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# Chasing Plenty: A Documentary on Food Security in Montana

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Capstone Project: *Chasing Plenty*, a Documentary about Food Security  
and Climate Change in Montana  
Franke Global Leadership Initiative  
University of Montana

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Climate change is the defining issue of our time. It is multifaceted, far-reaching, and will affect various aspects of our society. The changing climate will alter land use, agricultural productivity, geographic plant distributions, and other earth and social systems (EPA 2016). To prepare for this reality, we conducted research on how climate change impacts our agricultural systems by examining food security in Montana. Food security is defined as, “when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 2008). Collectively, we must take steps to adapt to climate change and improve global food security.

Although food security is a global climate change concern, we can learn from our own state of Montana. Agriculture is the leading industry in the state of Montana (MDA). Montana crops, especially wheat, sustain people throughout the state, nation, and globe. Given the threat climate change poses to agriculture and our food security, we attempt to address the following question in our research: how can Montana agricultural systems stay resilient in the face of climate change while supporting food security at home and abroad?

### **Literature Review**

In this section we outline current literature regarding the state of climate change as it affects food security, related policy frameworks, the defined dimensions of food security, and the state of food security in Montana. Climate change has direct effects on agriculture. It alters weather patterns and creates more erratic growing seasons. The growing abilities of farmers and the robustness of their crops will be challenged. The international population already has a staggering 805,000,000 people currently classified as chronically hungry (“U.S. Government Global Food Security Strategy 2017-2021”). Climate change will only push that number higher. The U.S. Department of State classifies hunger as a national and global security threat,

describing it as an inhibitor to personal well-being, national development, and a cause of governmental instability and terrorism (“U.S. Government Global Food Security Strategy 2017-2021”). Innovative policy mechanisms and frameworks will be needed to mitigate the risks caused by food insecurity and hunger.

### *Policy Frameworks*

Before delving into the literature about climate change and food security more precisely, we begin with a brief overview of important climate policies to date. The Paris Climate Agreement of 2015 set clear global standards for climate change mitigation, focusing on emissions reduction to keep global temperature rise below 2 degrees celsius (UNFCCC 2017). At this point, scientists have irrevocably shown an increase in sea levels, environmental devastation, and that extreme weather events will result from human activity continuing to warm the planet. Rising temperatures will force nations to adapt for survival. While all those factors threaten the function of human societies, arguably the largest threat climate change presents to humanity is how it will challenge our food security. The Paris Agreement outlines the agreements of 195 countries that have pledged to reduce global greenhouse emissions through domestic regulation. The deal has been estimated to cut greenhouse gas emissions to half their predicted levels by 2030 (Ellis 2017).

In addition to global policies, several US policies were implemented to address climate as well, including the Clean Air Act and the Global Food Security Act of 2016. The Clean Air Act was created in 1970 and reauthorized in 1990 (42 U.S.C. §7401 et seq. (1970)). It marks the beginning of atmospheric emission regulations in the United States. The Environmental Protection Agency (EPA) was granted the authority to regulate greenhouse gas emissions by the Supreme Court ruling in *Massachusetts v. EPA* (“Massachusetts” 2015). In the Global Food

Security Act of 2016, the United States outlines clear steps to be taken at both the international and national levels to combat food insecurity with the goal of creating long lasting agricultural growth and resiliency among people and food systems (“Global” 2016). Still, one in five Americans have difficulty affording food (Partridge 2014). In order to improve these systems, we need to first understand the dimensions of food security.

### *Dimensions of Food Security*

The Food and Agriculture Organization of the United Nations (FAO) defines food security as having the following four dimensions: the “physical availability of food, economic and physical access to food, food utilization,” and the “stability of the other three dimensions over time.” For a food system to be considered secure, all four of these dimensions must be met simultaneously (FAO 2008). Climate change will impact each of these dimensions separately. Therefore, each must be analyzed individually to gain a better understanding of how climate change will affect food security as a whole.

### *I Food Availability*

The first dimension of food security specified by the FAO is availability. This is defined as the “availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (FAO 2016).” As outlined in many studies, the yields of different crops are expected to drastically change in the face of climate change (Rosenzweig et al., R. Lal, United States Environmental Protection Agency). As temperatures and CO<sub>2</sub> levels rise, production of and access to different crops will slowly begin to dwindle. Additionally, increased global temperatures are expected to make it more difficult to raise cattle and other essential livestock (EPA 2016). As these two major food sources begin to change, availability of food around the world will be affected.

