The Role of Values in Decision-making of Small, Vegetable Farmers in the Minneapolis-St. Paul Foodshed

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Abstract:

In a simplified and often romanticized view of agriculture, many consumers may think small, vegetable farmers are a straight forward group—persons in rural areas seem similar in nature through planting, growing, harvesting, and selling their produce. In reality, the farmers making up the small, vegetable farming community are complex and diverse. For example the farmers who participated in this study have identities as business-minded farmers who use social networks as a means of gaining skills and business connections, farmers who rely heavily on close-knit family groups and see farming purely as a job, farmers who fell in love with the humbling work of farming and see it as a connection to a higher cause, and generational farmers who see farming as a way to change the food system. Layered underneath each of these typologies is a complexity of forces driving small, vegetable farmers to farm. These dynamics forces influence how individuals evolve as farmers and interact with policies.

This paper uses a mixed methods approach to better understand the values of small, vegetable farmers serving Minneapolis. With the goals of Homegrown Minneapolis, the food policy council for Minneapolis, in mind this paper aims to give better insight to decision-makers. By better understand the perceived pathway for change rooted in farmers' perception of quality of life, epistemology, and perceived barriers, policy makers are better be able to create targeted polices and, in turn, reach the key goals outlined by Homegrown Minneapolis.

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1. Introduction

In 2009, the city of Minneapolis's City Council adopted *The Homegrown Minneapolis Report*, which offered recommendations to improve the city's growth, processing, distribution, consumption and waste management of healthy, locally grown foods and authorized the Homegrown Minneapolis Food Council (Homegrown Minneapolis). Since 2009 Homegrown Minneapolis's goals for the city and region have grown into six domains: (1) economic, (2) health, (3) foods security, (4) environmental, (5) social connectivity, and (6) food safety (*Table 1*).

Domains	Goal
Economic	A local food system supports small farms and local jobs, creates new business opportunities, and encourages the re-circulation of financial capital within the city.
Health	Increasing consumption of healthy foods contributes to improved nutrition and reduced levels of obesity and other chronic diseases.
Food Security	The ability for residents to grow, process sell and easily obtain a consistent, adequate supply of fresh, sustainably grown, local foods can empower families and communities to be more self-sufficient
Environmental	Producing and buying sustainably grown, local food can improve: *Water and soil quality* by reducing chemical and water usage; and *Air quality* by reducing the amount of transportation and packaging required to bring our food from farm to table, thereby by decreasing pollution.
Social Connectivity	A local food system enhances community cohesion and encourages individuals to share resources in order to provide for the collective needs of their neighbors and the community as a whole.
Food Safety	Food grown locally can be processed and distributed by small and mid-size operations where careful attention can be paid to food quality and safety measures.

Table 1: Homegrown Minneapolis's Goals from Homegrown Minneapolis's website

The Homegrown Minneapolis Report makes clear that local food production is a vital component of the initiative and to each of its six domains. To understand how this citywide initiative fits the context of small, vegetable farmers serving Minneapolis and St. Paul, this paper seeks to link the farmers' perceived pathways for change in their vegetable production to Homegrown Minneapolis's goals through targeted policies.

There are two main types of farming policies, each targets different farmers, types of farming, and therefore overall has different broad objectives. The first, known as targeted policies are local in nature and are seen as appropriate interventions and optimal policy response to a specific problem. An example of a targeted policy is the Minnesota Department of Agriculture's Farm to School Grant (Sawyer, 2018). In order to increase the capacity of schools to buy food directly from farmers, the grant program helps schools identify barriers and offers support for purchasing equipment, offering training or modifying school district policies. The programs identify the specific barriers and policy instruments need to achieve the goals of increasing local food in schools. In contrast, the second type of policy known as broad-band policies seek to implement large market-based interventions (Van Tongeren et al, 2008). Examples of broad-band policies are those using large market policies to stabilize domestic prices like crop insurance and production subsidies (Van Tongeren et al, 2008).

The use of targeted policies and programs are often discussed in agriculture policy-making as a ways to increase agricultural productivity. However, targeted policies for specific agricultural producers may be even more important when trying to engage small producers focused on supplying their immediate surrounding areas in comparison to produces practicing conventional agriculture. Furthermore, targeted polices may achieve better results at a lower cost than broad-band policies (Van Tongeren et al, 2008).
To structure the targeted policy discussion and link policy to the goals of Homegrown Minneapolis, this study uses the Organization for Economic Co-operation and Development's (OECD) targeted policy guidelines.The OECD outlines four steps: (1) the identification of strategic objectives to form general concepts, (2) operational objectives

to define specific outcomes, (3) setting of target variable that is a point of intervention, and (4) create a specific instrument with direct indicators (Van Tongeren et al). Using the OECD targeted policy outlines, links can be made between co-association between farmers' quality of life based values, their perceived pathways for changing their farm, and their epistemology (how farmers are justifying and understand information) that underpin farmer typologies and Homegrown Minneapolis's goals. The operationalization linking OECD guidelines with Home Grown Minneapolis objective is expressed in the conceptual framework in *Table 2* and discussed below.

