 6 below). Some AFNs will also use Facebook in a promotional way that encourages active participation for followers. For example, some post competitions to caption photos, which maximizes exposure and promotion for the business in a fun and lighthearted way (Bos & Owen, 2016).

Figure 6: Nokomis Market's promotional post

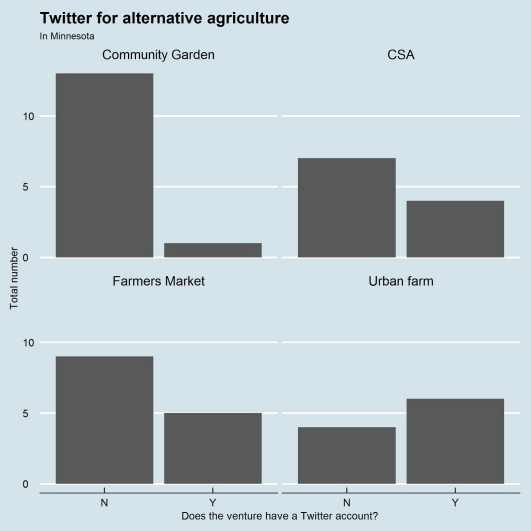


3.3 Twitter and Instagram

As an alternative to Facebook, some AFNs have embraced Twitter and Instagram for their concise messaging and popular appeal. Twitter has text-based posts while Instagram has image-based posts. The only category that uses Twitter more than it doesn't is urban farming. This is likely because younger and more urban people are more likely to use Twitter, (Duggan, et al., 2016). Urban farmers are

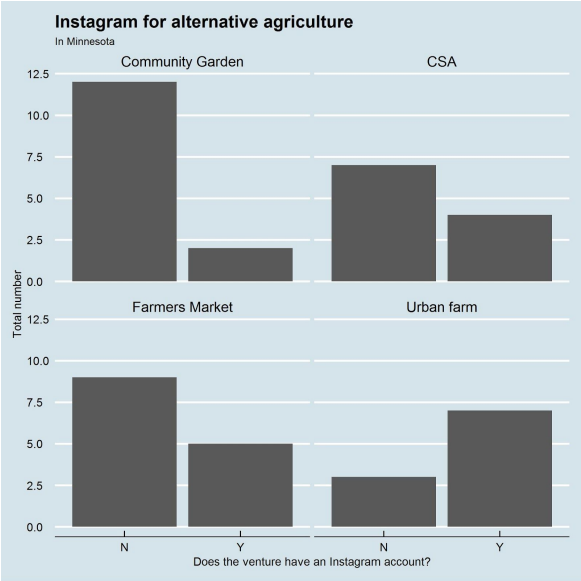
often young entrepreneurs driven by a commitment to social justice and see food sustainability as their way to contribute (Olimberio, 2017). One critique of Twitter is that it is more time-consuming that other platforms. One farm shop from the UK study noted "We have a Twitter account but... you have to make sure you're [tweeting] two or three times a day… whereas Facebook [we] manage two or three times a week or a bit more if we are in peak season" (Bos & Owen, 2016). In Minnesota, Twitter is very popular for urban farms, only somewhat popular for CSAs and Farmers Markets and not at all popular for community gardens (Figure 7 below). One way to quantify the community type for Twitter especially is to calculate a ratio of followers to following. The idea behind

Figure 7: Twitter



this method is that if the ratio is approx. 2 or greater, the account is more promotional. If it is approx. 0.75 or less, then it is more communal (and meant to foster conversation). If the ratio is in between, it's hard to put it into a discrete category so a content analysis would be necessary for any classification. I will apply this method to Instagram as well, although Instagram does not lend itself well to discussion because followers can only interact by commenting on a posted photo. In general, usage patterns for Instagram mirror the Twitter patterns (Figure 8 below).

Figure 8: Instagram



The ratio calculations provided some interesting insights. The results are in Figure 9 below. I had expected that the CSA values would be closer to 1 for both ratios. However, these values are skewed somewhat by two very popular CSAs. If I were to improve this calculation, I would add a standard amount to the denominator to make up for the small numbers problem. The 50 would not affect popular sites, but it would decrease the effect size of small accounts where one extra follower or following account can have a large impact on percent.

Figure 9: Ratios

Type	% with Twitter	Followers/Following (Twitter)	% with Instagram	Followers/Following (Instagram)
Community garden	7.14	.53	14.28	.71
CSA	36.36	4.58	36.36	4.63
Farmers market	35.71	2.09	35.71	21.62
Urban farm	60.00	1.88	70.00	4.02

In general, the AFNs tended to use Instagram more promotionally than Twitter (according to my ratio model). Community gardens, arguably the most civic-minded of the AFNs, had ratios of less than 1 for both Twitter and Instagram, possibly reflecting their emphasis on community and aversion to social media use (when compared to other AFNs). Farmers markets also exhibited an interesting pattern: hugely disproportionate ratio for Instagram and only somewhat disproportionate ratio for Twitter. Twitter lends itself more to a discursive environment, but I would be interested in looking more in-depth at that pattern. For the most part, with the exception of community gardens, Twitter and Instagram were used more for promotional purposes. They likely reach larger audiences on social media than their food will reach in real life.

4. Conclusion

4.1 Localness

It is with the point about the reach of social media that we move into a conclusion. One of the most impactful outcomes of social media is the altering of "localness" in terms of AFNs. As previously stated in this paper, two of the core tenants of AFNs are that they are short and small, implying a certain degree of localness. With social media in mind, that definition is somewhat convoluted. The impact of an AFN can go far beyond their food through an online presence. When I spoke to a friend about her connections to AFNs online, she said that she liked feeling like a member of a community, even hundreds of miles away.

> *"Every weekend, a farm somewhere in America gets to take over the [Modern Farmer Instagram] account. Then… they post pictures of their farm and they talk about what they do and who they are, including their philosophy on sustainability and family-farm life. Sometimes, I feel inspired and I follow the farm account. Even though these farms are all really far away, I'm part of a community in some sense online" (Dobbyn, personal interview, 2017).*

Through interactions like this, AFNs can broaden their reach. While community gardens and farmers markets likely won't appeal to people outside of their immediate vicinity, many people like the idea of CSAs and urban farms and see them as part of a larger movement rather than a solitary entity. Thus, local becomes an idea rather than a distance measure.

4.2 Outcomes

From the study in this paper, we have seen that community gardens use social media the least and urban farms use it the most. This speaks largely to the impact of proximity and age-differences on presentation of an AFN to the larger world. A CFN like community supported agriculture uses Facebook more than Instagram or Twitter because Facebook lends itself well to conversation and community interaction. This study also did not include private Facebook groups, which as we have seen is a popular option for tight-knit CSAs. Hyper-local CFNs like community gardens likely don't find much need for social media because they rely more on community connections and word-of-mouth advertisement for gardeners. Websites were popular for all AFNs in the study, but less so for farmers markets. Additionally, AFNs that made the transition from Facebook to another platform (Twitter or Instagram) almost always used both. There were few AFNs that had a Twitter but not an Instagram account, and vice versa. There are likely perceived high barriers to entry (lack of knowledge or interest, primarily (Bos & Owen, 2016)) to making an account apart from Facebook but low barriers of entry between Twitter and Instagram. In general, Instagram was used as a more promotional site than Twitter, especially for farmers markets.

In all, social media should be embraced as a cheap, easy, and accessible platform for community building, as well as promotion. It has the capacity of reaching a wide audience, thus altering the meaning of local for an AFN. CFNs in particular should focus on platforms like Facebook that allow them to communicate directly with members. To build on this research, I would like to conduct a discourse analysis on social media pages to better classify promotional and community-building accounts.

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People, Agriculture, and the Environment

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Tilling: The Intersection of Technological and Biological Farming Methods

Introduction:

The traditional image of a farmer is someone who understands the land and the natural processes that are involved in producing a crop. However, as mechanization has increased in agricultural production this foundational understanding of nature has been traded for increased knowledge of technology, specifically in conventional agricultural practices (Reid, 2011). Since much of agricultural production in the United States occurs in the Midwest it is valuable to investigate the ways in which alternative farmers in this region are using technology differently from their conventional counterparts (Kirk, 2012). Tillage–a mechanized method for preparing soil for planting–is deeply central to the way technology is used in agriculture because every crop produced is grown in soil (Guenthner, 2017). I will be analysing how tilling technology is at once beneficial and disadvantageous for alternative farmers in the upper Midwest. I will first provide a brief introduction to soil ecology and its importance to agriculture as a whole, before supplying a definition of tilling and its applications to alternative agriculture in the upper Midwest. I will then discuss the drawbacks to tillage in relation to soil structure and soil organic matter, and finally I will examine the biological methods used by alternative farmers to combat these issues.

Methods:

Visiting Common Harvest with the class allowed me to gain invaluable understanding of how farms work, and helped me better understand the importance of the role of tillage in farming. In addition to the farm visit, I interviewed Dan Guenthner separately over the phone to get more specific information on his tilling practices at Common Harvest and his opinions about alternative farming and technology in general. I initially wanted to get the perspectives of several different types of alternative farmers in the upper Midwest, particularly urban farmers and Hmong farmers in the Twin Cities, however I was unable to get ahold of any of the farmers I called. Nevertheless, Guenthner gave me the names of several other Community Supported Agriculture (CSA) and alternative farmers in the region, two of whom (Mike Jacobs from Easy Bean Farm in Milan, Minnesota, and Alex McKiernan from Robinette Farms in Martell, Nebraska) I interviewed. It was useful to see how Jacobs' and McKiernan's perspectives on tilling and alternative agriculture compared to those of Guenthner. To supplement information from the interviews, I used popular press articles and scientific studies.

The Importance of Soil Ecology in Agriculture

The ideal soil for farming has 50% solid materials (the soil particles themselves, organic matter, biological life) and 50% pore space to hold water and oxygen (Institute of Agriculture and Natural Resources, 2017). It is most beneficial to have soil made up of larger and smaller sized soil particles, which allow for there to be spaces between the particles (Guenthner, 2017). These large pores allow for the existence of biological life in the soil, which work with organic matter to maintain soil structure by holding together groups of soil particles, called aggregates (Institute of Agriculture and Natural Resources, 2017; Guenthner, 2017). This biological life

takes the form of soil microbes, which "contribute significantly to nutrient cycling and nitrogen availability" in the soil and facilitate plant growth by transferring nutrients to plant roots that the plants cannot obtain on their own (Mazzola, 2016; Guenthner, 2017).

Tillage and Alternative Agriculture

Before delving into the benefits and drawbacks of tilling in alternative agriculture, it is important to describe what tilling is, why it is used, and the general types of tillage. Tillage is the practice of mechanically breaking up soil, in order to make it easier to plant seeds and warmer for seed germination (Guenthner, 2017). This process is done mechanically using a plow pulled behind a tractor. While the primary function of tilling is to prepare soil for planting, it also serves as an effective form of weed control for perennial weeds (Guenthner, 2017). This is particularly useful to alternative farmers, who generally disagree with the use of pesticides on their farms.

There are a variety of different plows that can be used for tillage, each with different strengths. The moldboard plow, pictured below, is the most commonly used plow across North America. This plow is shaped like a wing and so as to leave no soil unturned (Robson, 2013).

Figure 1. Source: Farming Equipment Canada

Alex McKiernan, from Robinette Farms in Nebraska, has used a rototiller and a disker to till his fields, each of which work the soil differently: the rototiller uses motorized rotating curved blades to aggressively turn soil, whereas the disker uses

angled disks (McKiernan, 2017; New World Encyclopedia, 2015; Robson, 2013). The latter is useful for cutting through sticky or rocky soils, although the former does a better job of covering weeds because of its aggressive spinning (New World Encyclopedia, 2015; Robson, 2013). At Easy Bean Farm in Milan, Minnesota, Mike Jacobs uses a variety of tilling tools, due to the presence of different soil types on his 18 acres, and due to the array of crops he produces (Jacobs, 2017). Crops that are transplanted need only light tillage from a disker, or from a roterra power harrow, which works horizontally and does not invert the soil (Jacobs, 2017). For deeper tillage Jacobs uses a chisel plow, which loosen the soil down to 12 to 15 inches deep (Jacobs, 2017).

Figure 2. Source: Common Harvest Farm Visit

On the other hand, Dan Guenthner, of Common Harvest Farms in Osceola, Wisconsin, primarily uses a keyline plow (pictured above) created in Australia to allow Australian farmers to circumvent the main problem related to tillage and tilling technology: loss of soil structure (Guenthner, 2017).

The Problem with Tilling

The act of mechanically, and often intensely, inverting soil "has a major effect on soil organisms, heat and water flow, and the position and types of organic matter accumulated in the soil" (Lutche & Schillinger, 2016). The main issue is that this inversion of soil disrupts natural soil structure by breaking up healthy soil aggregates of heterogeneously sized particles (Guenthner, 2017). This action breaks bonds between the particles formed by soil organisms and

organic matter, creating uniform size particles and minimizing the amount of space available between the particles for water and oxygen (Institute of Agriculture and Natural Resources, 2017; Guenthner, 2017). When oxygen is lost soil microbe activity decreases, which prevents the plants from obtaining the same nutrients from the soil, thus reducing the quality of the crop (Duiker, 2004).

Many studies have been done observing levels of soil organic matter, specifically nitrogen and carbon, between conventional tillage and no-till practices on soil. Loss of organic matter and soil structure is correlated with long term tilling, and "the magnitude of these effects depends on the intensity of cultivation, in particular the type and frequency of tillage" (Beare *et al.*, 1994). Soil organic matter is generally protected from decomposition by clay minerals and soil aggregates and remains in the soil for 10-15 years, however when the soil is disrupted organic matter decomposition is sped up (Jones & Donnelly, 2004).

It might seem like the simple solution to these issues would be to stop tilling altogether, and that approach is possible for conventional industrial farms (Moseley, 2017). However, alternative (primarily organic) farms rely to an extent on tilling as a form of weed control, as opposed to the application of chemical pesticides used by industrial farms (Moseley, 2017). When asked why he prefers tilling to no-till, McKiernan replied that because Robinette Farms would like to become certified organic, they use tilling to get rid of weeds instead of resorting to using herbicides (McKiernan, 2017). However, while alternative farmers are reliant on tilling, they often recognize that some methods of tilling are less aggressive than others, and that there are biological methods to solve problems related to tilling.

Biological Solutions to a Technological Problem

While it is not necessarily a problem with the technology used for tilling, the use of tilling technology creates a problem for soil, and the organisms that rely on the soil. The primary way to prevent the disruption of soil structure and its consequences is to reduce tillage, or, in the case of alternative farmers, reduce *aggressive* tillage. Earlier I spoke of Dan Guenthner's Australian keyline plow; Guenthner's plow allows him to naturally break the bonds between soil particles without disturbing the soil's structure (Guenthner, 2017). McKiernan, as mentioned earlier, currently uses a rototiller and a disker, however he hopes to transition to primarily using a power harrow, which is much less aggressive because it does not actually invert the soil (McKiernan, 2017). At Easy Bean Farm, Jacobs has already been using a power harrow for that exact reason, and while some of his crops require rototiller tillage he states that his goal is to leave the soil as intact as possible (Jacobs, 2017).

Aside from changing the technology used for tilling, alternative farmers use a variety of biological techniques to retain soil structure and soil organic matter. Dan Guenthner in particular has a fascinating use for daikon radishes: instead of harvesting the radishes, he allows them to decompose in the soil and leave large holes. These holes eventually fill with water, which then spreads throughout the soil–a natural form of tillage! It is not uncommon for alternative farmers to use one crop as a means of preparing soil for the production of another crop, which usually takes the form of cover cropping (Guenthner, 2017). A cover crop is planted to prevent nutrients from descending lower into the soil while commercial crops are not being produced (Guenthner, 2017). When the cover crop decomposes it returns the nutrients to the soil, to be readily available for the next crop that is planted (Guenthner, 2017). The use of winter cover crops, such as

rye–which McKiernan uses–and hairy vetch, not only build up soil quality, they reduce weed density as well (Leavitt *et al.,* 2011). For these reasons, the use of winter cover crops has often been coupled with no-till agriculture (Leavitt *et al.,* 2011). However, this "presents unique implementation challenges in cool, northern states where growing seasons are short and low soil temperatures can reduce crop growth," which is where tilling becomes convenient (Leavitt *et al.,* 2011).

In addition to using cover crops, alternative farmers make extensive use of natural (as opposed to synthetic) fertilizers. A study done at Kansas State University compared the levels of soil organic matter in no-till and conventional till soils, with either manure or synthetic ammonium nitrate, and found that the highest levels of nitrogen and carbon were in no-till soils treated with manure (Mikha & Rice, 2004). Both Jacobs and McKiernan stated that they primarily use compost, manure, and green manure (dead plant matter) as forms of natural fertilizer, while Guenthner uses pellets made of compressed feathers. Although tilling causes the loss of soil organic matter, this effect can be offset by the "quantity and quality of fertilizers and organic residues returned to the soil" (Beare *et al.,* 1994).