## *II Food Access*

Access, defined by the FAO as the “access by individuals to adequate resources for acquiring foods for a nutritious diet,” is the second dimension of food security. Access to food in rural communities across the globe is expected to be severely impacted as climate change intensifies. Because rural communities tend to rely on local food sources, their access to food as extreme climate events like drought become more common will likely be affected (FAO 2016). Although these communities remain the most vulnerable to climate induced food shortage, they have also developed some of the most effective methods of combating extreme climate events. For example, some rural communities in Africa have shifted away from growing crops during years of extreme drought. This allows them to seek other sources of income and import food when they are not able to produce their own (Wreford et al. 2010). Luckily, food access issues caused by climate change aren’t expected to pose a significant threat until 2050 (FAO 2016). This means there is still time to act before these rural communities across the globe feel the full effects of climate change in their daily diets.

## *III Food Utilization*

Utilization is the aspect of food security that comes into play once food enters the household. Studying utilization does not examine the quantity or cost of food obtained, but instead it looks at the type of food and the method of preparation. One of the main factors distinguishing utilization from the other food security pillars is its concern with personal health. According to the FAO, utilization is best understood as “the way the body makes the most of various nutrients in the food.” (FAO 2008). Unlike access and availability, utilization is always directly impacted by the individual consuming the food. Gauging food utilization is a formal way to study the diet of a community. Nutritional values and variety of food, sanitation, intra-

household food distribution, and the optimal method of preparation are all taken into consideration when analyzing food utilization (Burke and Lobell 2010). Acknowledging the two-way relationship between food and health is essential in studying utilization. The nutritional quality of food consumed affects a person's health and, in the reverse relationship, a person's health changes the way his or her body is able to metabolize nutrients. Therefore, hygiene, food safety, and health care are the important factors to include when assessing food utilization (Burke and Lobell 2010).

Climate change may not have as direct of an impact on food utilization when compared to access and availability, but a shifting global climate will undoubtedly affect numerous elements of food utilization. By altering crop yields and affecting what types of crops can be grown in certain regions, climate change could drastically impact the variety in an individual's diet (Burke and Lobell 2010). If the fresh produce necessary for a balanced diet becomes unavailable, people may be forced to turn to processed foods that lack the vitamins and proteins needed for a healthy existence. When looking at personal health, the effects of climate change on the spread of infectious diseases need to be considered. Global warming has already proven to be a massive contributor to the expanding range of diseases like malaria (Altizer et al. 2013). Less developed nations that are already highly susceptible to public health crises will bear the brunt of these impacts.

#### *IV Stability of Other Dimensions*

Stability is the fourth and final food security pillar. It acts as a general marker that incorporates the other three pillars. The future of a community's food resources is the main concern of stability. Access, availability, and utilization all pertain to current conditions, but stability examines how those dimensions transform over time. As the FAO states, "Even if your

food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis.” (FAO 2008). Significant fluctuations in food prices, large shifts in the types of food available, short-term variability in food availability, and inconsistent diet quality are all signs of food instability (Wheeler and von Braun 2013). Political turmoil and economic factors (e.g. unemployment rates) are two major ways humans directly create instability in food systems. However, neither of those elements rival the sheer magnitude and rapidity with which severe weather patterns can impact the stability of food security. The most visible impact of climate change is the way it is affecting global weather. As extreme weather events become more commonplace, stability in food systems becomes harder to achieve. Given the global reality of climate change, communities around the world, Montana included, will have to adapt.

### *Food Security in Montana*

In this project, we will examine food networks in Montana to see how they can adapt to a changing climate and mitigate future climate change. Montana is a largely rural state with high agricultural production. Due to a potential mean annual temperature increase of 9.8° F and a predicted decrease in summer rainfall, the majority of farmers in the state will be affected by climate change in some way (Whitlock et al, 2017). We will study both the impact of climate on agriculture and methods to substantially improve food programs.