OECD's Targeted Policy Guideline Components	Strategic Objectives	Operational Objectives	Set of Target Variables	Instruments
Operationalization in this Study	Societal goals as defined by the *Homegrown Minneapolis Report*	Facilitators to overcome the farmer typology specific barriers as identified by the study		Farmers typology specific, value-based components as identified by the study to drive effective uptake of policy

Table 2: Conceptual framework linking the OECD's targeted policy guideline components to the operationalization in the study based on the goals of Homegrown Minneapolis and study results.

The six goals of Homegrown Minneapolis can be seen as societal goals set out to positively impact the city and region and are conceptually nested underneath OECD's strategic objectives. The study identifies specific facilitators, which can be leveraged to help farmers in specific typologies overcome their typology-specific barriers to uptake targeted farming policies set out by Homegrown Minneapolis. These study-identified facilitators are nested under OECD's Operational Objectives and Set of Target Variables. In turn, the Set of Target Variables identified are measurable targets linked to the Operational Objective. Lastly, the values and perceived pathways for change expressed by each farmer typology are nested under OECD's Instruments. While the goals for Homegrown Minneapolis offer societal targets that the food council is aiming for, this study provides a deep description of four farmer typologies. Farmer typologies are

themes of perceptions and thoughts regarding farming. By discovering farmer typologies and their accompanying themes, this study aims to outline farmers' needs and pathways to change and adoption of targeted policies, by farmer typology.

This thesis, the result of two years of research, has five sections. First the thesis offers context through a literature review of the local food system, quality of life, decision-making. With this context in mind, the study offers a conceptual model, which represents a generalized perceived pathway for change for farmers to adopt targeted policies as informed by the academic literature. Second, the methodology section then outlines the two research phases: (1) qualitative semi-structured interviews and (2) surveys conducted following Q Methodology. Third, the results section, four farmer typologies are revealed and interpreted. Fourth, in the discussion section the four farmer typologies and their unique narratives are linked to Homegrown Minneapolis's goals through a policy discussion. Finally, fifth, the conclusion section conclusion connects the results to other literature and outlines potential steps for continuing research.

Literature Review

Secretary Earl Butz of the USDA famously advised farmers during the early 70s, "get big or get out… adapt or die" (Scholar, 1973). While federal policies of the 70s stimulated the commodity market, the 'counter-culture,' *back to the land movement* drove people back to rural areas to grow their own food (Brown, 2011). In the past 50 years, local agriculture has moved from a fringe topic to a more common place position in society. In agriculture, "local" is an ambiguous concept, however recent consumer surveys show that consumer perception of what local production means is a product produced within 100-miles or within one's home state (The Hartman Group, 2008).

In part, the rejuvenation of local vegetable markets is also driven by the bifurcation between lifestyle-oriented and industrial scale producers (Constance et al, 2008). Lifestyle-oriented and local producers are understood to be one and the same (Constance et al, 2008). Lifestyle-oriented producers are defined as smaller farmers producing a variety of crops using artisanal and more sustainable practices, while industrial-scale farmers use monoculture production, or single crop systems, of high volume crops targeted to indirect markets. This bifurcation is driven by distinct and different motivations within the same system. Constance and colleagues argue there is an increasing gap between lifestyle-oriented producers and larger, industrial-scale producers, which shows more care should be given to understanding the distinct and different values of small, vegetable farmers (Constance et al, 2008).

Since local agriculture has become more commonplace in society in the United States over the last ten years (Low and Vogel, 2011; King and White, 2016), consumers are more able to identify benefits of small, diversified locally produced agriculture (Brown, 2011; The Hartman Group, 2008). Even though literature has not come to a clear consensus on the environmental pros and cons of local agriculture compared to industrial agriculture, consumers often perceive local food as better for the environment (Feldmann, 2015). Reviews of consumers' perceptions of local agriculture consistently show consumers expect local agriculture to be more environmentally conscious through, better understanding of production practices (Feldmann, 2015).