Conclusion

Questions related to tillage are important for alternative and organic farming because many alternative farmers are focused on not only producing food but doing so in a manner that is modelled after how nature works. Each of the farmers I spoke with admitted the flaws to their tilling practices, whether they were using a rototiller, disker, power harrow, or keyline plow, and recognized the place of biological rather than technological methods for solving technological problems related to tilling. The techniques used by alternative farmers to return organic matter to

soil, such as cover cropping and applying natural fertilizers, are well-supported in literature as well as in practice.

Humans put an amazing amount of effort into creating new technology to make agricultural production easier. However the solutions to our problems often exist in nature, a fact that alternative farmers realize and take advantage of. It would be advantageous for all people who are connected to the agricultural food system if a policy were put in place to provide farmers–alternative *and* conventional–with a class or module that would introduce them to a more wholesome way of interacting with the soil and to the practical applications of biological approaches to agricultural problems. Looking forward, new innovations should come not from new machines and tools, but from observing our ecosystem and taking note of how we can model and take part in natural processes, not only for our own benefit but for that of our surrounding nonhuman community.

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GEOG 232
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Is there room for robotic/computerized technology in the farmer, land, people alternative agricultural triangle?

Society today unknowingly partakes in a collective envisioning of agriculture as a vast landscape of green, filled with animals grazing, a diverse array of crops, a red barn, and a country home. This idyllic image is that of a simple life, having little to nothing to do with the technology that dominates urban cities. At least this is the image that Farmville would have us imagine, when through a virtual world each of us partook in the imagining of farming. However, if we simply took a drive through rural America, we would find that the farming of yesterday is no longer the farming of today. Technology plays more and more of a larger role in agricultural production. As a result, the food that we eat today, is far more likely to have been grown in a large-scale monoculture industrial farm that treats agriculture as a business rather than a relationship with nature. In this case, it would be far more likely to find mechanized or computerized tools than the simple country life we would imagine. As modernization places more and more of an focus on advanced technology implementation, and since robotics is a key technology of the 21st century, it is important to start teasing at this relationship in order to determine what the future of alternative agriculture in the midwest will look like and if we as a society are happy with that vision. Consequently, this paper uncovers some of the contentions with technology innovation to examine the extent to which technological innovations (specifically robotics) can fit into the future of alternative agricultural practices, and not be at the detriment to the human environment relationship. I will do so by specifically looking at one technology of the future: the unmanned aerial vehicle.

First, I will begin by briefly discussing my research methods and then move onto giving an overview of the human-environment interaction discourse, drawing largely from Cronon. Then, I will highlight the UAV as a future technology to contextualize my discussion. Then, I will move on to breaking down the points of contention within the role of technology in farming discourse, revealing the sentiments of farmers involved in alternative agricultural practices.

Methods

For the purpose of this study, I turned to the broader scholarship, specifically within the popular press, on robotic or computerized technologies in agricultural farming. Our course also had a class visit to Common Harvest Farm in Osceola, WI, where I talked to Dan Guenther about robotics on the farm, which fueled my reasoning behind this topic. This study draws largely from Cronon's perspective on human-environment interactions. To supplement these findings, I also held brief unstructured interviews with two farmers practicing alternative agriculture: Mike and Alex. These farmers were asked the following questions:

> Do think young farmers are more reliant on technology as opposed to older farmers?
> Would you be willing to start implementing some more mechanized/robotic agricultural technologies on your farm? Why or why not?
> Where do you see farming going in the future?
> Do you think using more technology will decrease your connection with your land?
> Why do you use the form of technology that you do?
> Should technology replace human labor?

All of these questions are meant to unravel ways in which relationships between technology, humans, and agriculture can coexist without the expense of the other.

Humans, Nature, & Farming Background

The connection between humans and nature has been a murky, contentious one. The most notable scholarship within the human-environment interaction discourse is Cronon's "The Trouble With Nature or, Getting Back to the Wrong Wilderness." According to Cronon,

agriculture is framed as “the human fall from natural grace,”it is the cause of the disconnect between humans and the natural environment (1996). Consequently, because of agriculture’s historical role in causing this disconnect, Cronon believes that “the farm becomes the first and most important battlefield in the long war against wild nature, and all else follows in its wake,” (1996). Basically, within agricultural practices, the level and quality of human-environment interactions is foundational for the way all of society interacts with the nature. In other words, the future of farming will set the stage for the future of all human-environment interactions.

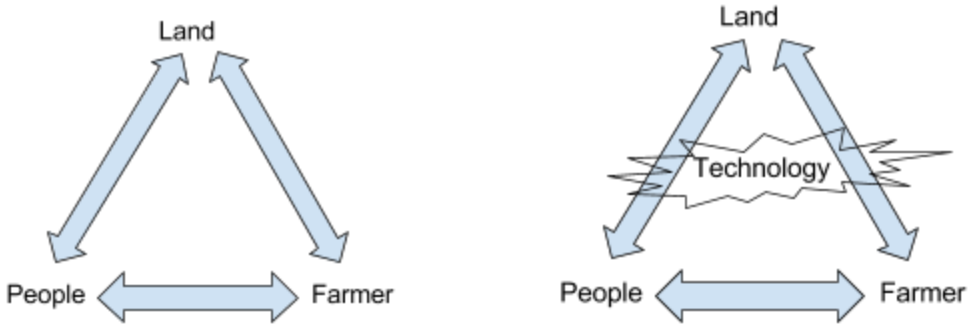
However, the duality between human and nature has been further exacerbated by the use of industrial and mechanized technology. A multitude of scholars, farmers, and scientists alike have attested to what they feel the future of farming looks like. Associate director of Carnegie Mellon University's National Robotics Engineering Center, Tony Stentz said, "In the next five years or so, we'll see robots out in the field [...] And they'll lose their novelty. To the farmers, it'll just be another tractor, with no one in the cab," (Sofge 2009). It is this specific train of thought, and resignation to the uncontested role of technology in the future, that has led many alternative agricultural practices to believe that technological innovations became the vehicle that drove a wedge between humans and the environment, transforming agriculture’s human-environment relationship to one of industrial yield-maximizing factories. An article in the Economist, speaks to this very point, stating,“Farms, then, are becoming more like factories: tightly controlled operations for turning out reliable products, immune as far as possible from the vagaries of nature,” (The Future of Agriculture, 2016).

Alternative Agriculture

Within alternative agriculture discourse the idea exists that with the implementation of more technology, the relationship between humans and nature becomes more and more distant. Alternative agriculture, encapsulating organic, small-scale, or community oriented farming places an emphasis on the human interaction with the land However, alternative agriculture is

often found to be synonymous with the farming of the old days when technology had no place. In a discussion, with Dan Guenther, an organic practicing vegetable farmer in Wisconsin, he posits that " [society] creates technological solutions to biological problems." Farmer Dan takes part of the CSA model of agriculture: Community Sponsored Agriculture where the land, people, and the farmer are interconnected and dependent of one another. This model is a representation of alternative agriculture interactions. Can this wedge that technology creates be ameliorated by the connection that is believed to exist between the the farmer and their own farmland in alternative agriculture?

Figure 1.



As Cronon puts it, "learning to honor the wild [...]means looking at the part of nature we intend to turn toward our own ends and asking whether we can use it again and again and again--sustainably--without its being diminished in the process" (1996, 25). If we are to find a middle-ground for innovative robotics and proper stewardship of resources, while maintaining the human environment connection, alternative agriculture is the best place to start finding where technology is appropriate.

The UAV Drone

To really ground this discussion, I want to use a specific example of a technology of the future: the UAV. UAV stands for unmanned aerial vehicles, or as they are better known, agricultural drones. These drones, "stitch aerial shots into a high resolution mosaic map," (Anderson 2014). These maps reveal patterns that can bring light to irrigation problems, soil variation, pest and fungal infestations in a time-series animation, tracking changes. These drones have the capacity to catch problems not visible to the human eye. The hope is that these drones will be able to determine the adequate levels of field inputs, to properly apply them to specific areas of the land (Anderson 2014).

As of now, engineers are still trying to workout the kinks in UAV. Engineers are trying to reconfigure the UAV operating range (how far they can go), flight times (how long they can go for), and payload capacity (how much they can carry) (Freeman et al. 2015). The current models that disperse adequate levels of fertilizer, water, and any other inputs could go for tens up to hundred thousands of euros (Marinello 2016). On the other hand, the simple camera drones could go for as low one thousand euros (Anderson 2014). In the US, the FAA bans commercial use of UAVs. However, policymakers are said to be prone to loosening UAV regulations for farmers, granted a growing interest in the agricultural community. The future US policy regarding drone use in agriculture, would attest to the shift toward data-driven agriculture (Freeman et al. 2015). Now, more than ever, it is essential to have these conversations about the appropriateness about robotics in farming, before regulations allow for them to be used.

Findings, Analysis and Discussion

Within the technology discourse surrounding alternative agriculture, three themes are the most pervasive: the costs of repair, the age dichotomy, and the technology treadmill. In order to address all of these issues, while economizing on space, I will touch very briefly on the first two themes, focusing more on the technology treadmill.

Fixing technology

Computerized technologies cannot be repaired by the average farmer because of their complex, mechanized nature. Therefore, fixing these advanced technologies require outside assistance, and can be costly. In an NPR interview with a farmer called Schwarting, Schwarting says, “Maybe a gasket or something you can fix, but everything else is computer controlled (on my farm) and so if it breaks down I'm really in a bad spot,” (Gerlock 2017). In this situation, with computer controlled tech, Schwarting has to call the dealer. The same issue presents itself within alternative agricultural. Dan Guenther attested to this dilemma when he admitted that he owns the tractors that he does because he has friends that can work on them. Other tractors are more computerized and would require more assistance. Perhaps, the future of farming technology will take a little longer to adapt to computerized technologies because of this critique, especially because the current UAV models can still stand to benefit from more tweaking. While not a groundbreaking point of contention, understanding why some alternative agriculture farmers would be opposed to advance technology can allow us to better determine the role of technology in the future.

Age dichotomy

In addition, farmers and studies alike like to play the blame game when it comes to technological implementation in farming. Through a perusal of popular press literature, there is a growing assumption that young, educated individuals are likelier to implement modern tools with agricultural production. MPR news interviewed a farmer named Brower, who stated that young farmers express more interest in technology (Anderson 2016). Similarly, Lasley, found that, “farmers who are younger farmers who are younger, better educated, with higher incomes and operating larger farms are the most likely to adopt innovative technologies. Consistent with these findings we hypothesized that age, education, income, and farm size would be correlated with farmers' reactions to some third-wave technologies,” (1986; 5). The stereotype that young farmers are the catalysts for computerized technology on the farm, places the future of farming

into young farmers hand. However, my discussions with both Alex and Mike, involved in alternative farming proved a different phenomenon. Alex claimed that newer diverse crops are likely to be used by younger farmers. Older farmers in the commodity-driven world are more reliant technology because they are far more driven by cost of production. This drives them to be more on the average large-scale commodity farm side of agriculture. Essentially, since the average older farmer is more technologic driven, they would be likelier to adopt UAVs. Whereas, the younger farmers are less likely to own large farms. Similarly, Mike felt that, while younger farmers are more social media savvy, he sees many young farmers in alternative agriculture that are trying to step away from the speed of technology. On the other hand, there are plenty of older farmers who are more likely to adopt because have the money to spend on new technologies like UAVs. Overall, there can be no wide overarching claim based on these discussions, because of the lack of statistical significance. Regardless, it is apparent that old farmers and young farmers play a role in the extent to which computerized technologies are implemented in the future.

The Technology Treadmill

Another issue that arises with attempting to be at the forefront of technology, and treating agriculture like a business where efficiency is crucial, is that technological boosts can be a never-ending trap. Dan Guenther highlights this concept referred to as the technology treadmill where first farm to implement new technology gets the economic boost, or added benefits, yet as technology gets adopted and the price of products goes down, farmers are constantly forced to look for the next cutting edge technology to cheapen inputs, rapidly create outputs, and make a profit. The low prices would force all farmers that want to stay in the market to adopt these technologies, regardless of how they feel about maintaining their human-environment connection. For this same reason, in Lasley's study of receptiveness of technology on the farm,

the least popular technologies were on-farm robotics (1986). The general notion is that they can be a hassle and are not really necessary.

In reference to this technology treadmill, when I asked whether or not Mike and Alex would be likely to adopt robotics in their practices, specifically UAVs, they gave very similar answers. Both believe price of goods in the agriculture market will be the determining factor. Price will determine production technology. Technology allows farmers to produce more cheaply. If, UAVs are widely adopted, in order to stay in the market, eventually alternative agriculture farmers are going to have to adopt these technologies. Regardless of this rationale, they both showed a great level of hesitancy about adopting robotic technologies like UAVs. Mike admitted, "I am caught between love for that stuff and a dread of it." This is because as a farmer, finding the balance between having a farm that is taking care of the ecosystem surrounding the farm, while also have it be a an economically viable practice is the biggest conundrum. Mike still wants to practice good stewardship, and minimize non-renewable resources. While he feels that robotics are super cool, in farming they hinder his spiritual connection to the land. Ultimately replacing work that he takes great pleasure in doing. So, with lots of resignation and sadness, Alex farmer stated they do not honestly see how they avoid implementing these more advanced, computerized technologies in the future. Both farmers do not want to farm from a computer, because it would mean having no connection to that land and therefore put at stake the proper stewardship of resources. When faced with the reality that costs drive production to be more expensive, they believe they will have to adopt more technology. However, Mike has hope that there is room for sustainable, computerized technologies like UAVs in the future of agriculture--with moderation. He stated that:

> Just because I don't want do something does not mean I do not think it has a place. I don't think organic is a retro notion [where farmers live without technology]. The goal for the future should be to take the best of what we know now, and apply it to

> what we have always known. I can't imagine people who develop systems who still feel in touch with land, using robots. I can't imagine it, but that doesn't mean it doesn't exist.

Though UAVs still have some time until they are accepted on the market, there is time to make more farmers and engineers aware of the repair costs associated with new robotic technologies, the importance of human-environment interaction, the age dichotomy stereotype, and the technology treadmill. If more stakeholders understand what is at stake, perhaps they could work to find sustainable robotics that do not force small-scale farmers into a corner.

Conclusion

To simply google the word "farm" results in images of idyllic green fields, red barns, and blue skies. In a stark contrast, "industrial farm" in a google search yields images of landscapes dominated with factories and pollution. Alternative forms of agriculture, like small-scale organic farms or community supported agriculture, are the perfect medium to test sustainable forms of technology that will not be at the expense of the human-environment relationship. Ultimately, this paper explored the contentions behind technology on the farm to envision the extent that computerized technology fits into the future of alternative farming. Of course, due to a variety of limitations, time, resources, and space, I was not able to touch on all aspects of this discourse. I am happy that my peers have been able to touch on the labor and education aspect. Overall, finding the middle ground between treating agriculture as a business venture as well as a relationship with nature is very complex. Yet, with modernization, and robotics as a key tech in the 21st century, it's hard to see a future without the use of these tools. The only recommendation I have based on these discussions, would be to raise more awareness and increase the studies surrounding these drones to measure their ecological impact and whether or not they are truly sustainable. This should definitely be done, before policies start being more

lenient on UAV use in agricultural practices, so farmers can maintain the human-environment interaction.

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GEOG 232
Alternative Agriculture Paper
5/4/17

The History of Agricultural Technology in the United States with a Focus on the Upper Midwest

Overarching Question: What is the role of technology in constraining or facilitating alternative agriculture?

Subquestion: How has farming technology changed over time and thus changed the nature of farming and food production? What can we learn from the history and development of agricultural technology, and how could such knowledge be useful today?

Introduction

The development and evolution of agriculture has played a vital role in the formation of human societies. Agriculture is what allows us to stay in one singular place for any significant period of time. As the case with the advancement of anything, as agriculture advances and progresses, the techniques once used shift out of practice. First came the plough pulled by a horse, then the mechanized tractor, and so forth. Technology now plays an integral role in food production in agriculture, and advances in farming technology offer many newfound possible solutions to current issues. However, I am interested in looking at the history and evolution of agricultural technology in the Midwestern United States and how the development of new farming technology has changed the nature of food production. As farming technology has evolved, food production has become more centralized and mainstreamed. Today, alternative agricultural trends toward traditional agricultural practices, with focus on human labor and the use of hand tools. In this paper, I am going to detail traditional agricultural technology in the context of the upper Midwest and how it has evolved over the years. I am going to describe how new innovations in agricultural technology has changed farming, and why alternative agriculture today tends to dismiss current agricultural technology. We often lose sight of where our food

comes from and how it is produced, and I think that it is important to investigate how our current method of food production, and the technology used, became mainstreamed.