Compared to the rest of the country, Montana residents have relatively high food insecurity despite the state’s high agricultural production (Partridge 2014) (MDA). Montana has several programs in place to address the issue of hunger, though they could be improved. The Supplemental Nutrition Assistance Program enables many low-income households to afford food (Hogan). The Montana Food Security council also supports various programs designed to

provide nutrition to individuals in need (“Council”). Still, one in seven Montanans are affected by hunger and 48,000 children in Montana live in food insecure households (Partridge 2014). We aim to examine the various dimensions of food security and analyze the ways they will be impacted by a changing climate. We can then assess the security of food systems in Montana, provide suggestions as to how the state’s food network can be made more resilient, and extrapolate our findings to look at how global food security can be addressed.

Using our case study of Montana to draw conclusions about the global food network, we will address the complex connections between climate change, agriculture, and food security. To the privileged, climate change can seem like a distant problem, but if people do not alter their habits now, temperature changes will reach a tipping point and large-scale climate effects will be inevitable. The global food network is a massive system and change can only come gradually. We view this project as a preliminary step in facing the challenge of our generation.

### **Research Methods**

To address the question of how climate change will impact food security we used both quantitative and qualitative approaches to evaluate the various effects. First, we conducted 14 semi-constructed interviews during Spring 2018 with various members of the community connected to food security. We posed questions like: “In what ways do you see our changing climate affecting our local and global food systems?” (see Appendix A for more examples). Questions were tailored to fit the expertise of the interviewee. We interviewed a variety of individuals from groups such as: Montana farmers, ranchers, food bank administrators, public policymakers and employees of non-profit organizations involved with studying and adapting to climate change.

Using the information we gathered in our interviews, we developed a food security index of Montana (See Appendix C). We created this index by incorporating the statistics commonly used in global food indices and supplementing them with qualitative data gathered in our interviews. According to The Economist's Global Food Security Index, some of the biggest factors affecting global food security are access to potable water, projected temperature increase and proximity to food sources (The Economist 2017). In our interviews, we found that the cost of housing relative to income and access to affordable healthcare were the two of the major drivers of food insecurity. We created our food index by conducting a simple multi-criteria evaluation that merges all of these variables. The result is a census-tract level food security index of Montana. Using the same variables as inputs, this method can be used to determine which areas of the world are most at risk of being food insecure. Once we had completed our interviews and compiled the data, we turned our focus towards communicating our findings.

Since it can be difficult to convey data and create an emotional connection through graphics and writing alone, we produced a documentary exploring food security and agricultural sustainability in Montana to better inform global practices. Our documentary acts as the medium to share our findings and raise awareness. We intend to start a discussion around current food security, responding to climate change, and what our food systems will need to look like in the future. Our documentary attempts to portray the reality and nuances of the issue in a way that will emphasize the magnitude of the problem, but since overwhelming problems of such a large scale can breed apathy, we end the film on a note of optimism and a call to action by listing ways individuals can get involved and make a difference. Changes in weather patterns will undoubtedly impact food systems in communities across the planet, and must be accounted for in the development of new food security programs. Systemic change, as a rethinking our food

systems would require, needs widespread public support. Our documentary will serve as a means of bringing attention to the global issue of climate change and food security. The following section, findings, analyzes the common threads that tied in throughout all our interviews that were used to form the basis for our short film.

## **Findings**

This section examines the overarching themes of the interviews we conducted. Interviewees were stakeholders in a variety of positions throughout Montana's food systems. The breakdown of interviewees is as follows: two farmers, two city government officials, four employees of non-profit organizations, four food bank employees, one school district employee, and one rancher. The gender split was eight males and six females. Using inductive analysis, we articulated three major themes that commonly appeared in the responses. Those themes were used in the creation of our documentary to give the short film a structure and formulate the message we tried to convey to the audience.

### *Food Self-Sufficiency*

Climate change will affect every area differently, so adaptations will have to be tailored to location. When discussing what people can do to mitigate impacts from the changing climate, many of the interviewees spoke about possible solutions in terms of Montana specifically. Particularly regarding food systems, state-scale strategies were brought up frequently. A recurring theme when asked about how food security has changed in the last few decades was a decline in self-sufficiency in Montana's food supply. One respondent quoted the statistic that in the 1950's 70 to 75% of the food consumed in Montana was grown and produced in the state, whereas currently that number is only about 5%. Not every interviewee had a quantifiable number in mind, but many echoed the idea that while Montana is an agricultural state it still

imports a vast majority of its food. Many pointed out establishing strong, diverse local food networks is the best way for Montana to become less reliant on imports and more resilient to climate change. There was a lot of hope surrounding the local food movement and its future, especially in Missoula. Optimism was often tempered by the reality that Montana has a limited growing season, complicated by increasingly unpredictable precipitation and frosts and summer fires. Still, the local food movement was always portrayed as a way to deal with the impacts of climate change and a way to reduce our carbon footprint by limiting monocropping, petrochemical fertilizer usage, and transportation emissions.