In addition to perceived environmental benefits, cutting out the 'middle man' is seen as a means to shift power back to small farmers, returning full control of the business, and creating better livelihoods (Wilkinson, 2002). Because farmers sell directly

to consumers, local agriculture is touted as focusing on direct relationships without any intermediaries creating more stable and lucrative livelihoods (Saul et al, 2016).

Although there are benefits to the local agriculture system and individual farmers, there are also clear barriers for local producers. Small, local growers are disadvantaged in the market place in many ways compared to larger, conventional producers (Vorley et al, 2009; Johnson et al, 2012). The differences between a consolidated production system and a distributed production system can lead to scaling and logistical disadvantages for small farms through the lack of economies of scale (Vorley et al, 2009). A consolidated system in represented by large farmers with large production capacities; common in conventional agriculture systems. In contrast, a distributed agriculture system has many small farmers with small production capacities; common in local agricultural systems. Economies of scale, or the economic phenomenon where larger farmers can produce the same unit as a smaller farm for a lower cost due to efficiencies, can manifest in many different ways (Vorley et al, 2009; Biermacher et al, 2007). The inconsistency of product and smaller volumes of product to leverage in the marketplace, local farmers also suffer from weak negotiating power. Poor access to new production or market information, financing, and technologies also weaken small farmers' abilities to achieve the economies of scale seen as required to sustain an on-farm livelihood (Johnson et al, 2012). The issue of scale is exacerbated when farm owners are unable to find skilled labor—further driving inconsistencies in their production value (Hardesty, 2008; LeRoux et al, 2009). Many of these constraints are seen as reasons why small, diversified farmers often struggle creating lucrative livelihoods (Abate, 2008; Shipman, 2009).

Despite all of these barriers, the market for local food from small producers is growing in the United States (Johnson et al, 2012). In 2008, small producers selling direct-to-consumers (through farmers' markets, roadside stands, onfarm stores, or community supported agriculture) accounted for $877 million in sales (Low and Vogel, 2011). *Figure 1* depicts the amount of sales and division of market streams in the local food sector. By 2015, the total U.S. sales in the direct-to-consumer market has grown to $2.3 billion (King and White, 2016). The near doubling of the local market and the near tripling of the direct-to-consumer market is a strong market signal of the importance of the local agricultural market. These market signals alone convincingly show the importance of the growing local food market, which drive the importance of reducing barriers for small, local farmers.

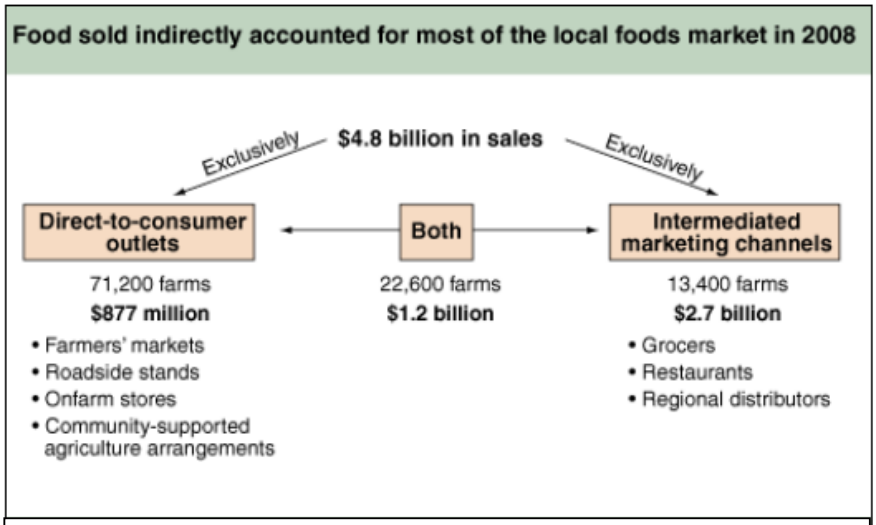

Figure 1: USDA Estimates of Local Food Sales (Source: Low, Sarah A., and Stephen Vogel. "Local foods marketing channels encompass a wide range of producers." *Amber Waves* 9, no. 4 (2011): 18.)

Quality of Life

Perception of quality of life has grown into a major area of research, but has not been used to understand the decision-making impacts of small, vegetable farmers.