Research Methods

I spoke with Dan Guenther at his farm about his knowledge on the evolution farming technology. He provided me with some books that greatly describe the evolution of farming technology, especially in regards to the Minnesota and the Midwestern United States. I have also utilized many online resources, including articles from academic journals and popular press. There is much literature available on the history of farming in the upper Midwest, which has been very helpful in detailing the evolution of agricultural technology. I have also used information provided to our group from Dan Guenther about his own personal knowledge on the topic of the history of agricultural technology.

Findings, Analysis, and Discussion

Agriculture in the United States was first practiced by Native Americans long before European settlement. Native Americans developed and perfected many agricultural techniques that are still in practice today. In the 1600s and 1700s, many Native American tribes moved into the Midwestern United States because of displacement by European settlers. The French were the first European settlers to come to the St. Croix area, and ultimately most Native Americans in the area were forced to move even further west (Andersen et al., 1996).

The first farming to take place by European settlers in Minnesota occurred around 1820 near Fort Snelling and the Red River. Other farms in the Midwest area were established around this time. Farms established after these were usually located near rivers or waterways as roads were not a viable means of transportation in the early 1800s in Minnesota and other Midwestern locations (Granger & Kelly, 2005). Early farming technology in the area consisted of hand tools

and relied on difficult human labor. The axe and hoe were typical farming tools of the time (Hoffbeck, 2000). They were effective farming tools, but required much time and labor to use on an entire field. Plows pulled by oxen and mules provided minimal relief from the hard labors of the farm. Barns were not yet commonplace for housing farm animals - they were usually kept outside (Granger & Kelly, 2005).

In the mid 1800s, hay making was an integral part of farming in the upper Midwest. Hay was needed to feed cattle that was used for meat. An early tool for making hay was the scythe. Some farmers could cut a foot swath of hay at once. A scythe had a long, sharp, crescent-shaped blade with a curved wooden handle (Hoffbeck, 2000). The scythe, along with the axe and hoe, was the main early farming tool in the upper Midwest. These early farming tools are now coming back into the popular sphere, as alternative agriculture today often focuses on hand tools and physical labor.

In the upper Midwest, wooden plows were important tools for early farmers. However, the rich soil of the Midwest stuck to wooden plows, rendering them fairly inefficient (Bonney, 1981). In 1797, Charles Newbold of New Jersey built the first cast-iron plow. Then, 22 years later, Jethro Wood of New York developed a cast-iron plow with interchangeable parts, which required less human labor and animal power than earlier models (Cochrane, 1993). In the upper Midwest, however, the cast-iron plow could not cut through the dense soil and sod. In 1833, John Lane of Illinois revolutionized the plow for the Midwest by using a wood base with steel strips at the front. John Lane, however, is often lost in history, as he did not patent his invention. Just four years later, the more well-known John Deere, slightly altered Lane's design and exchanged the wood base for cast-iron, and the steel strips for a single steel piece (Cochrane, 1993). Deere then patented his design, and his plows became a staple tool for Midwestern farmers.

In the latter half of the 19th century, there was a technological boom in Midwestern agriculture. Horsepower, the actual power of horses, became a common means of powering machinery on farms in the Midwest. Many machines and tools were developed during this time to increase and expedite grain production while reducing human labor, including the combine, grain drill, and grain thresher (Cochrane, 1994). Power sources alternative to that of horsepower was also introduced. In the last decade of the 19th century, the steam tractor enjoyed a short-lived period of popularity in the Midwest. Steam tractors proved not to be all that efficient, as they were heavy, slow, and were prone to catching fire (Cochrane, 1994). This trend toward more and more mechanized agricultural tools proved to be telling of the evolution of farming through the next century. Farmers began to rely more on machinery than ever before, which came with many benefits, including greater yield sizes and less manual labor. However, with the introduction of mechanized agricultural technology, farmers also began to lose touch with the land.

Throughout the same time period, many innovations in technology not related to agriculture were introduced. These technological advances, including a more advanced and farther reaching railroad network, refrigerated train cars, and canning as an industry, ultimately allowed for farmers to expand their markets and increase profits (Cochrane, 1994). Farmers now were not limited by range or the inability to keep food fresh. By expanding their networks, farmers were able to increase sales, and in turn they could then increase their farm size and invest in new agricultural technology.

At the beginning of the 20th century, possibly the most significant advance in agricultural technology was introduced, that being the gasoline powered tractor. Unlike the steam powered tractor of the decade before, the gasoline tractor posed much less of a fire hazard to farmers in the upper Midwest. In 1901, Charles Hart of Iowa and Charles Parr of Wisconsin developed the

first commercially successful gasoline powered tractor. John Froelich of Iowa "is generally credited with assembling the first gasoline-powered tractor in 1892, [but] his invention possessed several failings: it was unwieldy and did not have enough horsepower to drag a plow" (Hudson et al., 2009, p. 174). Hart and Parr's gasoline powered tractor proved to be the first tractors available on a commercial scale.

Their tractors, manufactured in Charles City, Iowa, were especially well suited for the Midwest. Oil was used in place of water as a cooling agent in the engine, allowing for the tractors to run year-round. By 1907, the Hart-Parr Company in Charles City manufactured about one third of the world's gasoline powered tractors (Hudson et al., 2009). Two years later, in 1909, at least 30 companies were manufacturing gasoline powered tractors (Cochrane, 1994). Up until the introduction of the gasoline powered tractor, most agricultural innovations had relieved some of the harsh demand of human and animal labor, but both were still required in large amounts to accomplish some farming tasks. However, gasoline powered tractors required little to no animal labor and minimal human labor. With early gasoline powered tractors, an operator and two or three supplemental workers were needed to successfully operate a tractor. Within a decade, that number had diminished and only the operator was needed (Dooley, 2009).

The introduction of the tractor and the decrease of labor needed proved to be a defining factor in the evolution of agricultural technology and farming as a practice. Throughout the 19th century, the hours required to produce 100 bushels of corn steadily decreased due to innovations in agricultural technology. In 1830, 250 – 300 hours were required to produce 100 bushels of corn. In 1850, only 75 – 90 hours were required. However, following the introduction of the gasoline powered tractor in the early 20th century, required hours fell to just 15 – 20 (Macmillan & Broehl, 2003). The gasoline powered tractor allowed for less manual labor, less animal labor,

and less time spent farming. With the time required to grow and harvest crops much reduced from prior rates, farmers were able to increase farm acreage and produce more, which led to an increase in profits. As farm sizes began to increase, the number of overall farms in the United States began to decrease as farming became more consolidated (USDA, 2007).

In 1900, there were 5,739,657 farms in the United States, with an average size of 146.6 acres (Merriam, 1902). The upper Midwest contained almost half of the country's farms at the time, with 2,196,207 farms (Merriam, 1902). Over the next 100 years, largely due to the commercialization of the tractor, the size of farms increased, but the number of farms decreased. In 2002, there were 2,128,892 farms in the United States – less than the number of farms just in the upper Midwest in 1900. (USDA, 2002). However, the average farm size in 2002 was 441 acres, almost 4 times as large as average farms a century before (USDA, 2002). Just between 1997 and 2002, the United States lost 86,894 farms (USDA, 2002). The number of farms increased in the United States until the interwar period between World War I and World War II. At this time, the number of farms became fairly stagnant, and eventually began to decline (Sisson et al., 2007).

The standardization of tractor parts following its commercialization allowed for more widespread access to tractors (Cochrane, 1994). Before, tractors had been a costly investment, as finding replacement parts for specific models was very expensive. However, once parts were standardized, replacement was fairly easy and inexpensive. This shift allowed for the tractor to reach more farmers, and by the mid 20th century, manual and animal labor on farms was almost completely eliminated (Cochrane, 1994).

Following the introduction of the tractor, innovations in agricultural technology were largely focused on tractor improvements and the mechanization of other farm tools. Steel and

iron wheels were swapped out for rubber tires. Tractors became lighter, easier to maneuver, and could travel at faster speeds (Cochrane, 1994). At this time, plant breeding and hybrid plants also became topics of interest. Henry A. Wallace, who later went on to become the 33rd Vice President of the United States under Franklin Delano Roosevelt from 1941 to 1945, was a pioneer in the field of hybrid crop production. In 1924, Wallace created a corn hybrid called Copper Cross, which became the first hybrid plant to win a gold medal at Iowa State's Iowa Corn Yield Contest that same year (Hardesty, 1991). Copper Cross itself was not a commercial success, but by 1943 almost all of Iowa farmland was planted with hybrid plants (Hardesty, 1991). Wallace's innovations in hybrid crop breeding sparked a new age in agriculture, as biology and genetics were now integral aspects of farming.

Before the start of World War I, Fritz Haber developed the Haber-Bosch Process (which Carl Bosch later made commercially feasible, hence the name), which synthesized ammonia from atmospheric nitrogen (Croddy, 2001). This allowed for chemical weapons to be manufactured on a large scale for the first time – a defining aspect of World War I. Post World War I, however, the Haber-Bosch process was used for a very different purpose. During the interwar period and throughout World War II, chemical fertilizers increased in popularity, as ammonia and nitric acid could both be manufactured commercially (Hergert et al., 2015). Commercial chemical fertilizers then became staples on most farms.

As the 20th century came to a close, farming still was becoming more mechanized and dependent on chemical fertilizers. Agricultural machines became more powerful. Fertilizers became more potent and specialized. However, as the general trend of agriculture shifted in this direction, alternative agriculture trended toward the other direction.

Conclusion and Recommendation

Today, alternative agriculture focuses on manual labor and minimal use of chemical fertilizer and pesticides. In the upper Midwest, and across the United States, alternative agriculture closely resembles farming of the past. There is a focus on natural processes without the addition of chemical or technological inputs, which has paved the way for the organic movement of today. While agricultural history is perhaps not a topic that warrants a typical recommendation, I recommend that we reflect on farming practices of the past and explore how agricultural technology has evolved. We can learn why farming has developed in the way it has, how different methods differ from one another, and the pros and cons of each. Looking back at our past is an important practice in any field, but in agriculture it proves to be especially important as we can learn much about how and why food is produced in the way it is, and how we can better its production in the future.

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Question #3: What is the role of agricultural technology in constraining or facilitating alternative agriculture?

Sub-Question: What are the role of organic pesticides in constraining and facilitating organic agriculture as an alternative form to industrial agriculture?

The Oxymoron of Organic Pesticides

Introduction

With increasing and rapid technological advancement in our world today, producing food has rapidly changed to implement these new technologies and expand into new ranges of alternative agricultures. In the upper Midwest of United States of America lies the Corn Belt, where large access of cash crops, including but not limited to corn and soybeans, are produced on large-scale industrial farms. Many different forms of alternative agriculture have been developed and experienced a rise in popularity in protest against the negative impacts of industrial agriculture. There are countless technological advancements implemented on and outside these alternative agricultural systems, such as solar panels, drones and social media that facilitate and constrain alternative agriculture.

Organic agriculture is a form of alternative agriculture whose values and practices opposes those of industrial agriculture by fostering healthy relationship and practices with the land and its community. While there are many other forms of alternative agriculture, organic agriculture should be further promoted due to its current wide support from both the top, through national organizations and government policies, and bottom, through farmers and consumers. Organic agriculture has experienced a 12 percent increase of domestic certified organic operations from

2014 – 2015 alone, and continues to be a rising industry both domestically and globally (U.S. Department of Agriculture, n.d.). It also allows for flexibility, in terms, of size and technological use, while still maintaining its values of giving back to the land and organisms more that what is taken, and providing healthy options for consumers (Oien, 2017). Minnesota is the state with the largest number of food co-ops in the United States, making it a perfect location to promote and increase support for organic agriculture (Riddle, 2017). However, the technological addition of organic pesticides is influencing the role of organic farming as a form of alternative agriculture in the United States.

Pesticides, one of the most influential technologies in agriculture, have found their way into organic farming. According to Environmental Protection Agency (EPA), the governing body regulating pesticides in the U.S., pesticides are defined as " any substance or a mixture of substances intended for preventing, destroying, repelling or mitigating any pests," and include herbicides to control weeds and insecticides to control insects (Beyond Pesticides, n.d.). The first introduction to the dangerous nature of pesticides was from Rachel Carson's book, *Silent Spring*, outlining the prevalence and harmful nature of synthetic chemicals in our food and farms (Carson, 1962). One major benefit of organic farming is to remove these synthetic pesticides. However, a new strand of pesticides made from organic materials and chemicals have been developed. Summer Set All Down Organic Herbicide was one of the newest organic pesticides to become approved and marketed for use on certified organic farms (Guenthner, 2017). The negatives of promoting and using organic pesticides overshadow the positives. While organic pesticides acts as a safety net to the organic industry, it contributes to a negative image of organic agriculture for consumers, due to its conflict with the core values of organic agriculture.

Methods

I collected data and information from all sources. I attended a pesticide forum organized by Beyond Pesticides, which contributed a lot to my understanding of organic agriculture and pesticide use. I interviewed Dan Guenthner, a farmer who practices organic practices on his farm in Wisconsin. The personal interview was useful in getting a clear idea of the opinions of the very farmers who produce our food. I also obtained information through websites of official national organization, such as OMRI and USDA. Other general sources, academic and non-academic, are found from databases and the Internet – many of which depicted the myths of pesticide use in organic agriculture. I also relied on pesticide information and views from *Silent Spring* by Rachel Carson, who introduced the world to the dangers of pesticides in our agricultural systems. The conclusions I came to, are extrapolated from the information I obtained through my research process.

Analysis

Organic farming is often associated with the use of no pesticides. However, this is a misconception (Britt, 2013; Foundation, n.d.; Porterfield, 2016; "Yes, Organic Farmers Can Use Pesticides," n.d.). According to United States Department of Agriculture (USDA) and the Organic Materials Review Institute (OMRI), certain pesticides are allowed on certified organic farms, but under strict and controlled rules and regulations. Approved pesticides have to undergo and pass regulations by the National Organic Standards Board and USDA, such as being non-toxic to the environment and made from naturally occurring substances, as well as, undergo review processes through data collection (Britt, 2013; Saun, 2017). These pesticides approved for organic farms are commonly referred to as organic pesticides. With increasing technology

and research into organically approved pesticides, as well as, the current weakening political power for the environmental movement and EPA, there will be shifts in the practices of organic farming, which have both positive and negative implications.

Organic pesticides were introduced into organic agriculture as a last resort method to control pest populations, and acts as a safety net to the organic industry and those involved. These organic-approved pesticides are important for protecting the farmers, the crops and the organic industry in moments of emergencies. Regulations dictate that organic pesticides be only used when all other methods have been exhausted (Britt, 2013; "Organics Materials Review Institute," n.d.). Other methods include cover cropping, crop rotation and tillage (Britt, 2013; Foundation, n.d.). When all those have failed, are organic farmers are allowed to choose from a list of USDA-approved pesticides (Britt, 2013; "Organics Materials Review Institute," n.d.; Saun; 2017; "Yes, Organic Farmers Can Use Pesticides," n.d.). These approved pesticides go through an extensive check, with follow-up inspections, that meets requirements including not persistent in the environment, and no environmental contamination during the manufacturing process (Britt, 2013). These highly regulated organic pesticides are a last resort, needed and used by organic farmers in order to prevent and protect devastation and complete loss of crops when all other biological methods of controlling pests have failed. Without these organic pesticides, organic farmers are highly susceptible to heavy damages, which can further lead to unpredictability and uncertainty in the organic business and fluctuations in prices of organic produce for consumers (Britt, 2013; Foundation, n.d.; Porterfield, 2016). Organic pesticides, with proper control and use, are beneficial to facilitating the survival and growth of organic agriculture as it provides a safety net.

However, the positive of organic pesticides fail to counter the negatives that organic pesticides bring to the organic industry. “Organic pesticide” is an oxymoron that creates a negative image of organic agriculture and produce, by destroying the very nature of organic agriculture of a healthy relationship with the land. Problems that arise with synthetic pesticides, such as impacts on other life forms through harmful nature of pesticides or through indirect means such as pollution, are also present in organic pesticide use (Carson, 2002; Guenthner). Regardless of its organic nature, organic pesticides still have the potential to encounter the problems of synthetic pesticides – disrupting nature’s cycle, causing pollution and failing, ultimately, to control the pests they were made for (“Yes, Organic Farmers Can Use Pesticides,” 2017). Other studies provide evidence that organic pesticides contribute to health problems, similar to those of synthetic pesticides (Johnston, 2008; Zaruk, 2015). The support for organic agriculture from consumers and producers are often due to better environmental and health implications than that of industrial agriculture. The foundations of organic agriculture lie in creating a healthy relationship with the land to provide healthier and ethical produce for consumption. Organic pesticides fail to support this foundation, and thus will hurt the organic industry as a whole due to a decrease in both consumer and farmer support. The negative image brought by organic pesticides, due to its failure to support the values of organic agriculture, would prevent the expansion of the organic industry and understanding of underlying benefits of the food it produces.