When asked about the obstacles to achieving food security in Montana, respondents often focused on affordability as a primary barrier to procuring nutritious food. However, multiple interviewees also discussed how geography and culture influence how food is acquired. One farmer described how food deserts in Montana are rural, since gas stations may be the only food-sellers in many small towns. Access to fresh, healthy food can be out of reach to some of those living in the state's many non-urban areas. In addition to access and affordability, the restraints for people to buying nutritious food can be more ingrained. One interviewee discussed American food culture in depth, noting how many Americans value affordability and convenience above all else when shopping for food. Furthermore, food is deeply tied with identity, so changing people's diets is difficult and telling them to change their eating habits is rarely effective. Another respondent described how food can become an afterthought to many, when bills, rent, and other financial obligations take precedence. Creating more avenues for people to buy affordable, healthy, local food is the most direct way to increase Montana's food self-sufficiency and thereby increase the food security of the state's most vulnerable residents.

*Poverty/Economics*

Over the course of our interviews it became clear that poverty is a driving force behind food insecurity in Montana. This relationship between food security and poverty manifests itself in two main ways. First is the increase in day-to-day expenses relative to wages. According to many interviewees, the increase in the cost of food in conjunction with stagnating wages has made it difficult for Montanans to provide for their families. According to the Missoula Food Bank, on average, 1 in 6 Missoulians visit the Missoula food bank each month. Unfortunately, officials at the Missoula Food Bank expect this trend to continue because some people simply don't have enough money to buy food for their families. This issue of stagnating wages is closely tied to the second driver between food security and poverty in Montana: the cost of housing.

In nearly all of our interviews, the interviewees cited the high cost of housing as one of the biggest reasons that food security is such a prevalent issue in Montana. At a national and local scale, "housing is vastly outstripping wages" (Food Bank). One of the representatives from a non-profit phrased it, "if food prices go up, and they have, and housing prices are also going up each day, folks who maybe struggled to buy food to begin with, that's becoming an even bigger squeeze... their income as wages have stagnated." When Montanans are forced to spend large portions of their income on housing, any additional expense such as a medical bill or vehicle repair can quickly make a household food insecure. Unless we see an increase in wages to match the high housing costs in our country, it is likely that food insecurity will continue to be a prevalent issue in Montana.

### *Climate Change and Sustainability*

A recurrent theme we encountered throughout the interviews was the impact climate change has already had on local and global food systems. Some interviewees predicted problems that might arise in the future. There was a wide variety in responses to our question about the

impact of climate change on food security; only two interviewees declined to answer. Two respondents believed climate change has not affected food systems yet, though they expect it will in the near future. The majority gave answers to the effect that our food systems are already experiencing the impacts of climate change in some way.

The most widespread sentiment regarding the effects of climate change was concern with increased temperatures, lack of moisture (and less predictable precipitation), and a lengthened, intensified drought season. Other commenters mentioned the increasing prevalence of erratic weather events like hail storms, untimely cold snaps early in the fall, springtime flooding, the spread of pests, and water scarcity as issues all rooted in anthropogenic climate change. One problem particularly noticeable to Montana farmers is the negative effects extended periods of summer skies filled with wildfire smoke have on plant growth and fruiting. An official for the city of Missoula discussed the spreading global issue of climate migrants or refugees forced to move into new areas following drought, food shortages, or natural disaster.

While climate change was a central component of our interview findings, there was also a wide variety of information regarding different environmental factors and the importance of sustainability. Several interviewees discussed the importance of soil health and the use of crop rotation techniques and the use of cover crops, the importance of preserving cropland as urban centers grow, the use of high intensity or “mob” grazing, and the negative effects of hormone and antibiotic use in livestock, and the overuse of nitrogen-based fertilizers. In total, there was a clear acknowledgment among interviewees that an important component of food security is the health and sustainability of local and global food systems.