Quality of life research attempts to understand what makes one feel good about one's life and sense of self (Flora, 1998). Quality of life is difficult to measure, because it is closely related to subjective feelings linked to fulfilling a purpose. It is also hard to measure, since interpersonal relations are an important aspect, or perhaps the most important aspect, of quality of life (Flora, 1998; Floress et al., 2011). Although quality of life is often associated with subjective well-being and standard of living, there are distinct differences in these terms. Subjective well-being focuses on a person's self-reported happiness and fulfillment with specific components of life (Diener, 1984; Flora, 1998; Contanza et al, 2008). Standard of living measures the amount of consumption required to meet one's basic needs (Sen, 1984). Each of these terms offers a different structure to understand fulfillment and happiness. Because subjective well-being and standard of living use scaled and often operational measurements for fulfillment and happiness, they are often easier to use. Operational measurements are measurements which come from the researcher's past knowledge and are often not specific to the study's context and population. While quality of life is more difficult to measure, due to its subjective and bottom up nature, it is required for creating innovative targeted policies by better understanding the context and population specific values poorly measured by other methods.

Although interest in farmer fulfillment and happiness has rapidly developed in recent years (Flora, 1999; Woroz et al, 2008; Silva et al, 2015; Chouinard et al, 2008; Dobbs et al, 2004; Mayberry et al, 2005; Burke et al, 2009; Campbell et all, 2011; Floress et al., 2011; Lynn, 2006), research addressing small farmers' perceptions of quality of life has not been conducted. While Worosz and colleagues' interview farmers, extension

agents and farming organization directors to better understand how farmers interact with specific policies and forms of institutions, the paper makes no mention of the method by which the group assessed quality of life and fails to even define quality of life (Woroz et al, 2008). In another highly cited paper, researchers discuss small farmer quality of life by simply asking the level of "[s]atisfaction [the farmers have] with quality of life provided by [their] farm" (Silva et al, 2015).

Many studies that address quality of life questions in agricultural populations have done so through a quantitative lens. Qualitative tests utilize the Likert-type Scale or other numeric scales. However, these scales have been proven ineffective due to a problem of self-reference as explained by 'community quality of life yardstick' (Fowler and Christakis, 2008). In Likert-type scale studies research participants are left comparing themselves to other community members rather than reflecting on the values important to their own quality of life. These measures include the use of a single question or a Likert-type 5-point scale. The use of these scales develop an inaccurate expression of participant perception of quality of life since participants are left measuring their quality of life based on the values prescribed by the researchers. Because quality of life is influenced by a variety of elements, including social connections, feeling like one is achieving their goals, and a connection to a higher cause, researchers that use single questions to measure or assess the quality of life of small, vegetable farmers may produce results that lack a nuanced understanding of the situation.

Significant research in quality of life has been done in the Urban Food System, but these studies mainly consider the social impacts of urban gardeners and do not consider the quality of life of farmers selling their produce commercially (Zigas, 2012; Genter et

al, 2015; Soga et al, 2017; UC-Davis, 2012). Since gardeners, by definition, do not sell their produce and can treat gardening as a hobby, it is expected that these quality of life results will be different than those of people who are farming as a livelihood.

When literature does consider commercial growers, research often does not focus on the underlying values (1) driving farmers to enter this market and (2) the impact these values have on the decision-making process of small, vegetable farmers (Woroz et al, 2008; Silva et al, 2015; Chouinard et al, 2008; Dobbs et al, 2004; Mayberry et al, 2005; Burke et al, 2009; Campbell et all, 2011; Floress et al., 2011). By better understanding the values farmers associate with quality of life, we can better understand these underlying forces.

Farmers' actions are heavily influenced by individual preferences formed in both the social and the institutional contexts (Wildavsky, 1987). This research, therefore, aims to fill the knowledge gap by (1) better understanding how small, vegetable farmers' values are associated with their perceptions of quality of life and (2) how these perceptions influence their farm management decisions. By filling this gap, this study will help researchers, communities and institutions serve small, vegetable farmers through targeted policies and programs, which could reduce barriers through more effective and engaging policy levers.

Farming and Values

In light of differing world views in a bifurcated agricultural system, divided between lifestyle-oriented and industrial scale producers (Constance et al, 2008), experts call for "new approaches in policies and structures" to create realistic change in agriculture in order to feed the planet's population (Giovannucci, 2012). A robust

understanding of farmer typologies and their associated barriers and facilitators to change and adopt targeted policies can help policy makers issue policies that are calibrated to their target adopters. As McGuire and colleagues eloquently reason,

> "[u]nderstanding why farmers perform agriculture as they do may inform efforts to engage farmers in educational opportunities, incentives, and regulations that will motivate them to modify their practices to take action that improves and protects the social and ecological systems within and outside their farm gates" (McGuire, 2015).