The positives of organic pesticides are overshadowed by the negatives, and if not explained and executed properly would harm the organic industry. With the already false image of organic as free of pesticides, it is even more important to educate and market to consumers and farmers alike on the foundations and values of organic agriculture and the role that organic pesticides

play in it. The first step to introducing and providing transparency into organic pesticides is to debunk the myth that organic equates to free of pesticides (Porterfield, 2016). Only then can organic pesticides be introduced and its importance and dangers be highlighted without causing a rift in opinions in consumers and farmers who support and advocate for responsibly grown organic agriculture and produce.

Conclusion

Like any new changes, there are negative and positive implications of organic pesticides on organic agriculture and other forms of alternative agriculture. On the trajectory we are heading, the future may see a divide in the views of organic agriculture – one side that favours pesticides for its ability to efficiently control pests, and the other side that are against pesticides due to its failure to support the values of organic agriculture. Therefore, to prevent a rift, it is important to educate supporters and non-supporters of organic pesticides on the purpose and values of organic agriculture, and ways to correctly and responsibly use organic pesticides when needed. Research should also continue in science labs and on the farms on the development of other technologies or methods to better control pests in order to reduce the need and use of organic pesticides, in which everyone will benefit from, especially in the long run ("Sustainability of Organic vs. Synthetic Pesticides," 2010). The rights and knowledge of consumers and farmers must accompany implementation of organic pesticides.

Implementation of organic pesticides in organic agriculture needs to be approached from both ends – bottom, through consumers and farmers, and top, through national regulations and political institution. Educating those who are farming and consuming organic produce, while upholding strict regulations at the political level will reduce these negative impacts of organic

pesticides, while at the same time, protect the organic industry and ultimately, reducing and eliminating the need for pesticides, organic or not, altogether. The future of organic pesticides and organic farming are still very uncertain. However, technologies including, but limited to organic pesticides, will definitely contribute to a shift in organic agriculture as we know it, whether by constraining or facilitating is still unclear.

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Chapter 5: Given that farm labor shortages are a recurring problem in many areas of the country, what are the major drivers of this problem and how might the situation be ameliorated?

The Findings of Research Group 5 (Kristi Wyrobek, Anonymous*, Elena Santarella & Ellyse Retana)

Internal and External Factors Shaping Agricultural Labor Shortages in the United States

Kristi Wyrobek

Historically it has been immigrants who make up the overwhelming majority of the farm labor pool in rural America. It has been the norm that both documented and undocumented immigrants of Hispanic origin, the vast majority from Mexico, were the mostly likely to fill the labor pool of the farming industry. This relationship was established because the agricultural industry is not highly profitable for the farmers, so they need to find cheap labor, and because immigrant workers are willing to take low wage jobs because something is better than nothing. Recently, however, this trend has shifted and there is a labor shortage in the farming industry; a shortage that many people see as urgent and likely to have dire impacts on farming in the United States. To investigate this issue we investigated the following question: given that farm labor shortages are a recurring problem in many areas of the country, what are the major drivers of this problem and how might the situation be ameliorated? To further focus the question I decided to ask, “what role does cultural isolation in rural America and increasing educational opportunities in Mexico play in the agricultural labor shortage across the United States?” It seems that the answer is overall very complex, but it can be boiled down to this: Mexican workers are dis-incentivized to work on rural American farms because the education and opportunities in Mexico are increasing, and farming jobs in the United States are a culturally/socially isolating environment.

METHODS

The information gathered for this project has come from several different sources: traditional scholarly work and publications, governmental reports, and time spent on Common

Harvest Farm. I attempted to conduct interviews, but I was largely unsuccessful because the farmers that I reached out to did not have a personal connection to the issue, or never returned my calls. For the purposes of maintaining a common frame of reference throughout the paper, I chose to only look at the Hispanic immigrant populations (people "of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race") and how this specific population deals with cultural isolation (USDA, 2017). So throughout the paper when I reference immigrants, I am referring to this specific group of immigrants. My initial information was collected through the visit to Common Harvest Farm, where we were given a comprehensive tour of the agricultural area around Stillwater Minnesota and the history of agriculture in the area. It was the stories that I heard on this tour that provided me with preliminary information about immigrant labor in rural America and the lifestyles that many farm hands lead. But clearly this was not enough information so I then turned to scholarly sources to gain a better understanding of the issue. I gathered my scholarly sources by using online search engines such as the Macalester college library and also academic search premier. I narrowed my sources down to the ones that were applicable to my topic by scanning through the documents and reading the abstracts. Once I had gathered my sources I read through them thoroughly and started to form my argument. It is the culmination of visiting common harvest farm and conducting traditional research that has lead me to complete this research project.

CULTURAL ISOLATION IN RURAL AMERICA

STATISTICS AND TRENDS

It is estimated that between one and three million migrant farm workers enter the US every year to find work on rural American farms in the dairy and vegetable/fruit industry. In recent years, seventy percent of crop workers have been of Mexican origin and half of these farm

laborers are undocumented. Males make up three quarters of the farm labor pool from Mexico and over half of all crop workers are under the age of 35. The immigrant population from Mexico who end up working on American farms or in dairy or meat processing facilities generally have ten years or less of schooling and also speak very little English (Martin, P et al, 2013, 13). Foreign-born farm laborers make, on average, a dollar less than their native-born counterparts: about $8.89 per hour as opposed to $9.89 per hour. Additionally, Mexican immigrant workers work more days each year than American farm workers; 200 days compared to 180 days. Mexican farm workers are unlikely to be offered health insurance through their employment and only one seventh of immigrant farm workers receive health insurance (Martin, P et al, 2013, 14) (See Figure 1). Between 1997 and 1998, 81% of all farm workers were foreign born, and 77% of all farm workers were of Mexican origin (U.S Department of Labor, 2000, 5). As of 2014, the total percentage of Mexican born farm workers in the U.S. had fallen to 68%, a ten percent decrease (U.S Department of Labor, 2016, 2). It is apparent that these trends are shifting, in terms of the sheer number of Mexican farm laborers hired in the United States, and this is all due to the issue of cultural isolation and access to better educational opportunities.

CULTURAL DIFFERENCES

Immigrant workers is the United States work very hard to sustain their livelihood, and they are often striving to provide for their extended family and to try to better the lives of their children. But agricultural work is not without its downsides. Farming families that live in rural areas in Mexico generally have access to a local “village” center or a cultural center. The presence of such a place helps to keep people and places connected and to restore a sense of appreciation for life and culture by sharing with people who have similar values. But rural

America lacks any sort of cultural cohesion for the Mexican community, leading many immigrant farm laborers to feelings of “alienation and isolation”(González, E, 2015). Such feelings of cultural isolation are not what immigrant populations need. It has been shown time and time again, that immigrants are happier and more successful when they are able to form communities and maintain a connection to their cultural roots of origin (California Newsreel). These tight knit communities help immigrants to create a cultural safety net, and also to foster a space where they are supported and happy. Rural farm workers do not have the same ability to foster community because of how spread out their community is and because most farm laborers do not have access to transportation. It appears that the cultural isolation and geographic isolation play a major role in dis-incentivizing farming jobs in America for immigrant labor.

It seems that “immigrants expand the cultural fabric of a community, but [they] are not always welcomed by people already in place”(WASAL, 2007, 9). Scholars have found that while Anglo residents are generally not openly disrespectful or aggressive towards Hispanic immigrants in their rural community, they do express sentiments which highlight that Hispanic immigrants are not a part of the community. They believe that since the immigrants are newcomers, they should be expected to conform and fit in (Sizemore, D. S., 2004, 353). A case study conducted in Appleton Illinois by David S. Sizemore of Trinity University found that despite governmental support for the increasing Hispanic population, the local community used language that was both enthocentric and paternalistic allowing them to “justify separation as logical and necessary”(Sizemore, D. S., 2004, 536). This mindset can be found across America, and one can imagine that as an immigrant worker it would be stressful and difficult to live in a community where you are viewed as an outsider until you conform to the culture and community of the place you are in.

The reality is that many migrant workers on American crop and dairy farms are undocumented, and this changes the access such workers have to governmental programs or even to the community. Undocumented workers are less likely to venture into the town or the leave the farm for fear of being deported. And often times, children of undocumented workers in rural areas do not attend school on a regular basis. Undocumented farm workers are a known but unspoken secret in the United States, they are essentially the "nation's invisible population" (González, E., 2015). But it seems that given the circumstances, there has been minimal response by rural governments to provide notable assistance towards immigrant families. Most immigrant parents have a strong desire to provide a better way of life for their children, but with the nature of migrant farm work children move often and have responsibilities on the farm and family that interfere with success (Green, P. E., 2003, 63). Based on statistics and research, immigrants who work on farms in rural America do no receive access to most American amenities and services, effectively separating them from society and isolating their community.

FARMERS' STORIES AND PERSONAL ACCOUNTS

It is not fair to claim that immigrant farm laborers are mistreated in all circumstances, they are often exploited but it is not always with malicious intent. Because Mexican immigrants who work on farms are such a hidden and disregarded population in the United States, it is often up to the owners of the farm to provide and show kindness towards their workers as they see fit. Many farm owners exploit their workers by paying incredibly low wages and expecting them to work long and tedious hours. But even in these circumstances, farm owners do show kindness towards their workers. For example, on a tour around Stillwater Minnesota I learned about the history of the farmers in the area. A farmer from Common Harvest CSA told a story of a farm where an entire family of immigrants from Brazil lived and worked alongside the Anglo family

that had owned the farm for generations. The farm was losing money quickly, and the farmer did not have enough money to pay the workers the wages they deserved. But he did take the time to set them up with nice trailers and a place to live on the farm. He even helped one of the couples to purchase land in their name. So, while it was not a perfect situation for all parties involved, it would be very unfair to claim that this farmer did not care for his workers and was only exploiting them. Because in reality, the farmer is exploited by the economic system of farming and to maintain some semblance of a livelihood he in turn must exploit his workers, to some extent.

INCREASING ACCESS TO EDUCATION IN MEXICO

A large piece in the puzzle of the decreasing farm labor pool in the United States is that quality of life, and in particular access to education is improving in Mexico. There has been a push in Mexico to provide improved and more comprehensive education opportunities to the population, and in particular to rural and marginalized groups (The World Bank, 2015). Recently, Mexico has achieved near universal coverage for preschool aged children and primary school students, an improvements that means most children are going to school and receiving and education. There is less improvement in enrollment in secondary education, but enrollment was around 47% in 2011, reflective of a 3.6% annual increase in secondary enrollment across the nation (OECD, 2013, 4). Furthermore, there has been an increase in the number of students who attend tertiary education (from 359,635 in 2005 to 475,584 in 2011) a phenomenon that is the result of new programs that make higher education more accessible and more affordable to residents. Studies have found that with increasing access to education, student's socio-economic background has much less of an effect on their likelihood to attend school and their success in a public school setting (The World Bank, 2015). Student performance in all subjects: math, science

and language have increased in the last several years, a testament to Mexico's new focus on education and policies that are directed towards increasing education.

To address the issue of unequal access to education in Mexico, the government has imposed a series of new policies and programs. A series of policy reforms were directed at universalizing the qualifications of teachers and the assessments used to measure student progress (OECD, 2013, 6). Most of the policies are directed at standardizing the system and providing greater access to marginalized communities. However, Mexico has created programs to help incentivize poor families to send their children to school instead of joining the workforce. Programs such as "Oportunidades," a cash transfer program, incentivizes poor families to send their children to primary and secondary school. Essentially, this program provides funds to poor families as long as they agree to enroll their children in both primary and secondary education (OECD, 2013, 6). The program has helped 6.5 million Mexican families, and is particularly helpful in providing education for girls (OECD, 2013, 7). The Mexican government improved access to tertiary education through their PRONABES program which sought to provide more financial assistance to poor and marginalized families and set up programs to help encourage secondary school students to enter into college (The World Bank, 2014).

With the new focus that Mexico has placed on the importance of education and bringing education to all people in all parts of Mexico, many families are choosing to stay home and work on local farms in Mexico with the knowledge that their children will receive a decent education with the new policies in Mexico. Furthermore, they are able to stay with their families and to maintain their culture without having to travel to a new country where they are unwelcome unless they conform to the ideologies of rural America.

RECOMMENDATION AND WAYS FORWARD

There is no simple solution that will fix the farm labor shortage in the United States, for it is a complicated issue that we are only just starting to address as a nation. And with the new rhetoric of the Trump administration against immigrants and in favor of the deportation of undocumented immigrants, it is likely that the issue of farm labor shortages will only increase in the coming years. So, while these recommendations may not be politically feasible in the coming years, I do believe that in order to incentivize immigrant workers to farm in rural America, governmental agencies and local county officials need to be responsive to demographic changes in their community and to respond in ways that help to support all members of the community. This means more support for bilingual school programs and programs that provide newcomers with access to health care. Additionally, community based programs that support cross cultural conversations would be beneficial in bringing new community members into the social circles of small town life without expecting them to conform to unrealistic cultural expectations. These community programs could serve as a place for long standing residents to share information with new members and for new member to ask questions to gain a better understanding of their new community. There needs to be a shift away from viewing communities as stagnant bodies in rural America, communities are meant to be places for conversation and the exchange of ideas between people of different cultural backgrounds and origins.

CONCLUSION

With a decreasing labor pool to fuel the American agricultural system, farms and farmers are in danger of failing. But with changes to the Mexican education system that have increased access and success across the board, many would-be immigrant farming families are choosing to stay in Mexico where their children can receive a decent education and grow up around family

and culture. Coming to rural America is culturally isolating for immigrant families, and particularly undocumented workers. Rural Anglo communities are not very welcoming to Mexican immigrant families and workers, and they express ethnocentric and paternalistic views towards the issue, suggesting that immigrants are outsiders until they conform to the mindset and culture of rural American society. Furthermore, living in social and cultural isolation is a hindrance to success and also leaves many people more susceptible to health related issues. Overall, it seems that the labor shortage in the American agricultural sector can be attributed, at least in part, to increased educational opportunities in Mexico which dis-incentivize workers from coming to the United States in seek of education, and also to the cultural isolation that plagues immigrant farmers in rural America.

Appendix

Table 2. US-Born and Foreign-Born Crop Workers, 2007-09

	All	US-Born	Foreign-Born
Demographics			
Authorized (%)	52	100	45
Male (%)	78	77	78
Average age (years)	36	37	36
High school & more education (%)	28	68	13
Speak English well (%)	30	97	3
Married (%)	59	44	65
Families below poverty income (%)	23	23	23
Families with welfare (%)	30	23	32
Follow-the-crop migrant (%)	6	1	7
Farm Work			
Age first farm job (years)	23	22	23
Average years of farm work	13	14	12
Directly hired (%)	88	98	83
>10 years current employer (%)	17	20	15
>4 farm employers past year (%)	1	0	1
FVH crops (%)	78	56	88
Harvest and post-harvest jobs (%)	45	27	52
Wages, Benefits, Future Plans			
Average hourly earnings ($)	9.13	9.74	8.89
Farm days worked, past year	194	180	200
Health insurance, current job (%)	18	26	14
Continue farm work > 5 years (%)	73	66	78
Find nonfarm job <1 month?	44	76	31

Note: US born were 29 percent of crop workers between 2007-09.
Source: DOL, "NAWS Survey," 2007-09.

Figure 1: US born and foreign-born crop workers in the United States

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Undocumented, unprotected, unappealing:

How labor and immigration policy has contributed to recurring farm labor shortages.

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Geography 232- 01

Macalester College

Spring 2017

Introduction

Donald Trump's election sparked fears of widespread labor shortages on farms. Industry experts, farmers, and pundits warned increased deportations and border security would shrink the farm labor market substantially (Bjerga and Laya, 2017). Indeed, American farm labor is predominantly performed by undocumented workers. Anywhere from 46% to 70% of farm labor is performed by undocumented workers (Haspel, 2017). This is not a recent phenomenon; migrant workers have supplied seasonal farm labor throughout American history. Considering the vital role of undocumented labor in American food systems, and considering recent anti-immigrant rhetoric, this paper will examine the farm labor shortage from the perspective of immigration policy and enforcement. I will argue failed American immigration and labor policy has failed to protect farm laborers throughout history, and current policy reflects these failed efforts. I will also show migrant laborers fail to receive sufficient labor protections, and, potentially as a result, immigration has decreased dramatically. Lastly, I will argue recent minor policy improvements must be extended at a broader level, while efforts for the broad formalization of the sector through immigration reform must be considered.

Methods

This paper draws primarily on news outlets for discussion of recent trends, perspectives from farmers and, when available, undocumented workers. Considerable analyses of recent immigration policy and farm labor shortages emerged in the popular press following Donald Trump's election, so these sources provide remarkably recent information.

Academics and policy scholars have written more extensively about historical immigration policy and farm labor trends. Intriguingly, a common debate is whether there is a farm labor shortage (Levine, 2009; Hertz et al, 2013). These analyses often consider the historical and economic causes of seasonal migrant labor to the United States.