## **Conclusion**

Our first goal when conducting interviews with stakeholders in Montana's food system was to answer our research question, but we knew we would need a way to effectively communicate our findings. Using the documentary format was the most logical way to engage an audience with our message. Climate change and food security are both complex and deeply entangled with our economy and culture, so they often seem abstracted. Abstract issues inspire apathy rather than action, so we set out to ground the problem and present it in a digestible way. Interviewees consistently mentioned that one of the obstacles in addressing food security is how rarely it is part of the political discourse. Ideally, our documentary will get people to think about food security in their communities and the impacts climate change will have on it. We attempted to present the issue from a variety of perspectives and make a seemingly distant issue more immediate. The challenges with alleviating food insecurity are too multifaceted to have one simple solution, but conditions will never improve if the general public does not realize there is a problem and that climate change will only exacerbate it. We believe a short video is the best way to get people talking about food security. Transcribing and discussing the interview clips helped us find themes and through-lines in the responses. Using those themes allowed us to create a narrative structure for the film. To give the film a logical progression, we analyzed how our understanding of the issue increased and tried to reflect the process in the film. Footage from interviews forms the backbone of the documentary, though it also includes transitional narration from our group, shots of people working on farms or in food resource centers (like the Missoula Food Bank), and landscape footage from around the state. Answering the research question is not enough, to have an impact, we want to raise awareness as well.

Food insecurity in Montana is high for a number of reasons. Foremost being that housing costs are increasing and wages are not keeping pace. As a result, individuals and families are

forced to allocate more of their income towards housing costs, instead of other priorities. For the majority, food insecurity is not a constant issue, but many households teeter on the edge, barely able to keep the budget balanced. Even minor problems can break an already tight budget. An unexpected layoff or unforeseen expense can push a household past the threshold, leaving them without enough income to purchase healthy food. Thus, many individuals become food insecure for a short time and must rely on emergency food resources. Many rural areas do not receive enough fresh, nutritious food to allow for a healthy diet, and gas stations can serve as the primary food suppliers for an area. The food that is affordable and available for low-income and food insecure households is generally lacking in nutrition, and fails to thoroughly fulfill health needs. Climate change may be currently impacting our farmers' and ranchers' crop yields, and will almost certainly change them significantly in the future. The yearly number of warm days is likely to increase, snowpack will decrease, wildfires are expected to worsen, and extreme weather events will likely occur more frequently. If Montana is to improve the food security of its citizens, steps should be taken to reduce poverty and increase access to food (especially in rural areas). Many of our interviewees recommend purchasing local food, to support local farmers and spur local economic growth. Acknowledging that there is an issue with food security and contributing to funding local food suppliers will help food insecurity in the meantime as our local economy develops. Food security may be a prevalent issue, but it is a solvable one given sufficient community support.

Given that our main reason for creating a documentary was to spread awareness, the final step in the project is to ensure our documentary reaches as large an audience as possible. Social media is the most efficient way to organize activist movements, so it will be our first method for spreading the word. We plan on using a combination of showings at local venues and posting the

film on various video sharing platforms to put our film in the public eye. This method should allow us to connect with both a local and a global audience. Ultimately, the key to reducing food security will be to make it part of the political discourse. If our documentary gets people talking and thinking about what they can do to help alleviate food insecurity and mitigate climate change, we will have accomplished our goal.

## Works Cited

- Altizer, Sonia, et al. "Climate Change and Infectious Diseases." *Science Magazine*, 2 Aug. 2013.
- Burke, Marshall, and David Lobell, editors. "Climate Effects on Food Security: An Overview." *Climate Change and Food Security*, 1st ed., ser. 37, Springer Netherlands, 2010, pp. 13–30.
- Clean Air Act. 42 U.S.C. §7401 et seq. (1970)
- Cynthia Rosenzweig, et al. "Assessing Agricultural Risks of Climate Change in the 21st Century in a Global Gridded Crop Model Intercomparison." *Proceedings of the National Academy of Sciences of the United States of America*, vol. 111, no. 9, 2014, pp. 3268-3273, *Virology and AIDS Abstracts*, <http://www.jstor.org/stable/23770681>, doi:10.1073/pnas.1222463110
- Ellis, Jonathan. "The Paris Climate Deal: What You Need to Know." *The New York Times*, The New York Times, 1 June 2017,
- Food and Agriculture Organization. *An Introduction to the Basic Concepts of Food Security*. Report. 2008. <http://www.fao.org/docrep/013/al936e/al936e00.pdf>
- Food and Agriculture Organization. *The State of Food and Agriculture: Climate Change, Agriculture and Food Security*. Report. 2016. <http://www.fao.org/3/a-i6030e.pdf>
- "Food Security Council." *Montana Foodbank Network*. Web 11 Oct 2017.
- Global Food Security Act of 2016. Pub. L. 114-195. Stat. 675-684 *Congress.gov*. 20 July 2016. Web. 10 Oct 2017.
- Hogan, Sheila. "State of Montana SNAP Program Overview." *Montana DPHHS*. Web. 10 Oct 2017.
- LAL, R. "Soil Carbon Sequestration Impacts on Global Climate Change and Food Security." *Science*, vol. 304, no. 5677, 2004, <http://science.sciencemag.org/content/304/5677/1623>.
- "Massachusetts vs EPA." US Department of Justice. Supreme. 1999. 14 May 2015. Web. 27 Sep 2017.
- The Montana Department of Agriculture (MDA), Ag Facts. [Montana.gov](http://Montana.gov), [agr.mt.gov/AgFacts](http://agr.mt.gov/AgFacts).
- "Overview of the Clean Air act and Air Pollution." EPA. Environmental Protection Agency. 28 April 2017. Web. 3 Oct 2017.