By understanding (1) farmers' value-based motivations, (2) farmers' epistemology and (3) farmers' perceived pathways for change to adopt targeted policies, researchers will will be able to develop appropriate targeted policies for the small, vegetable farmers typologies identified in this study.

In a series of papers, McGuire and colleagues used farmers perception of values to test performance-based environmental management interventions (PBEMI), which are interventions utilizing technology to give farmers more consistence reading on environmental impacts (2015). The project focused on the PBEMIs as a tool for better informing farmers on their water quality impacts. Researchers conducted seven farmer interviews and two watershed specialists at the beginning of the PBEMI project. Four years later, six original farmers, three additional farmers and two watershed specialists were interviewed. Researchers worked to understand the influence PBEMI on production and conservation outcomes. The interviews showed the PBEMIs influenced the farmers' identities bring conservation identities more in balance with a production identities. Even though the study only focuses on production and conservation values, it show one can influence farmers' actions by activating the value-based identities of farmers.

Despite literature showing a large distinction in values between conventional and local vegetable farmers, agriculture policies and regulations have largerly been driven by neoclassical economic expectations of profit maximization (Walder, 2018; Malawska, 2014; Lindbeck, 1997, Neilson, 2009; Nielson 2012). Economic policies through either command and control (policy instruments which enforce a desired behavior) or market based instruments (instruments which give economic incentives for a desirable behavior) (Walder, 2018; Malawska, 2014), assumes farmers to be rational actors oriented towards maximizing profits. This assumption is in direct conflict with decision-making literature.

While most policy is based on rational, profit maximization of farmers, studies have shown farmers do not act the way dominant theory predicts (Nielsen, 2009). Both theoretical and empirical studies show social values, among other influences, often keep farmers from profit maximization (Linbeck, 1997). When using broad-band policies, market incentives might not be high enough to shift behavior away from the actor's original values (Nielsen, 2012). Studies conducted in the US, Germany, Scotland, and Denmark have shown the social norm of having a 'good looking field' is a major reason why pesticides and fertilizers are applied above both economically optimal and legal limits (Kaljonen, 2006; Burton, 2008, Nielsen, 2009). Researchers explain the social norm of having a tidy field is associated with a farmer's value of professionalism driving decisions that do not maximize the farm's utility (Robbins and Sharp, 2003; Hirsch and Baxter, 2011). Therefore, farmers are influenced by non-monetized social rules, and compliance with programs is often lower than expected. Guillem and Barnes (2013) show farmers are likely to imitate the behavior of their neighbor rather than taking the most

appropriate actions for their own farm purely because the neighbor farmer is perceived as more successful in the community. While literature shows differing production styles and decision-making behavior are important in addition to profit-maximization, agriculture policies still rely solely on profit-maximizing assumptions.

Bounded rationality theory is used to explain the influence of values outside of profit-maximization. In bounded rationality theory the decisions of the farmers are rational when bounded by the specific objectives the farmer is pursuing and the direct context in which the decision is being made (Simon, 1985). Bounded rationality theory asserts actors do not make decisions purely based on self-interest and economic utility; rather a mixture of self-interest, social consciousness and altruism drives actors in concert. The theory asserts that actors have a limited capacity to make decisions—especially when decisions are complex or evolve rapidly (Simon, 1985). Because of a reduced ability to make fully informed and comprehensive decisions in a complex or rapidly changing environment, actors often fall into value-based tendencies rather than choosing a path that optimizes their utility.

Theoretical Framework

By understanding the quality of life components driving farmers' values in pilot research this study uses the Cognitive Hierarchy Model as a theoretical framework (Whittaker, 2006). While other models emphasize contextual (Guagnano et al, 1995), personal capability (Stern et al, 1999) or habitual influences (Dahlstrand and Biel 1997), behavior literature focuses on the influence of fundamental values on behavior, which is reflected in the Cognitive Hierarchy Model. Vaske and Donnelly's (1999) original Cognitive Hierarchy model aims to represent the steps and connection between values

and behaviors. The framework is represented as a triangle, since as one moves up the hierarchy from bottom to top components move from a few core and overarching values to many context-specific behaviors. *Value*s represent very few elements of basic social cognition. Although there are very few *Values,* they are elements that can be broadly applied to most aspects of a person's life.