History of migrant labor on farms

The United States has a long history of relying heavily on migrant and seasonal laborers, predominantly marginalized immigrant groups, who have historically received fewer labor protections. A large undocumented and unprotected workforce has emerged as a result of decades of failed immigration and labor policy. This section considers how farm labor and immigration policy throughout history has created a deep-rooted structure of reliance on a low-wage, unprotected workforce for record harvests and improved land prices.

Many agricultural systems rely on seasonal labor. Historically, seasonal labor was provided by the family unit, but the completion of the transcontinental railway in 1869 lowered transportation costs and promoted a shift toward labor-intensive fruit crops. The Chinese Exclusion Act (CEA) of 1882 was expected to reduce the labor supply of low-wage seasonal Chinese workers, who provided over 80% of farm labor (Yaya, 2017). However, waves of other similarly marginalized immigrants filled the vacant market. These immigrants received virtually no labor protections, and low production costs were instead transferred into the price California farmland, which gained value (Martin, 2002). As a result, landowners strongly opposed immigration or policy that would increase wages and depress land prices (Martin, 2002).

The dustbowl generated a new wave of temporary migrants and brought the United States to the precipe of radically transforming agricultural labor. Steps were drafted to "end… agricultural exceptionalism, the tendency to exclude agriculture from labor law protection," but the outbreak of World War II and increased mechanization created an acute farm labor shortage (Martin, 2002; Briggs, 2004). In response, the government began a series of guest worker programs, called Braceros, that temporarily admitted 4.6 million workers for seasonal farm labor over the next 22 years (Martin, 2002). Harvests and yields grew to historic highs in states historically reliant on migrant labor, primarily in the Southwest and California. While this growth is not solely attributable to cheap migrant labor, the increase would have been decelerated given more expensive labor; farm workers' wages rose from $0.85 an hour in 1950 to $1.20 an hour in 1960, slower than factory wages, which rose from $1.60 to $2.60 an hour (Martin, 2002). The Braceros programs were ended following widespread abuses of laborers and concerns that the working conditions, wages and employment opportunity of domestic workers were adversely affected (Yaya, 2017).

The conclusion of the Bracero program brought a period of improved wages and labor treatment. The United Farm Workers (UFW) successfully unionized agricultural laborers and bargained for substantial wage increases. Bolstered by popular support, the UFW lobbied for fines on employers who knowingly hired illegal workers and protested the use of illegal migrants to break strikes (Martin, 2006). By 1977 the non-farm wage gap narrowed; farm workers earned on average $3.53 an hour, 59 percent of the $6 average in California factories (Martin, 2006).

In 1986 Congress passed the Immigration Reform and Control Act, which imposing sanctions on employers who knowingly hired illegal workers, and established the Special

Agricultural Worker (SAW) Program to provide legal seasonal labor. The laws were loosely enforced, and the share unauthorized workers rose from 7% to 55% of the seasonal labor force by in the 1990's (Levine, 2009). By 2002, 99% of foreign-born new agricultural workers were undocumented (Levine, 2009).

Farm labor shortages have occurred throughout American agricultural history. Any shortages have historically been solved by recruiting marginalized social groups, who have received fewer labor protections. It should be noted that labor laws have failed to protect farm workers and domestic laborers, industries historically dominated by African Americans and immigrants (Yaya, 2017). Successive waves of agricultural workers, beginning with Chinese migrants in the 19th century, and moving toward Mexican immigrants in the 20th century, have failed to receive protections. This is reflected in their depressed wages and poor labor conditions throughout history.In turn, cheap labor has been converted into record harvests and high land prices. Political reform or meaningful enforcement of any policy has been scant, and received minimal support from growers or consumers. These historical structures are reflected in our current policy, the H-2A visa program.

H-2A Visa Program

The United States currently uses the H-2A visa program "for temporarily importing low-skilled workers, or guest workers" (Bruno, 2004). The program is generally considered burdensome and costly. This section will outline why the current visa program is ineffective at protecting workers, before discussing the implications of the policy.

The H-2A visa program is generally considered "expensive" and "tons of red tape" (Axtell, 2015). Domestic employers must first petition the U.S. Department of Labor (DoL) for certification that no domestic workers are capable of performing the work, and that their employment will not negatively impact the wages and working conditions of similar domestic workers (Bruno, 2010). The employer must subsequently petition the U.S. Department of Homeland Security for approval. Once farmers receive approval they must "pay $1,000 per worker to fly them to and from Latin America, guarantee them an average of 30 hours weekly over no more than 10 months, pay them at least $10.32 an hour (plus workman's compensation) and provide free housing" (Axtell, 2015). There is also an increased risk of wage-investigation from the government (Axtell, 2015).

As a result of the reliance on undocumented workers, the farm labor force faces considerable social and economic challenges. According to the DoL (2010), just 25% of farm workers held non-farm employment, and median income from farm employments was between $2,500 and $5,000. Three-fourths earned less than $10,000 annually (DoL, 2010). Just 10% of children from migrant worker families graduate from high school (Yaya, 2017). Workers also have virtually no resources if employers refuse promised work or wages, and could face deportation or arrest if they report abuses (Barth, 2017). Charles Rangel, the first African-American to chair the House Ways and Means Committee, described the program as "the closest thing I've ever seen to slavery" (Barth, 2017). Deepening the "pervasive poverty" is an inability to access, or ineligibility for social security programs (DoL, 2010).

While not all farm laborers are exploited or underpaid, the current guest-worker programs invites abuses. The seasonal agricultural labor force continues to be marginalized and

unprotected. Considering a broader time-scale, the H-2A visa program is an extension of decades of failed immigration and labor policy. Indeed, the program was developed only shortly after the SAW program. The United States food system, particularly its fruits and vegetables market, is sustained by a broader structure that has historically allowed, and continues to allow, the prevalence of extremely poor labor conditions.

Joining the U.S. agricultural labor force the US labor force is not an attractive employment proposition; Agricultural workers are not necessarily guaranteed minimum wage, overtime pay (except in California), or any days off. In most states, workers cannot unionize and collectively bargain. This is reflected in recent migrations patterns of domestic full-time field and crop workers, which have fallen by more than 20 percent between 2002 and 2014 (Bronars, 2015). Similarly, the number of new field and crop workers immigrating to the United States decreased by almost 75 percent between 2002 and 2012 (Bronars, 2015). As a result, the workforce is rapidly aging; in 2002, 14.2 percent of farmworkers were 45 years older, but 27.1 percent were over 45 in 2012 (Bronars, 2015).

Potential solutions

Recent state level and federal policy has tried to address these issues. For example, an executive order] by President Obama bans intermediaries between employers and H-2A workers. While this added burden to farmers, it removed predatory recruiters who promised high wages, secure work, and visa assistance. More dramatically, Governor Brown of California recently signed legislation ensuring overtime for employees who have worked more than eight hours.

Critics of the recent measures argue extending basic labor rights would make costs unsustainable and uncompetitive for American farmers and consumers. Some growers have warned they would not be able to compete with foreign products, and the legislation removed the opportunity for farmworkers "who want to live that California dream of working a lot of hours to buy a home and do things they wouldn't be able to do in Mexico" (Ulloa and Myers, 2016). Proponents of the law argue labor costs are just 6% percent of the final consumer price, meaning a 40 percent increase, like the increase the UFW famously won for grape pickers in the 1980's, would be about $8-$30 a year (Haspel, 2017).

Some authors argue mechanization will offset higher labor costs and solve the farm labor shortage, arguing that despite farm worker wages rising dramatically after the Bracero program, prices rose relatively little because increased mechanization improved productivity.

Considering the prevalence of undocumented workers, immigration reform or legalization programs that provide a path to citizenship and protections for farmworker should be considered. In 2014, Obama issued the Deferred Action for Parents of Americans and Lawful Permanent Residents (DAPA), another executive order DAPA would have protected parents of American children from deportation, and potentially eased some of the economic and social restrictions on agricultural workers. However, the fifth circuit court ruled the deferral programs were unconstitutional, and the Supreme Court split 4-4, leaving the lower court's injunction in place.

While broad-based immigration and labor reform combined with a streamlining of the H-2A visa program would be ideal, minor changes can have dramatic impacts. Governor Brown legalized unionization for crop workers in the 1970's and helped usher in a period of wage

growth, and his recent ruling provides another basic protection to agricultural workers in California. President Obama took simple legislative steps that could have dramatically altered the agricultural labor market by deferring deportation for certain migrants, granting them the ability to access social services and report abuses.

Conclusion

Farm labor shortages are a recurring problem in American agricultural systems. Recent drops in migrant arrivals, an aging migrant-worker population are reflective of poor labor standards and threats to deport illegal immigrants that have deterred new seasonal workers. These problems have been caused by decades of ineffective labor and immigration policy that helped foster a vulnerable and unstable workforce, broadly centered around marginalized politically or socially groups. The current visa program is riddled with flaws and fails to formalize or protect the majority of laborers. Although growers express concern about unsustainable wage structures and warn about impending price increases, the nut and fruit industries were not significantly affected by recent California legislation, and labor costs are a worryingly minor factor in the consumer price.

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Implications of the Mechanization of Agriculture on Labor

Introduction

Technology has shaped agriculture production from the outset as humans have tried to increase their efficiency and output. The recent trend towards increased production in United States agriculture has been met with increased mechanization. As technology use has increased on farms, the industry as a whole has seen labor shortages. Addressing the trends behind the current farm labor shortages requires asking the question: *what is the relationship between shifts to more technologically intensive agriculture and farm labor shortages?* The question stems from a larger question: *what are the major drivers of labor shortages in many areas of the country and how might the situation be ameliorated?*

This paper will argue that the increased reliance on machine innovation in agricultural processes and production is one mechanism causing farm labor shortages. Specifically, technological advancements in agriculture directly influences labor by causing increased unemployment and devaluing the work of the laborer. To make this argument, I will give context into the current mechanization trend. Then, I will describe the adverse effects that mechanization has on farm laborers and reveal some of the reasons machines have become more prevalent in agriculture. Last, I will suggest solutions to reduce the negative impacts of mechanization and industrial farming on the labor force.

Methods

For the purpose of this paper, the term "farm" will refer to operations dealing with vegetable production on a large or small scale. Additionally, I want to distinguish between all

farm innovation that has been occurring since the advent of agriculture and the farm mechanisms that are influencing labor shortages today. Thus, "mechanization" will refer to agricultural technology from the 1970s until the present. Reid classifies these advancements as "information and control technologies," and they link between early mechanization like tractors and computer-run systems such as the new driverless tractor (Reid 2011, 24). This mechanization aims to increase production by increasing efficiency in labor use, operation time, and inputs necessary (Reid 2011).

From 1970 to the present, mechanization has played a larger role in agriculture causing a rise in scholarship on the relationship between increased mechanization and labor published in the 1980s. The literature on the relationship between mechanization and labor tends to focus on large industrial crops such as the influence of the tomato harvester on farms Oregon or California as technologies started to become more prevalent. I also explored newspaper articles regarding important agricultural happenings such as the results of a court case, strike, or investigation. To gain insight into the state of farm worker justice today, I looked to activist organization websites or online publications. Discussion with Community Supported Agriculture (CSA) farmers Dan and Margaret Guenthner provided insight into the labor and technology implications for industrial farms compared to small farms. They also provided some background into the normative debate centered on what the ideal modern farm model should be.

The analysis of the paper will spend less time on farm philosophy and technology used on non-industrial farms, such as tractors or tillers. Instead, the argument will center on the ways that mechanization developed an agricultural model that disadvantages laborers and small farmers.

Findings, Analysis, and Discussion

Drawbacks to Farm Mechanization: Negative Impacts on Labor

The outcomes of mechanization replacing the labor force in agricultural settings vary from increased unemployment to forced migration to urban settings. The main advantage of mechanization lies its ability to increase production by replacing human laborers. The change has negative consequences for those being replaced by a machine, however, and leaves different types of laborers more vulnerable than others.

Workers replaced by machines are often left unemployed with little training that would allow them to transition to another occupation. When workers are replaced by machines, also known as "technological displacement," they often migrate to cities in search of work (Schmitz and Seckler 1970, 104). However, workers displaced from farm work regularly have no formal alternative employment opportunities and find themselves unable to easily transition into a new occupation. Without the formal training or skills required for nonfarm occupations or the social connections that could allow workers to thrive in cities, many workers searching for jobs are left in a state of "economic and social limbo" (Schmitz and Seckler 1970, 104). Mechanization of farm processes leads to increases in unemployment as farm workers are replaced by machines and left with little alternative occupation options.

Additionally, mechanization tends to promote the success of certain economic groups over others. Farm owners benefit from mechanization more than workers as they can save time and money when operating on large farms. Elrod argues that many farm owners tend to pursue productivity over workers' safety or employment security. Furthermore, he suggests that employees see the quality of their working conditions decline as mechanization increases (Elrod, 2014). For example, a lack of training on new machinery or briefing on the necessary safety

measures leaves workers vulnerable to accidents. Additionally, safety precautions, such as limiting employees' exposure to pesticides, are generally ignored (Elrod 2014). As a result, even if a machine does not replace the farm worker and force them into an urban occupation, mechanization has adverse effects on the quality of the farm laborer's workplace. In this way, mechanization can help owners to speed up production, but often comes at the cost of employee health and safety.

Although all the livelihoods of all are workers are vulnerable to the disruptions caused by mechanization, unorganized laborers are more susceptible to the exploitation that usually accompanies its adoption. Specifically, unorganized laborers find it hard to defend their rights against farm owners when mechanization threatens their jobs and workplace. In their analysis, the Schmitz and Seckler note that mechanization may benefit farm owners and consumers by creating the faster production of cheaper goods, but unorganized workers pay the price for technological advances through unemployment or exploitation. The difficulty that unorganized workers have in securing compensation and preventing exploitation, such as the aforementioned lack of safety precautions, makes them a "vulnerable sector" to the negative consequences of technological displacement (Schimtz and Seckler 1970, 114). Moreover, mechanized production reduces the collective bargaining power of workers by undercutting the rate that they can work. The power of a worker to negotiate better conditions has no leverage against a machine that can "pay for itself in fewer than six weeks of operation" because their jobs become easily replaceable (Elrod 2014). Machines devalue the price of human labor causing lower wages in some cases or replacement in others. Unorganized farm laborers often find themselves unable to defend their rights in the wake of technological displacement.

Addressing a Possible Endogeneity Issue

So far, the analysis of this paper has operated under the assumption that mechanization of farms causes labor shortages by replacing laborers or devaluing their work. However, an endogeneity problem may exist which reverses this original causality where mechanization displaces farm workers. Instead, an argument can be made that labor shortages force farm owners to resort to more mechanized production.

According to statistics on the USDA website, the average number of hired farm workers has declined steadily over the last century "from roughly 3.4 million to just about 1 million" as the United States economy has evolved towards more industrial production (Background 2016). With this in mind, Sassenrath et al. argue that increased mechanization in United States agriculture developed out of a need to "do more work with less people" (Sassenrath et al. 2008, 287). The demand for food production in the United States increased in response to a rising population. At the same time that production increased, agricultural worker numbers started to decline creating conditions for the current industrial agricultural model. Mechanization allowed farmers to produce more yields through a process that was less labor intensive and therefore more efficient. Thus, the increased need for agricultural output that coincided with a decrease in farm labor required farm owners to industrialize their processes.

The idea that a decline in agricultural workers caused an increase in mechanization operates only on the national scale of industrial agriculture, however. On the individual farm level, narratives of mechanization forcing workers off of farms and into cities or undermining the value of individual workers' jobs are more salient.

The Effects of Mechanization on Small vs. Large Farms

The trend towards industrial agriculture generally advantages the large farm model over small farms that do not produce monoculture crops on a large scale. Primarily, small farms usually do not have the capital for the upfront costs of expensive equipment. As a result, initial investment into expensive machinery mitigates the benefits of reduced labor costs that usually come "down the road" (Napasintuwong and Emerson 2003). Furthermore, small farmers lack sufficient political clout to influence farm policy. As a result, they cannot advocate as effectively for the government to adopt policies that will benefit small farmers over large industrial farms. Thus, large farms encourage the government to invest in increased mechanization because they can afford to purchase expensive machinery and stand to benefit from reduced labor costs (Napasintuwong and Emerson 2003). Although mechanization may seem advantageous for the small farmer, the development instead proved problematic for a variety of reasons.

The question of whether farm mechanization policy favors large farmers was taken to court in California in 1897. Small farmers in California prosecuted University of California agricultural scientists under the Hatch Act, arguing that the University's research and development favored large farmers as well as food processors, chemical companies, and machinery manufacturers (Hager 1989). Although the small farmers lost the case, they brought attention to the ways that the development of mechanization, such as the tomato harvester, unequally disadvantages small farmers and laborers. The current reality of agriculture in the United States means that small farmers and large farmers experience the benefits of mechanization differently.