- Partridge, Krista. "Taking a Look at Food Stamps in Montana." Montana Legal Services Association. 19 Dec 2014. Web. 10 Oct 2017.
- "The Global Food Security Index." *Global Food Security Index*, The Economist Intelligence Unit, Sept. 2017, [foodsecurityindex.eiu.com/](http://foodsecurityindex.eiu.com/).
- United Nations Framework Convention on Climate Change. "Status of Ratification." *The Paris Agreement - Main Page*, United Nations, 12 Oct. 2017, [unfccc.int/paris\\_agreement/items/9485.php](http://unfccc.int/paris_agreement/items/9485.php).
- United States Environmental Protection Agency. "Climate Impacts on Agriculture and Food Supply.", Washington, D.C, 2016. [https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-agriculture-and-food-supply\\_.html](https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-agriculture-and-food-supply_.html).
- "U.S. Government Global Food Security Strategy 2017-2021". U.S. Government, U.S. Aid, 2016.
- Wheeler, Tim, and Joachim Von Braun. "Climate Change Impacts on Global Food Security." *Science Magazine*, 2 Aug. 2013.
- Whitlock, Cathy, et al. *2017 Montana Climate Assessment: Stakeholder Driven, Science Informed*. Montana Institute on Ecosystems, 2017.
- Wreford, Anita, Dominic Moran, and Neil Adger. *Climate Change and Agriculture : Impacts, Adaptation and Mitigation*. Organization for Economic Co-Operation and Development, Washington, District of Columbia, 2010, *e-Journal/e-Book*, <http://hdl.handle.net/2324/1202337>.
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## **Appendix A - Interview Questions**

### All Interviewees

1. In your opinion, how would you define food security? [have a definition of food security if they are unfamiliar]
2. Where do you buy most of your food?
  - a. Potential follow ups: Why? What do you look for in your food?
3. In what ways do you see our changing climate affecting our local and global food systems?

### Food Security Organizations

4. What are some major obstacles to obtaining food in Missoula/Montana?
5. On average, how many individuals do you serve, per week?
  - a. Follow up: On average, how many are food insecure? [provide a definition]
6. How has food security changed in Montana over the past 2-3 decades?
7. What is the source of the majority of the food you distribute?

### Farmers

8. Does sustainability play any role in your business model/mission?
9. What types of techniques are you practicing to promote sustainable agriculture?
10. Have you changed your agricultural practices in any way during the last twenty years?  
Why or why not?
11. Where does the majority of your produce/livestock end up?

## **Appendix B - Subjects**

City of Missoula  
- Chase Jones

Climate Smart Missoula  
- Amy Climburg  
- Abby Huseth

Community Food and Agriculture Coalition  
- Bonnie Buckingham

Garden City Harvest  
- Greg Price  
- Josh Slotnick

Livingston Food Bank  
-Michael McCormick

Missoula Food Bank

- Aaron Brock
- Kelli Hess
- Jessica Alred

Missoula Mayor  
- John Engen

Missoula School Superintendent  
- Mark Thane

Missoula Urban Demonstration Project  
- Ellie Costello

Muddy Creek Ranch  
- David Shockey

The Poverello Center  
- Kristen Patton

## **Appendix C - Food Security Index**