When interviewing 8 small, vegetable farmers during the pilot study of phase one of the research between March 1, 2017 and May 1, 2017, the interviews began with broad questions, which aimed to better understand these high level values held by farmers. It was important to first understand these few in number, central beliefs of farmers, since these values are slow to change and touch every decision of the farmer. After analyzing and coding the interviews, three distinct values were identified: autonomy, community and passion. Autonomous-based values are associated with personal benefit or personal development. Community-based values are driven by social altruism or a community first perspective. Last, passion-based values are connected to a farmer's higher cause, or desire for altruistic benefits outside of community.

Above *Values* in the model are *Value Orientations,* which represent the basic beliefs people have about generalized topics such as agriculture or the environment. While *Values* are broad beliefs that touch every aspect of a person's decision-making, *Value Orientations* are more specific and represent the patterns of decision-making in specific domains of life—in this case agriculture. With the increase in specificity, *Value Orientations* are greater in number and have a more direct connection to the actions the farmer is taking on the farm or in the community. While the *Value Orientations* identified during the coding of the interviews range from generational identities to eco-centricism,

these values still depend on the broader *Values* of each farmer in the decision-making process.

Above *Value Orientations*, in Vaske and Donnelly's original Cognitive Hierarchy model is *Attitudes and Norms*. *Attitudes and Norms* are positive or negative evaluations of specific events and are influence by the first two levels, *Values* and *Value Orientations*. The *Attitudes and Norms* evaluate what would or should be appropriate in a specific situation. Because they are much narrower in time-frame and scope, attitudes and norms can vary widely based on the action, target, context, and location of the object being evaluated.

This study will not continue up the hierarchy to *Attitudes and Norms*. The aims and methods of the study do not address this level of specificity. For instance, if our study proposed a hypothetical situation to farmers and asked him or her what he or she should do, one would need to better understand the cognitive level of *Attitudes and Norms*. However, because this study aims to better understand the more generalizable *Values* and *Value Orientations* as a part of a farmer's decision-making, we do not address this level, or any higher levels, of the cognitive hierarchy.

In addition to recognizing the importance of the Cognitive Hierarchy model in understanding the decision-making process of farmers, three components were added to the model based on the pilot research: barriers, perceived pathways for change, and epistemologies (*Figure 2*).

Although barriers and constraints to farmers have been highly studied and are often associated with policy directives (Martinez et al, 2008; Ackoff et al, 2012), the connection between the values driving the farmer and the constraints keeping farmers

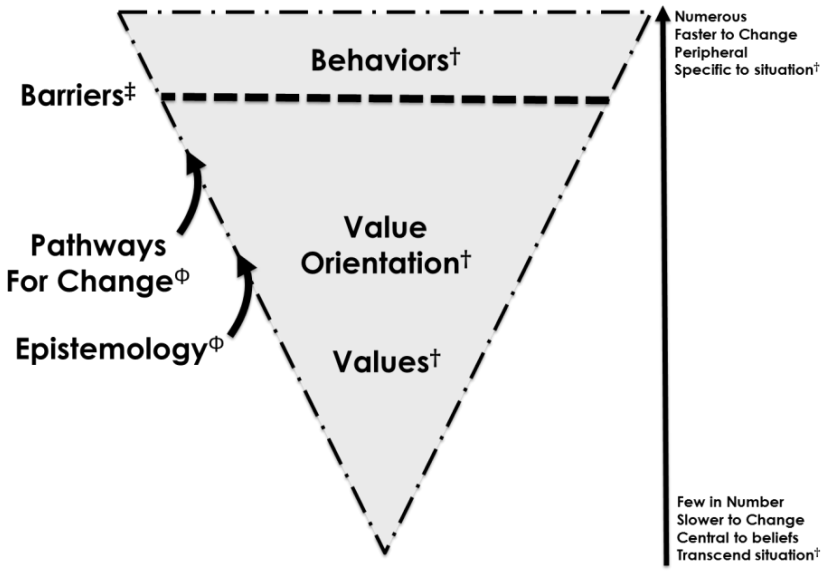

Figure 2: Theoretical Framework

† Vaske, Jerry J., and Maureen P. Donnelly. "A value-attitude-behavior model predicting wildland preservation voting intentions." *Society & Natural Resources* 12, no. 6 (1999): 523-537.

‡ Heberlein, Thomas A. "Navigating environmental attitudes." Conservation Biology 26, no. 4 (2012): 583-585.