Modern technological advancements generally allow farmers to control larger areas of land and require less skilled labor. The industrialization of agriculture tends to coincides with the increase in mechanization that encourages production and high yields. Overall, the recent influx of mechanization technology into the agricultural sector in the United States has disadvantaged not only small farmers but also laborers.

Weighing the Potential Benefits of Farm Mechanization

Although increases in mechanization can have negative impacts on the lives of individual workers' employment, farm technology has also had some positive implications for agriculture and labor. To begin, machines can improve production levels because they can work faster and more cheaply than human labor on large scale agricultural enterprises. If agricultural policy continues to move towards promoting production, this trend must be accompanied with increased mechanization. From driverless tractors to the integration of information technology into farm systems to keep track of biological phenomenon, farm innovations are becoming increasingly more advanced. The implementation of precision agricultural practices and information technology improves the efficiency of farming and increases yields. Farmers can apply pesticides or plant seeds at a faster more precise rate using GPS in tractors and in chemical implementation (Reid, 25). As a result, farmers can now manage large areas of land with less labor making increased production a cheaper reality.

An additional benefit to less farm labor could be the increased overall safety of farm workers. Right now, farm workers experience a host of occupational safety hazards from high ladders to potent chemicals. In fact, there have been more than 200 deaths from farm accidents alone in Minnesota since 2004 (Meitrodt 2015). Additionally, Farmworker Justice, an activist organization, notes on their website that exposure to pesticides make farmworkers more

vulnerable to chemical-related illness and injury when compared to other workforces (Pesticide Safety 2017). In replacing human laborers with machines, less workers are implicated in highly dangerous farm work. Workers doing less of the dangerous parts of farm labor, including driving vehicles, applying pesticides, or operating machinery, reduces their exposure to occupational hazards. Shifting the roles that people fill on farms by replacing dangerous jobs with machines could improve overall wellbeing of farm workers.

Despite the definite problems with farm mechanization, technological change does not come without some benefits. At the same time, the fact that increases in mechanization and calls for increased production are so closely linked points to the larger conflict within the evolution of agricultural. Mechanization tends to only benefit large, industrial farms looking to boost production. The livelihoods of small farmers and farm laborers tends to be lost in the pursuit of production goals.

Assuaging the Problems of Farm Mechanization

Addressing the problems presented by farm mechanization necessarily implicates agriculture policy and the status of labor in the United States. Overall, policy regarding agriculture and mechanization needs to be cognizant of the effects that increased use of technology has on workers.

First, the problem of technological displacement of workers can be addressed through the development of training programs that make it easier for workers to find other employment. Schmitz and Seckler suggest that state governments levy a tax on farm outputs and then use the profits from this tax to fund "retraining, relocative (sic), and retirement programs" for displaced farm workers (Schmitz and Seckler 2003, 116). Specifically, training programs could provide workers with a new skill that can be transferred to industrial sectors in urban settings to ease the

transition from a rural to urban lifestyle. A tax on the production of farms would also make the social costs of mechanization that workers face more tangible for farm owners and consumers. However, the viability of a tax that increases the price of food at production and purchase levels seems questionable when farmers already struggle to make a profit even when output is heavily subsidized. Thus, another alternative protection for workers includes increasing the strength and reach of labor unions on farms.

With the increase in technological displacement in the agricultural sector, the protections for workers before and after they find themselves unemployed needs to be strengthened. Increasing the power of unions in the lives of farm workers improves their chances of gaining protections from exploitation. The role that Farm Labor Organizing Committee (FLOC) played in the farm labor movement in the Midwest provides some basis for importance of unions in the lives of farmers.

When the Campbell Soup Company introduced the tomato harvester to the Midwest farms supplying their tomatoes to replace striking farm workers, the FLOC stepped in to support the workers. The union demanded that workers replaced by the harvester should be the first offered jobs operating the harvesters. They also advocated for the retraining of displaced workers so they could seek employment in other occupations (Barger and Reza 1994). With the support and power of a labor union behind them, workers on tomato farms in Ohio negotiated with Campbell Soup to create a labor relations committee to continue communication between the workers and the company in the future. The wins of the FLOC demonstrates the power that unions can have in negotiating for the rights of workers when navigating the volatility that mechanization can bring to the agricultural workplace.

Conclusion

Innovation in agriculture has always been present, but recent shifts in agricultural policy encouraging mechanization have serious consequences for farm workers and the ethos of agriculture. Increased mechanization as a result in the industrialization of agriculture causes increased unemployment for workers and leaves many without the skills to transition to another occupation. Many workers migrate to cities to find work causing a further loss in rural populations. Technological displacement has a more severe effect on workers who are not organized as they cannot defend themselves from exploitation from farm owners who stand to benefit from mechanization that speeds up production and increases yields. Part of the problem implicated in the mechanization of agriculture, then, is the devaluing of the worth of the farm worker.

Dan Guenthner, a CSA farmer, argues that agriculture should be about a connection to the land. Farm owners looking to maximize yields at the cost of employee livelihoods disadvantage society by seeing only the utility of a person and not their value beyond employment. Before introducing mechanization that will displace large amounts of farm workers, farm owners should balance the economic benefit of their actions with the social costs. The shift towards industrial agriculture that places yields before the needs of human beings necessarily calls into question the lengths United States society is willing to go for a tomato or strawberry.

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Introduction

Mexico- and more recently, Central America- has been a major source of farm labor for the U.S for more than half a century. The majority of the agricultural labor force in the U.S. is born outside of the country, and nearly all of this portion of the work force comes from Mexico (Martin, 2012). While Mexico has a long history of sending increasingly large numbers of people to the U.S. to work in agriculture, U.S. farms have had to deal with a rapidly shrinking labor supply within the past few years. This shortage in workers is a multi-faceted dilemma American farmers are facing, but in order to logically determine the true causes of this deficit, we have to look at the beginning of this labor supply chain. Labor is coming from Mexico, and therefore, we must identify what it is that's happening there to deter immigrants from coming to the U.S. to work in agriculture.

This paper proposes that labor shortages on farms in the United States are partially a result of the transitioning of Mexico and Central America's agricultural and labor markets. An analysis of agricultural changes within this region, as well as an understanding of how this interacts with changing social and living standards, aims to explain the labor dilemma U.S. farmers are facing. Additionally, it must be noted that this development and advancement of markets and economies is a pattern that countless countries are following. As this transition continues within Mexico and Central America, as well as in other parts of the world, the framing of this problem and its solution is of the utmost importance. That being said, this paper also

seeks to highlight the exploitative relationship between more developed countries and lesser developed ones, and how this presents a larger problem within our agricultural system.

History of Farm Labor in the U.S.

Farm labor- from indentured servants to slaves to migrant workers- has always been an integral part of American farms. For the past century, a huge portion of the farm labor force has come from Mexico. As migration from Europe to the U.S. declined during World War II, America looked to Mexico to supply labor "to fill the void" (Timeline of Agricultural Labor, n.d.). This resulted in the Bracero Program, under which "millions of Mexican guest workers" came to the U.S. (Leon & Scheinfeldt, 2017) The program came out of a 1942 executive order that allowed Mexicans to travel to the U.S. on "short-term, primarily agricultural labor contracts," and was intended to ensure basic rights and conditions, such as fair wages, employment for the time promised in the contracts, and decent housing (Leon & Scheinfeldt, 2017). Despite being viewed as a "complement" to endeavors against undocumented workers and guaranteeing adequate working conditions, the Bracero Program was ended in 1964 due to ineffective enforcement of such promises and regulations (Timeline of Agricultural Labor, n.d.).

Despite the end of this program, there has continued to be migration from south of the border into the U.S. to work in agriculture, and this has resulted in the States becoming increasingly reliant on immigrant labor. In between the years of 2007 and 2009, nearly 70% of crop workers in the U.S. were foreign-born (and "almost always in Mexico"); only 30% were born in the U.S. (Martin, 2012). Among these foreign-born workers today, it's estimated that as much as 75% are undocumented (Timeline of Agricultural Labor, n.d.).

Methods

In order to answer my question about the links between labor shortages in the U.S. and occurrences in countries that typically supply the U.S. with labor, I decided to conduct research about the changing economies, markets, and standards within Mexico and Central America. I looked specifically at reports and research regarding agricultural production in these countries and the changes they have undergone within the past few decades. This led me to research regarding the labor demand and supply within Mexico and Central America. While looking at the concrete numbers of the demand for labor across the U.S. and Central America was necessary, a deeper analysis was critical. For this reason, I looked at the combination of a number of factors, including increasing demand for labor in Mexico and Central America, as well as the actual causes of a decreasing supply of labor within these countries (and therefore the U.S.).

Transitioning Markets & Economies

As Mexico, along with other countries within Central America, develop and progress, standards of living continue to rise. More specifically, as incomes and education rates increase and their economies advance, people continue to shift out of agriculture and into other sectors (Charlton & Taylor, 2016). Simultaneously, however, agricultural production continues to increase in Mexico and other Central American countries, and they're becoming increasingly export-oriented (Martin & Taylor, 2013). These countries are beginning to gain the potential to compete with U.S. production, but this also means these countries themselves have an increasing demand for labor.

Mexico- as well as Guatemala, Honduras, and El Salvador- all have agricultural markets that have evolved off of their comparative advantage for "off-season production of high value and labor-intensive commodities," such as tomatoes or grapes (Martin & Taylor, 2013). Their extended season for crops like these and others has helped these countries to move away from producing solely "tropical" and "traditional" crops for domestic markets towards export crops (Martin & Taylor, 2013). Mexico's produce exports, for example, have increased by hundreds of thousands of dollars each year for the past decade; their agricultural GDP increased from just over 15 billion USD in 1995 to nearly 45 billion USD in 2011 (Martin & Taylor, 2013).

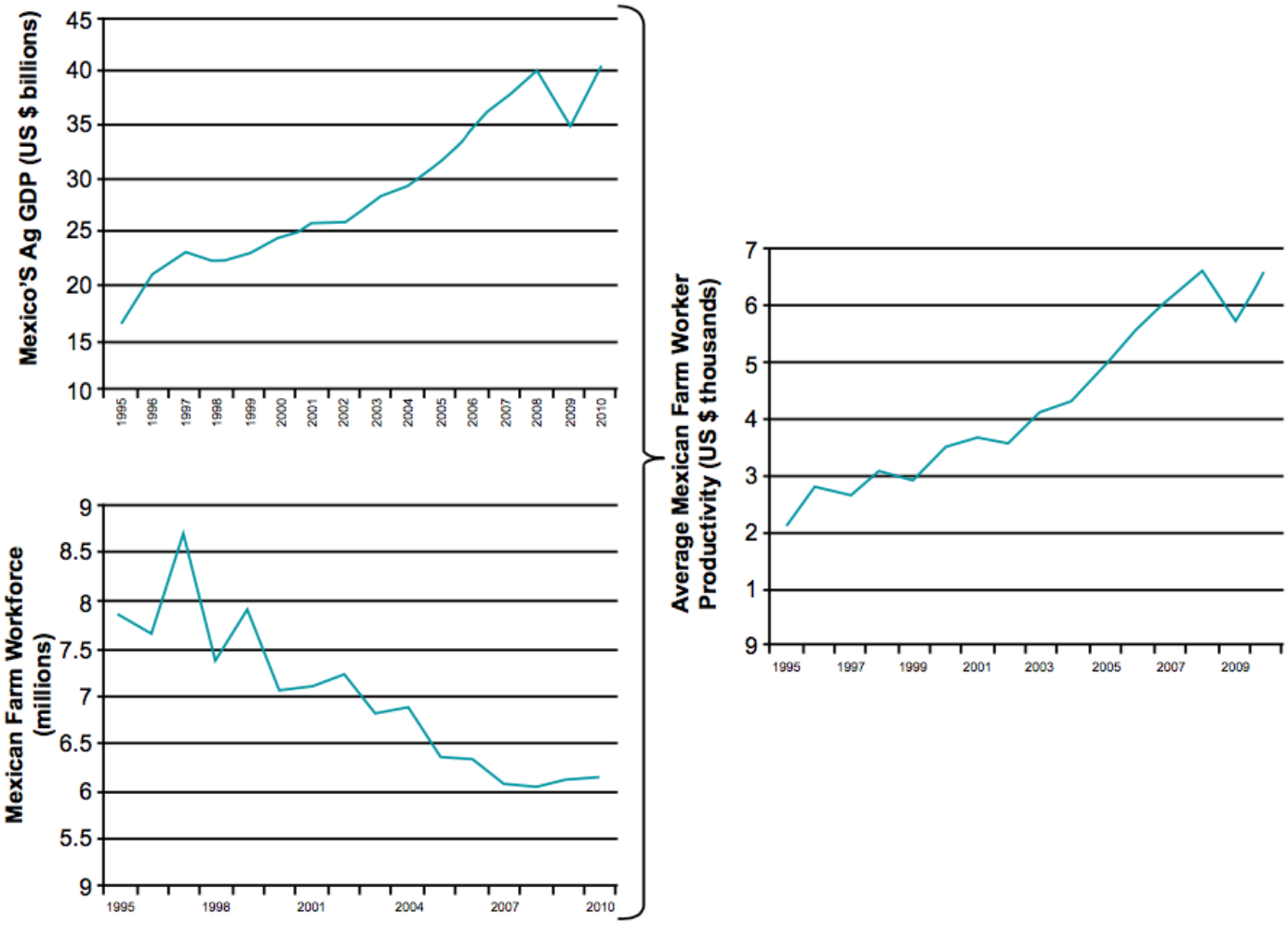
This increase in both agricultural production and exports in these countries can be attributed to changing consumer demands in the U.S. For one, despite the ultimate decrease in production of traditional, tropical produce, a niche market for these fruits and vegetables has certainly appeared. Exports of "exotic" produce, like jicama, nopalitos, and tamarindo have increased due to consumer "interest in and awareness" of these products, as well as "expanding ethnic segments" (Cook, 1995). While this is a niche market that Mexico can and does supply, the country has focused on meeting consumer demand for a greater variety of "principal" produce, year-round (Cook, 1995). Mexico and much of Central America are increasing their agricultural production in ways that allow them to compete with U.S. agricultural production, but there are other factors at play contributing to this other than just comparative advantage. Standards of both living and work are changing in Mexico and the rest of Central America. As these standards rise, their own labor supply decreases. Combined with the fact that agricultural production in Mexico and Central America is also increasing (meaning an increased demand for

a labor force to work in domestic agriculture), these countries are finding themselves in the same problem U.S. farms are experiencing.

Improving Conditions at Home

Farm labor supply in the U.S. depends on farm labor supply and demand in Mexico; an ample amount of cheap labor in the U.S. is only possible if Mexico and other countries in Central America have enough people working in agriculture, either in their own country or with the intent to work in the U.S. A typical source U.S. farms look to for labor, for example, would be rural villages in southern Mexico. A study that looked at rural Mexican labor between 2003 and 2008 documented the decline in rural labor and indicated that the decline in farm labor supply for the U.S. "is the consequence of long-term structural changes in the supply of Mexican labor" (Martin & Taylor, 2013). There are two changes happening within Mexico and Central America's agricultural labor supply: across the entire region, birth rates are going down as income and education rates are going up, and thus fewer people in the workforce are working in agriculture (Carney, 2013). This, along with incentive to work in agriculture in Mexico for those who choose to do so, impacts labor supply in both Mexico and the U.S.

In order to support Mexico's increasingly export-oriented agriculture, the restructuring of their agricultural production from a system composed predominantly of small, family run farms to one with only a few, corporate style and size farms reliant on hired labor has been an ongoing process (Martin & Taylor, 2013). This has caused average farm worker productivity- measured by Mexico's agriculture GDP, its farm workforce, and the average Mexican farm worker's productivity in USD- to "rise dramatically… quadrupling from 1995 to 2009" (Martin & Taylor, 2013).



Source: FAO, "FAOSTAT."

These graphs show Mexico's increasing agriculture GDP despite a decreasing workforce, meaning the productivity of the average farm worker in terms of thousands of U.S. dollars continues to increase. Rising productivity essentially equates to Mexican farm workers having a higher agricultural reservation wage, which is incentive for them to stay in Mexican agricultural production rather than emigrating to work on American farms (Taylor & Charlton, 2013). Agricultural reservation wage deals with the the wage it takes for people to work, and an "increasing market wage relative to the reservation wage" encourages entrance to the agricultural

labor market (Porto, 2005). The average daily wage for those working in the agricultural sector in Mexico increased by almost 14% from 2000 to 2007 (when adjusted for inflation), while those for "newly arrived, foreign-born farm workers in the U.S." only increased by 3% over the same time period (Martin & Taylor, 2013). As farm labor wages rise in Mexico, those who work in agriculture are inclined to remain in farm labor there rather than emigrate to work in agriculture in the U.S.

While rising wages in the Mexican agricultural sector may be enough reason for laborers to choose working on farms in Mexico rather than in the U.S., it isn't enough to entice people to enter the agricultural workforce in the first place, or stop people from leaving agriculture altogether. There is a multitude of factors that indicate social and economic development and advancement that contribute to a lower supply of low-skilled labor utilized by the agricultural sector. Some of the most documented and researched are declining birth rates, higher education attainment rates, and increasing incomes.

Data collected by Charlton & Taylor (2016) analyzes these factors side by side and in connection to the likelihood of working in agriculture in Mexico, ultimately finding they all contribute to a diminishing farm labor supply. For one, "a higher household ratio of children to adults is associated with a greater probability of working in agriculture" (Charlton & Taylor, 2016). Thus, declining birth rates in rural Mexico can be linked to a diminishing farm labor supply. Additionally, higher rates of educational attainment are connected to a lower probability of working in agriculture. With the implementation of education policy by governments in Mexico and Central America, the region has made considerable progress in expanding access to education, specifically primary education, and especially in rural areas (Terrazas, Papademetriou,

& Rosenblum, 2011). As these governments continue to invest in rural education, the workforce becomes much more skilled and is presented with far more opportunities than just agriculture, "[accelerating] the transition of labor out of farm work" (Charlton & Taylor, 2016). This, of course is linked to rising incomes. Research comparing per capita income and the farm workforce share in the U.S., Mexico, and a few Central American countries shows a negative correlation between the two variables; incomes go up as the share of the workforce in agriculture goes down. As these conditions improve life for rural citizens who have been the predominant source of farm labor, they become increasingly less likely to go into farm labor in their own country, let alone emigrate to the U.S. to work in agriculture.

Conclusion

As the farm labor supply in the U.S. continues to decline, we must acknowledge the importance of this issue as it is directly connected to the development of countries who are the primary suppliers of farm labor. Mexico and Central America have predominantly been the United States' primary source for cheap, hired labor. However, as this region's economy develops, the agricultural system evolves with it. The region is becoming more export-oriented, increasing demand for labor. At the same time, the actual labor supply within Mexico and Central America is declining as critical progress is made in terms of working and living conditions.

Presenting the advancement of Mexico and Central America as a "problem" the U.S. needs to solve is inherently problematic. While we do, in fact, need a solution to our declining labor supply, we cannot continue to rely on sourcing our farm labor from other countries. Thus, we must incentivize our own citizens to work in agriculture. This is a broad solution that could

be achieved through a number of avenues, possibly an approach that would essentially be all-encompassing in resolving all issues within agriculture. While ambitious, there are certainly partial solutions that have been identified. Anything from raising farm labor wages to efforts to make agriculture more localized could be help ameliorate the labor shortages the U.S. is facing. We must decouple cheap, hired labor from agriculture in order to encourage U.S. citizens to enter the farm labor force and for other countries to continue to advance and develop.

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Chapter 6: Given that farm labor shortages are a recurring problem in many areas of the country, what are the major drivers of this problem and how might the situation be ameliorated?

The Findings of Research Group 6 (Ethan Engberg, Stella Wang & Lizzie Warren)

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The Agronomics of On-Farm Labor Shortages

Analysis, Implications and Recommendations

Introduction

One of the most dramatic changes in the history of U.S. socioeconomics has been the abandonment of farming livelihoods. In the early 1900s, one in three Americans lived on a farm. But by the century's end, farming families constituted only 2% of the total population, and for those farmers who remained in the industry, approximately 90% of their household incomes came from off-farm employment (Lobao & Meyer, 2001). The transformation of American agriculture is evident both in the exodus of Americans from farming and in the structural transformation of the industry, whereby most remaining farms are marginal units in an increasingly concentrated economic sector. Research on the contemporary agricultural industry offers an alternative context in which to understand conventional accounts of economic development; such research yields insights about the factors causing labor to migrate off the farm. In this paper, I limit my focus to research concerned with agriculture of the middle, that is, those independent family farmers that constitute the heart of American agriculture. I intend to provide a retrospective account of the changes experienced by family farmers through a multi-scalar analysis that examines the theoretical explanations of, the impact on communities, and household responses to transformations of on-farm labor in the U.S. agricultural industry.

Research Methods

To conduct my research, I utilized a range of investigative methods. I began by reaching out to Dan Guenther and Margaret Pennings, owners of a community supported agriculture (CSA) farm in Osceola, WI to discuss the economic climate surrounding agriculture, with specific focus on labor shortages. These interviews were conducted in-person and via email. Our discussions provided valuable, community-level insights about the macro-level issues affecting agriculture in the Upper Midwest. We touched on the social organization of farms, the expanding influences of technology, concerns regarding undocumented workers, and economies of scale.

Additionally, I used the Dewitt Wallace library system to connect what I learned in the interviews to scholarship detailing the implications of broader economic conditions on farm labor. I was led to a collection of articles from academic institutions, including Iowa State University, and agricultural economics associations that describe agricultural transformations in the United States and those factors, including government policy, technology adoption and household income elasticity, that contribute to widespread reductions of on-farm labor.

Findings, Analysis and Research

Demographic Transitions & Agronomy

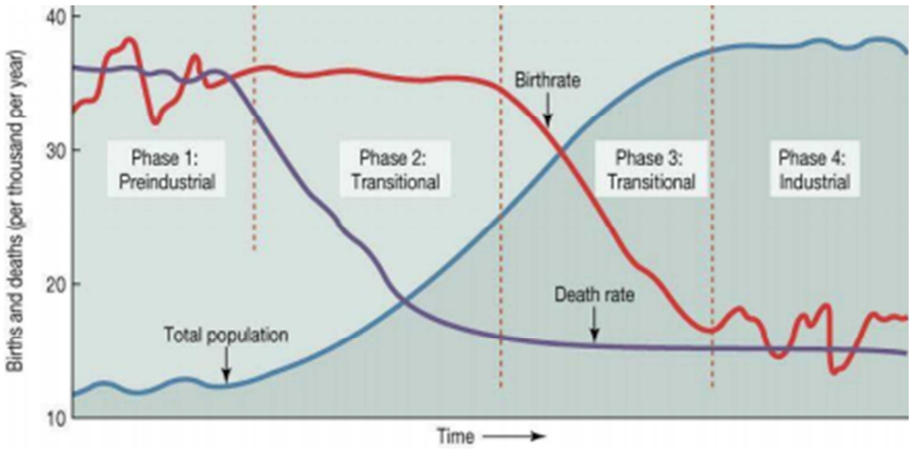

Figure 1. The Demographic Transition Model (Fusch, n.d.)

Agriculture plays a significant role in the process of economic development. According to theorist W. Arthur Lewis (1954), "agriculture is an existing industry of major proportions in all underdeveloped economies." Demarcated by fluctuating birth rates and high death rates, these pre-industrial economies are reliant on agricultural production as a source of national revenue (*see Figure 1)*. Large quantities of resources—chiefly land and labor—are committed to agriculture but are predominantly used at low levels of productivity (Johnston, & Mellor, 1961). Over time, an expansion of agricultural production acts as a stimulus for macroeconomic growth. Capital demands from other developing economic sectors place burdens on the pre-existing agricultural industry to bolster their expansion (Johnston & Mellor, 1961). This growth in the overall economy contributes to significant reductions of mortality and concentrations of wealth into urbanized areas, the results of which have lead to rapid increases of population growth in predominantly rural areas.

According to W. Arthur Lewis (1954), "an unlimited supply of labor may be said to exist where population is largest and where there are sectors of the economy in which the marginal productivity of labour is negligible, zero, or even negative." In the growing pre-industrial economy, the supply of labor in the agricultural sector is considered "unlimited" so long as it exceeds its demand (Lewis, 1954). But because most of the farming in this development phase is subsistence-based, the marginal product of an additional farmer is assumed to be zero as the law of diminishing marginal returns runs its course. By this logic, the agricultural sector has a population of laborers that can be moved to an nonagricultural sector with no effect on the total agricultural output. Thus, the expansion of nonagricultural economic sectors are made possible by extracting capital and labor from the agricultural sector.

The transfer of manpower to the nonagricultural sector is determined by the demand for labor in that sector (Johnston & Mellor, 1961). Generally, increased security and income inelasticity are more easily and consistently obtained in nonagricultural industries than those in the highly volatile of agricultural sector. Nevertheless, the amount of land under tillage must be sustained to compensate for the needs of the growing economy. As labor transitions into other industries, agricultural labor cannot be created at a fast enough rate, leading to declines in the total output of production. As a result, technological innovations compensate for the lack of labor in contemporary farming, also helping to reduce the costs of production and concentrate larger volumes of agricultural land in the hands of fewer laborers.

Market Competition and Technology

The transformation toward larger and fewer farms results from natural market competition in an industry where domestic demand is inelastic. During one of our interviews, farmer Dan Guenther mentioned that structural changes in farming have shown a decline in the total number of farms and farming population, but growth in the number of larger farms in terms of acreage and sales. The increase in both size and number of large farms and decrease in number of smaller farms is accompanied by production polarization; the market share of sales by the largest 5% of producers has steadily increased from 38% in 1939 to well over 50% in the 1990s (Smith, 2002). Agribusiness firms have expanded through vertical integration but more typically by production contracts through which farmers become the equivalent of factory homeworkers, raising commodities to be turned over to agribusinesses (Guenther, 2017). At the same time, most family farms have become marginal production units that cannot fully employ or sustain their families. To continue farming, off-farm jobs may be the only option for many farm families.

In the Upper Midwest, communities of small farmers are struggling to adapt to increasing economies of scale in which cost savings on large, industrial farms are gained by increasing the levels of production. From my discussions with farmer Dan, I learned that for corn and soybean farm operations, there is a definite tradeoff between time spent on-farm and in off-farm employment. For farm households, it seems clear that economies derived from engaging in multiple income-generating activities, on and off the farm, as a single economic unit can substitute for economies of scale in farming. Thus, farming households that operate small corn and soybean farms are more likely to devote time to off-farm employment, more likely to adopt management-saving technology, and less likely to adopt management intensive technologies to sustain their bottom lines (Smith, 2002).

Backed by government subsidy programs, both large and small farmers can expand their production activities to sustain farming livelihoods (Smith, 2002). However, this assumption is highly theoretical because larger recipients of government farm program payments tend to push smaller producers to off-farm job industries. In the marketplace, large, industrial producers of the cheap food industry -- including corn and soybeans crops -- have the ability to outstrip smaller farmers who cannot consistently regenerate yields with depreciating crop prices.

Modern machinery and the application of advanced technology has lead to revolutionary reductions in commodity costs, due to overproduction of crops, so that price-elasticity and the substitution of labor reinforce income elasticities for small, family farmers in the agricultural industry. With increases in mechanization and industrialization, large farmers are able to expand the total amount of land under tenure in a rapid manner by using modernized tractors, soil monitors and other industrial advancements to improve their fields without the need for labor. Additionally, advancements in genetic modifications enable farmers to reduce their labor inputs.

This economic system has dramatic implications for on-farm labor. In addition to over producing crops, large capital costs for seeds, fertilizers and farm equipment -- all necessary for producing and increasing the net volume of crops sent to market -- further limit family farmers from producing a net profit. As a result, farmers look to reduce costs and save money wherever possible. Typically, on-farm labor is cuts as the depreciated prices of the cheap food industry forces family farmers to suppress wages in an effort to continue farming the following year. As a result, laborers in the Upper Midwest, on average, work upwards of eighty hours a week on minimum wage salary, and more are being laid off with increasing frequency. (Guenther, 2017). Thus as development increases, farmers are caught in a dilemma -- either they find a way to produce larger quantities of their products, further depreciating the market prices and increasing their dependence on modern technology, or they search for off-farm work that can supplements a part-time farming livelihood.

Household Resource Reallocation

A transition away from agriculture in the national economy suggests that a considerable proportion of the farm labor force provides an increment to production greater than what can be sustained. A scarcity of manpower in agriculture has resulted, and it is the nonagricultural sector that is exacerbating this dearth (Johnston & Mellor, 1961). Government policies backing large, corporate growers; increasing debt and stripping nutrients from the soil with expanded adoptions of technology; and the elasticity of income variability due to risk and uncertainty associated with farm income are all motivators pushing family farmers to take up off-farm labor.

Thus, with sustained macroeconomic growth, farmers are pushed to respond by reallocating their on-farm labor resources. Economic theory maintains that risk-neutral farmers will divide their labor supply between farm and nonfarm employment opportunities such that

expected marginal returns are equalized (Huffman, 1980). This means that if expected marginal returns are greater in one opportunity, more labor will be devoted to that alternative. However, if producers are risk averse and perceive the variance of wages to be greater in one occupation than another, they will allocate less time to the risky job -- in this case farming -- and will be willing to accept stability and security found in the less risky alternative.

Since the 1980s, the agricultural sector has been perceived as an increasingly volatile industry in the larger U.S. economy (Huffman, 1997). Farm earnings, debt, and asset holdings are highly variable and such changes bring about increased variability of farm wages, thus influencing off-farm labor migration. Off-farm employment has become an attractive solution to many farmers and their households may attempt to reduce the variance of total income while working on their farms part-time. Thus, taking off-farm work by some farm operators is one method of reducing the quantity of labor employed in agriculture. For others, leaving agriculture permanently is an option, but farm-sector specific human capital would be lost, forcing a farmer to abandon farming completely (Huffman, 1997).

Conclusion

This paper outlined three research fields, those dealing with macro-level explanations for, community impacts of, and household responses to the transformation of the U.S. farm industry. The farm enterprise, as a production system, continues to undergo rapid transformations. It is inextricably connected to the household, so that production changes in family farms reverberate across communities. However, the causal paths by which these macro-level changes filter down to lower analytical units at the household and community level provide evidence of institutional mechanisms behind national farm transformation.

The secular decline of on-farm labor in the agricultural sector is based on three factors recognized as responsible for the structural transformation of an economy: an income elasticity of demand for agricultural products, the possibility of a substantial expansion of agricultural production with a constant or declining farm labor force, and innovations in modern technology that reduce costs and increase agricultural efficiency. It is within these fields that differential income elasticities and changing patterns of agricultural output to favor large, industrial growers while smaller, family farmers are disappearing into nonagricultural sectors of the economy.

Despite the decline of the agricultural population, farming remains essential for charting national social change and presents a unique case for interrogating conventional views about the economy. To ameliorate on-farm labor shortages, complementary inputs of institutional backing must be implemented in agricultural areas. Generally, government policy has the potential to mitigate the flow of labor off the farm. To be effective, these solutions must incorporate knowledge of the physical resources and agricultural characteristics of a particular region into their vision while simultaneously protecting the livelihoods of small, family farmers.

Investment in rural communities can also lead to improvements in agricultural production while reducing labor shortages. Expanding institutional and educational facilities for servicing agricultural industries, such as credit and marketing agencies and government bodies, supplies farmers with agency to safely manage their own agricultural production processes. Ultimately, ameliorating the issues in agricultural communities requires valuing farmers on every scale and giving them a voice to make their own decisions about protecting their homes and livelihoods.

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Group 4B: Farm Labor Shortage and the Rural/Urban Divide

Introduction

There are many barriers that can hinder people's ability to go into farming and subsequently contribute to the shortage of labor on farms. When discussing the farm labor shortage and its causes, it is important to consider the reasons contributing to the inaccessibility of rural employment and rural areas overall. People who come from farming communities are leaving these communities for jobs elsewhere, in search of better pay or opportunity for advancement. Those who have the option of going into farming or farm labor choose not to do so. In this paper I wish to analyze the significant divide between rural and urban communities in the U.S. and how this cultural divide, one factor among many, contributes to the overall phenomena of a shortage of labor on farms.

Research Methods

For this paper I am using a variety of different sources in order to provide the most well rounded view of the issue that I am able. I will be drawing upon sources from DeWitt Wallace Library and online databases with scholarly articles and books to provide background and to set up the context of the problem. I will also incorporate in person interviews and email correspondence with a farmer from the upper-Midwest region of the United States in order to discuss the opinions of people who are actually work in the field of farming. These interviews function as a way to concentrate my analysis to issues that are particular to the upper Midwestern region of the United States. Finally, I will utilize articles from news websites in order to provide

another frame through which to view the problem and as a source to analyze the attitude in which farming and farm labor jobs are discussed by popular media.

Findings, Analysis & Discussion

Following the trends around the world, the United States has been experiencing an increase in the urban population and as a result a lower number of people living in rural areas across the country (Donovan). By solely comparing the numbers of people who live in rural areas versus urban areas, there already exists a smaller pool of potential workers in rural areas. The discrepancies between rural and urban areas is significant and contributes to differences in career options, access to health services, and access to education. I would first like to focus on the nature of farm labor and the inherent qualities about working on a farm that would deter workers from taking these jobs, with a particular focus on domestic workers.