Φ Floress, Kristin, Linda Stalker Prokopy, and Shorna Broussard Allred. "It's who you know: social capital, social networks, and watershed groups." Society & Natural Resources 24, no. 9 (2011): 871-886.

from taking action is rarely studied. As discussed by Heberlein (2012), skills, opportunity, social network, or resources barriers often divert a person from his or her intended action. As a hypothetical example, a farmer's desire to act upon his value of passion and his value orientation of generational farming identity may be derailed due to a barrier of knowledge keeping him from acting or being successful. Through this lens it is important to understand the barriers that most often co-associate with values and value orientations. Research has not worked to connect the co-association of farmer typologies to common barriers faced specifically by the typology. By better understanding co-association, policy-makers will be better able to create clear, direct policies which address barriers based of farmer typologies. To represent the barriers keeping farmers from acting upon their beliefs, a dashed-line is added on the Cognitive Hierarchy model.

It is not only important to understand the values driving farmers and the barriers keeping farmers from acting on those values, it is also important to understand the farmer's perceived pathway for change (McGuire, 2013). In the past, policies have used market-based tools to influence change, but, as discussed, these policies often do not accurately predict the bounded rationalities of the farmers (Nielsen, 2009; Nielsen 2012). An understanding of farmers typologies should also include an analysis of how farmers learn of engage with new knowledge, their epistemology. Understanding the epistemology of small farmers creates opportunities for effective farmer engagement because it identifies the levers each typology already sees as trustworthy (Floress, 2011). Targeted policies addressing the perceived pathways for change and the epistemology of farmer groups have the ability to create greater success because both the information and the means of information transfer occur in a policy vehicle that is understood and accessible to the farmer typology. Two arrows, labeled 'epistemologies' and 'pathways of change' have been added to the model to represent these elements on a farmer's decision-making processes. As the model above shows, decision-making is not isolated attitudes but nested layers of values interacting with barriers and perceived pathways for change.

Study Aims

Without working to understand components of decision-making beyond neo-classical economic assumptions, such as quality of life based values and perceived pathways for change, policy makers will continue to adopt solutions for small, vegetable farmers with lower success than expected. While a perfect prediction of outcomes is not possible, adding these additional components to policy development, which work to

understand themes of altruism and farmer-specific-values, can help better address local agriculture specific barriers. Therefore, this study aims (1) to describe the values held by small, vegetable farmers located within 100 miles of Minneapolis-St. Paul, (2) to better understand the co-association of the values with perceived barriers and pathways for change, (3) make policy and program recommendations linking the goals of Homegrown Minneapolis to the perceived pathway for change rooted in farmers' perception of quality of life, epistemology, and perceived barriers.

2. Research Strategy and Methodology

Study Design

This study utilizes a mixed methodology approach with two phases. Both phases utilize Q Methodology, which was first developed by William Stephenson and Sir Cyril Bert as a method in the field of psychology (Brown, 1980). The name 'Q' comes from the type of analysis unique to the method. Normal factor analysis, called 'R Method', compares variables across study participants (such as acreage farmed, years of experience, or education). Q methodology compares study participants across all responses rather than just comparing single answers across individuals (Brown, 1980; Brown, 1996). This approach allows researchers to identify common belief systems in a population instead of a population's correlation to single ideas. In Q methodology these common belief systems are called narratives. The farmers who collectively tell a narrative are a part of the same *factor*. In Q methodology, the common group is called a *factor* and the beliefs they collectively hold are called their *narrative*. Through Q methodology, typologies of farmers and factors of farmers are one in the same. In recent years, this desire to understand narratives collectively held across individuals in a factor

has increased in popularity outside of psychology, driving the use of Q Methodology in many interdisciplinary fields (Brown, 1980; Brown, 1996; Kamal, 2014). As Davies and Hodge (2007) emphasize, Q Methodology is able to give an analytical approach developing groups of similar individuals rather than an individual's attachment to isolated attitudes.

Q methodology observes the narratives of these farmers, which are then aggregated into factors through understanding the different narratives of small, vegetable farmers. In Q methodology the discussions occurring amongst the stakeholders is termed as *the concourse* of the topic. The *concourse* then, is a collection of opinions, not facts, grouped into factors which provides a range of the participant viewpoints on a topic (Brown, 1980; Brown, 1996; Davis and Hodge, 2007). Opinions are used instead of facts because Q Methodology asserts that opinions carry a value-laden connection to the participants' identities and are often a more powerful influence on decision-making than facts alone (Brown, 1980; Brown, 1996).