One reason for the farm labor shortage is the unpredictability of the work. According to an interview, one farmer said that a difficulty in hiring regular workers is that the work is seasonal. This is particularly true in the upper Midwest where the winters are long and there is not any labor to be done for much of the year, all the work is concentrated within a short period of time. Because of the seasonality of the work, farming jobs may be undesirable because they do not offer as much stability and dependency as jobs in urban areas (Blanco). Farm labor jobs require frequent movement in order to have continuous work, and individuals may feel they have less agency in their lives compared to holding a stable office job in an urban setting. Another factor to consider about farming jobs is wages, vacation days, and other benefits that are frequently missing for farm workers (Blanco).

Lower wages can be another deterrent to people going into farm labor. Wages for farm workers have been on the rise since 1950 and some farms have tried offering benefits such as a

401(k) plan, health insurance, etc. to entice domestic workers to take farm jobs (Kitroeff & Mohan). In the case of California, their wages for farm workers increased 13% from 2010 to 2015 and some farms are offering paid holidays and vacation days throughout the year (Kitroeff & Moran 8). Despite these efforts, farms in California have not witnessed an increase in domestic workers going into the farm labor force (Kitroeff & Mohan). Their reforms were still not enough to attract workers to leave day-jobs in urban areas for farm labor in rural areas. These jobs continue to go primarily to immigrants, which is also a potentially diminishing labor pool in light of immigration reform. The common rhetoric surrounding immigration and jobs it that immigrants are going into the United States and taking jobs that could be going to domestic workers, and this is the sole reason for rates of unemployment among domestic workers. And yet when one considers jobs such as farm labor or most evidently the meatpacking industry, there is no desire among domestic workers to go into these jobs and thus they are jobs that go to immigrant laborers. If immigrant labor was significantly reduced, industries would suffer and those jobs would still go unfilled. This commonly held belief is disillusioned and further contributes to confusion about rural areas and the jobs that exist in rural areas.

Furthermore, there also exists the phenomenon of a worker shortage in farm jobs even with the existence of a substantial number of unemployed domestic potential workers. People would prefer to remain unemployed than go into farm work, which again demonstrates how undesirable farm work is. This can again go back into the seasonality of the work in rural areas, where those who are job searching want to be hired immediately but farm work does not begin for a few months (CBSNews). This is also because farm labor is hard work, living in rural areas can be more difficult than in urban areas, and there exists a rural/urban discrepancy in the services and opportunities offered.

According to the U.S. Department of Health & Human Services, there is a higher rate of uninsured individuals in rural areas than urban areas, as well as many other barriers that prevent rural residents from accessing the healthcare services they need ("Healthcare Access…" 12). Discrepancies such as these can contribute to the increasing desire to move away from rural areas and to not take jobs in rural areas as well as change the overall climate of urban versus rural communities into one of a dichotomy and foster more hostility toward one another.

The divide between urban and rural communities in the U.S. was brought to attention in mainstream media specifically after the 2016 presidential election. This does not mean however that these differences are a new phenomenon. Many people who lived in urban areas failed to comprehend the scale and nature of the political climate in rural areas, and vice versa (Glenn et al 4). The very nature of the differences between these two areas (spatiality, community, and types of occupations that people hold) can foster differing political thought. This also may be a factor in hindering movement between the two spheres due to cultural differences and a failure to empathize with the backgrounds and situations of different people.

According to e-mail correspondence with one farmer, another factor that contributes to this problem is the trend of young people moving away from farming communities and rural areas in general. According to the farmer, the increasing movement of young people to urban areas has "robbed rural areas of new creativity and vitality" (Personal Conversation, 4/27/17). Rural areas are places rich with resources and are increasingly seen as a place whose sole purpose is to provide resources, both natural resources and human resources (Duncan 6). When people move away from these areas and do not put in the effort to cultivate communities, rural areas become increasingly foreign and unknowable to urban residents. Young people who bring new ideas and innovation are now spending their energy and time in urban settings and not

cultivating communities in rural settings. Besides economic considerations, there are other reasons as to why urban living may be an attractive prospect for young people today.

Living in an urban area is enticing because of our desire as humans to remain connected (Cook 5). The literal closeness in proximity that exists when living in a city brings people in contact with many more people every day, people who are unlike them in many ways but who can still live and work together in the same city. Urban areas with higher concentrations of people and business provide young people with mobility and the chance to move up in terms of career and social life. Rural communities and the dispersed nature of civilization can be conducive less improvement or innovation.

The widespread use of technology also contributes to the decline of cultural opportunities in rural communities. With the advent of televisions and other forms of entertainment technology, individual households can become even more isolated than before as people find entertainment that does not involve interacting with others. Social media technologies allow us to remain connected virtually instead of in person, and this can contribute to further degeneration of community and cultural activities in rural areas (Personal Conversation, 4/27/2017). One study shows that there exist increasing feelings of social isolation with an increase in the use of social media technologies (Hampton et al 2). In rural communities, the use of these technologies means it is easier than ever to avoid interacting with your neighbors and others in the community, fostering a lack of connection with the community.

Rural living has traditionally been praised for the autonomy it allows and the emphasis on the individual, etc. (Kolnick). While these traits may have been praised in the past, today's social environments make it difficult for people to embrace these aspects of rural living. There is such a divide between what we consider to be natural and what we consider to be human made, it seems

that one cannot exist in both the natural world and the man-made world. To desire to spend time in rural places is very different from desiring to live in a rural community, and many people cannot see themselves living and working in rural areas long-term which further prevents people from taking farm labor jobs, regardless of how well the jobs pay.

Although this paper thus far has largely focused on the factors preventing domestic workers from going into farming, there also exist cultural barriers for immigrant workers who are going into the farm labor workforce and subsequently contribute to the overall shortage in farm labor throughout the country.

Because so much farm labor is comprised of immigrant and migrant laborers, the cultural differences between the farm laborers and farm owners can be isolating and uncomfortable for immigrant workers. Frequent relocations as well as language and cultural barriers can yield for poor health conditions among migrant workers (Bechtel et. al). Undocumented workers may live in fear of immigration officials and thus isolate themselves further by going into hiding within communities and not being able to fully participate in the community that they are living in.

Conclusion

While there are many important economic factors that contribute to the shortage of farm laborers in the United States, in this paper I specifically looked at cultural barriers that deter workers from choosing to take jobs on farms. When analyzing the rural and urban divide, there is often a dichotomy painted that can be prohibitive toward opening up discussion about the differences between these areas. I acknowledge that my paper and the discussion of these areas as uniform and one dimensional places contributes to this view, but I wanted to look more generally at the factors that contribute to the trends of differences between the two “spheres”.

While wages and benefits are a significant factor toward why farm labor is an undesirable occupation, there are other factors to consider when looking into why people are not taking jobs on farms. The rural community is not conducive to the kind of opportunity and connectivity and people desire in their lives. It true that there are more young people moving away from farming than before, and the farmer I spoke to about this confirmed that he has seen the effects of young people leaving rural areas as a detriment to the creativity and innovation of these communities. The farmer I spoke to cited entertainment technology and social media as contributing factor towards lack of community building and social isolation, and this connection between social media and isolation is confirmed by many different studies. The unpredictability of these farming jobs and the changing perceptions of nature and rural areas contributes to the movement toward urban areas.

Given all of these factors and their contributions to this farm labor shortage, there is no easy way to go about ameliorating the situation. It is difficult to apply policy recommendations to cultural barriers, and the sometimes cyclical nature of these self-reinforcing phenomena such as lack of cultural vitality makes it even more difficult as time goes on. Based on my analysis and discussion of these many contributing factors, I would encourage investing more time and energy in rural communities and not being so dismissive of these areas of the country.

Community Supported Agriculture initiatives are a great way for people who live in more urban areas to connect with rural communities and the land, to not see rural communities as such a foreign land but instead a place that is worth investing in and worth rebuilding in terms of community. There also needs to be more investment in the services that are offered in rural areas. Overall there must be more intentionality in building community and fostering connections face to face. Urban and rural areas are different and always will be different places in terms of living

and working, but one does not have to be a worse option than another. Farming is something that everyone who is alive is largely dependent on, so we must try to ameliorate the cultural barriers that are preventing workers from taking jobs on farms and furthering the vitality of rural communities.

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GEOG 232

The Impact of Migrant Labor and Immigration Policy on US Agriculture

Introduction

Producing enough food for the United States' consumption and export needs is a responsibility that falls on a shrinking portion of the population. Over the past century, the number of farmworkers in the US declined from around 3.4 million to just over 1 million, even while the size of the labor force grew overall (Hertz, 2016). For a variety of reasons, there have recently been shortages of the labor required to carry out much of the tasks needed to grow and harvest food, in some cases leaving fruits and vegetables unpicked in the fields. There are several different and intertwining factors that play important roles in decreasing the supply of agricultural labor, but since many of the workers who make up the farm labor force are foreign-born, policies and practices that impact this population likely have a strong influence on the availability of agricultural labor. In this paper, I aim to explore the question of how immigration policy and enforcement influence the agricultural labor market. Specifically, I will discuss the current and historical demographics of farmworkers as well as programs used to bring foreign seasonal workers into the US to meet the demand for agricultural labor. I will explore the implications of these programs and the effects of increased border and domestic enforcement of immigration policy on the agriculture sector. Finally, I will identify some potential strategies to help solve this ongoing problem.

Research Methods

To explore this research question, I began by speaking with two farmers who own an organic vegetable farm in the upper Midwest to better understand the local agricultural labor market and how it had changed over time. I then used the US Department of Agriculture website to begin gathering more information on the national level. The Economic Research Service portion of this website was very useful for finding information regarding the demographics of farm laborers, wages, and changes in these variables over time. I also used the Macalester College library website and google scholar to find additional relevant articles. Finally, I emailed the farmers to ask follow-up questions regarding their experiences and insights of migrant agricultural labor in their local community.

Findings, Analysis and Discussion

For many decades, the United States has relied on labor brought in from other countries to sustain and grow its agricultural system. As of 2009, of the approximately 1.1 million farm workers in the United States, about 71% were born in another country and immigrated into the country in order to work. Of these workers, 48% were not legally authorized to work in the US (Hertz & Zahniser, 2017). These workers typically work jobs that would otherwise go unfilled by native-born citizens because the type of work is often seen as undesirable since it is very physically demanding and requires long hours in the sun. Additionally, persistently low wages in the agricultural sector can deter locals from entering into the agricultural workforce.

Guest Worker Programs

To fill this need for low-cost farm workers, the US has implemented various programs over the years to recruit workers from outside of the country, primarily from Mexico. From 1942 to 1964, about 4.6 million Mexicans participated in the Bracero Program, which brought in seasonal farm workers to fill a sizable portion of the US demand for agricultural labor. When this program was eventually phased out due to recognition of the poor working conditions and low wages many workers faced, farmers were forced to adapt. Many decreased their reliance on labor by investing in new agricultural technology while others began offering higher wages to compete for scarce laborers. Still others turned to the H-2 temporary worker program, through which they could hire seasonal farm workers for 120 days out of the year (Hertz & Zahniser, 2017).

A version of this program exists today, called the H-2A visa program. However, this program has not been nearly as popular, with only about 5% of all farm workers hired through this program (Hertz & Zahniser, 2017). In order for a farmworker position to qualify for this program, a farmer must prove that he or she has advertised locally to fill the position, and the farmer also must pay for worker transportation, food and housing (Sullivan, 2017). Additionally, for many farmers trying to hire during peak fruit and vegetable season, the paperwork and bureaucratic delay make this process inconvenient and unrealistic (Devadoss & Luckstead, 2011). Hiring workers through this program can also be expensive, with costs ranging up to $1000 per worker to cover the application fee, advertising, and other associated costs. When farmers hire laborers through the H-2A visa program, they are required to pay them a minimum hourly wage of $12.86, which helps the workers by providing them with a living wage much higher than the federal

minimum. However, farmers must pay of their workers this higher rate, even if they are a "part-time [working] high school student, with little or no experience." In this way, farmers may be further disincentivised from using this program (personal communication, April 25, 2017).

Since relatively few foreign workers are hired through the H-2A visa program, which guarantees housing and a minimum wage, the undocumented workers that are hired tend to be more vulnerable to unfair treatment by their employers, since the boss could threaten to have the workers deported if they protested their treatment ("Farm Workers & Immigration," 2017). According to one of the farmers I spoke to, wage theft is a prominent issue facing many undocumented agricultural workers. He explained that one dairy farmer in his community would only pay undocumented workers if they worked for the entire two-week pay period, meaning that if a person was hired a day after the pay period began, or quit partway through one, the person would not receive any compensation for the work they completed during that time. The farmer explained that since many farmers do not have control over most of the prices of their inputs, such as fuel, fertilizer, and land, they must cut costs in other ways in order to make a profit and avoid bankruptcy. One of the only costs within their control is the price of hired labor, so farmers tend to pay their workers (especially vulnerable undocumented workers) less than a living wage in order to decrease their overall costs (personal communication, April 25, 2017).

While participation in the H-2A visa program has increased in the past five years due to a lack of domestic farm labor, farmers have had to deal with delays of obtaining visas for their workers because of a federal backlog in processing the program applications (Sullivan, 2017). In the past three years, the late arrival of foreign workers hired through

the program has been costly to many of the farmers who rely on migrant labor. In some cases, being severely short-staffed for up to six weeks into the season has cost individual farmers up to $300,000 in losses (Rosenthal, 2016). Hiring a farmworker through this program generally provides some protections for the worker, but with the current system in place to obtain these visas, doing so can sometimes have a variety of negative consequences for the farmer.

Policy Implications

Several studies have attempted to model the US agricultural system and labor force and how it would be impacted by changes in worker availability. According to one of these models which was created in 2011, increased government spending on domestic enforcement of immigration laws would unsurprisingly decrease the undocumented farm labor force and cause labor shortages and lower agricultural production. If instead more money were spent to patrol the border, wages of both authorized and unauthorized workers would be driven up due to a decreased supply of labor. As a result, the cost of many labor-intensive agricultural products would be driven up as well (Devadoss & Luckstead, 2011).

The USDA Economic Research Service also used an economic simulation created in 2012 to model how the US agricultural system would respond to changes in employment of foreign farm workers. In the first model, the unauthorized labor force in all sectors of the economy was reduced by 5.8 million over 15 years. These numbers are not tied to a specific policy change, but could reflect the effects of either policy mentioned above: increased domestic enforcement and increased border security. In this model, output from

labor-intensive agricultural systems, such as fruit, nut, and vegetable production, would decrease by an estimated 2 to 5.4 percent. This decrease in agricultural production, along with smaller decreases in other economic sectors, would slightly reduce total economic production, leading to an estimated 0.3 to 0.6 percent decrease in average wages of all residents of the US (Zahniser, Hertz, Dixon, & Rimmer, 2012). As evidenced from both of these studies, spending money to increase border security and domestic enforcement would decrease the number of unauthorized farm laborers and raise their wages, but would also increase the cost of agricultural production. This in turn would reduce agricultural output and slightly depress the whole economy, hurting not just the agriculture sector, but the rest of the country as well.

On the other hand, the US could instead increase the temporary employment of agricultural workers through programs like the H-2A temporary visa. According to the ERS model, an increase in 156,000 workers over 15 years would lead to a drop in the average wages of farm workers by about 4.4 percent, but a long-run increase of about 1.1 to 2 percent in agricultural output and exports, especially in labor-intensive sectors like fruit and vegetable production (Zahniser et al., 2012). While the market wages of agricultural workers in this scenario would be slightly less than if no policy were to be implemented, a higher proportion of foreign-born workers would be participating in this program, which guarantees these wages and provides some protections for the workers. This also means that a smaller portion of the agricultural work force would be undocumented and thus vulnerable to mistreatment and wage theft.

While expanding the use of the H-2A visa program may seem like a promising step to reduce agricultural labor shortages, the future of this program is unclear. President

Trump's campaign promises to build a wall and return jobs to Americans have many farmers concerned about the possibility of scaling the program back or eliminating it altogether (personal communication, April 25, 2017). In a draft executive order that circulated in late January and which dealt with foreign worker visas, there were no suggested changes to the H-2A visa program (Sullivan, 2017). So while it tentatively appears that this program may be safe from being cut, there are other factors that are also influenced by Trump's decisions. For example, the proposed border wall separating the US and Mexico, and the increased ICE raids on undocumented people would certainly affect the availability of farm workers. This in turn would not only impact the entire agricultural sector, especially the production of labor-intensive crops, but also the US economy as a whole.

Conclusions

The shortage of domestic agricultural workers in the United States has proven to be a persistent problem for farmers over the past several decades. As a result, the US agricultural sector has become fairly reliant on the relatively cheap labor of undocumented and temporary visa-holding workers. Increased domestic enforcement of immigration policies and increased border security would not only be expensive, but would exacerbate existing labor shortages, hurting agricultural production and the US economy. While economic modelling suggests that increasing the use of the H-2A temporary visa program would increase agricultural production while also protecting workers, many farmers still find obtaining visas through this program to be expensive and time-consuming. In order to increase participation in this program, it needs to be streamlined so that it is less

cumbersome and more beneficial for farmers while still safeguarding the rights and wages of foreign agricultural workers.

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