As Steven Brown asserts, the goal of Q methodology is to *elicit the survey taker's perception of the concourse rather than measuring their agreement to facts* (Brown, 1996). By eliciting participant perceptions of the concourse rather than measuring agreement with isolated facts, Q Methodology is better able to construct farmer typologies, which provide a better depiction of the co-association of a farmer's values with a farmer's perceived barriers and pathways for change. Additionally, past studies which use a questionnaire to elicit farmer's values have asked questions without competition among values (Chouinard et al, 2008; Dobbs et al, 2004; Mayberry et al). The use of ranked statement sorting in Q Methodology directly reflects the direct

competition of values described in the decision-making process. For this reason, the Q Sort is more representative of a farmer's real decision-making process, since it more directly reflects the complexities of decision-making by expressing co-associations and direct competition of values.

Because of its bottom-up and descriptive nature, Q methodology is not based on random sampling; therefore, this study cannot say the results are fully representative of the population nor can it predict the distribution of the farmer factors observed (Kamal, 2014).

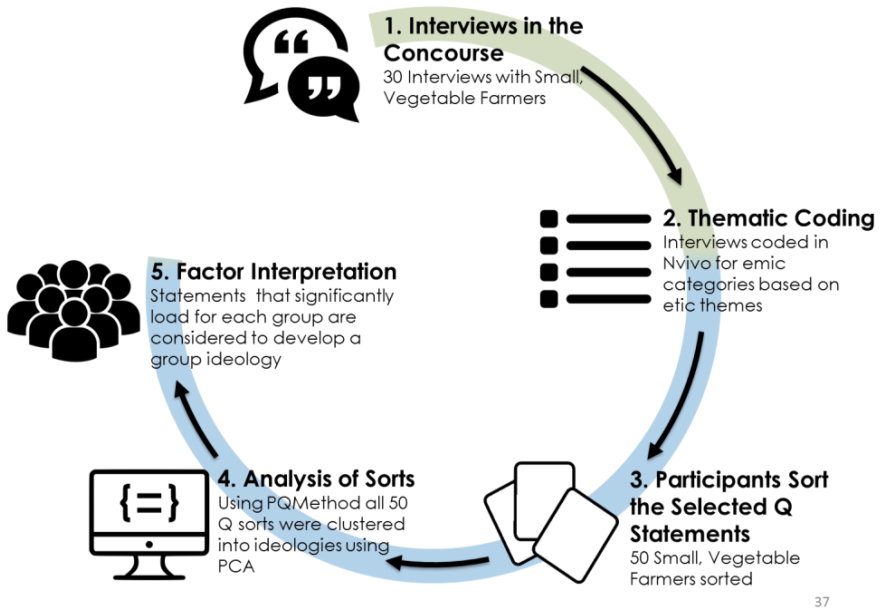

Figure 3: Outline of Study Method. Green-shaded research components are a part of phase one. Blue-shaded research components are a part of phase two.

The two phase of the research methods are depicted in *Figure 3*. First phase one is defined by the semi-structured interview process and the thematic coding of these interviews. In *Figure 3* phase one in depicted as the green-shaded components of (1) *Interviews in the Concourse* and (2) *Thematic Coding*. The thematic coding of phase one informs the survey component a part of phase two. The outline figure represents this

linkage by also shading component *Thematic Coding* blue. The final three components of the outline, (3) *Participants Sort the Selected Q Statements*, (4) *Analysis of Sorts*, and (5) *Factor Interpretation*, builds of the *Thematic Coding* so they are also blue-shaded. The following sections discuss the design, sampling, data collection, interview questions/statement selection, and data analysis for phase one and then phase two.

Phase One: Design

The first phase of this study works to understand the dialogue of small, vegetable farmers within 100 miles of Minneapolis and St. Paul. To capture and understand the concourse of the small, vegetable farming communities near Minneapolis and St. Paul, we utilized a 60-minute semi-structured interview approach. The semi-structured nature of the interviews allowed the researchers to add interview questions when new topics were brought up by participants, as well as remove questions when a topic has become saturated. Topics are seen as saturated when further interviews were unable to develop new information (Patton, 2002; Glaser, 1967). Previous qualitative research has shown at least 13 interviews are needed to reach thematic saturation (Guest, 2006).

Q Methodology is designed to reveal meaning constructs as they are defined by participants themselves (Brown, 1980; Brown, 1996). Traditional studies that are derived from the researcher's previous knowledge or assumptions tend to reduce the breadth of the questions down to the researcher's own expected outcomes (Brown, 1996). In this way, researchers functionally reduce farmers' perceptions around decision-making down to previous or known themes leaving little room for new or unanticipated knowledge discovery. In contrast, the semi-structured interviews of this study allow farmers' own perspectives to drive the research as themes percolate through discussion. By filling the

study's general theoretical model of decision-making inductively—bottom-up from the participants—rather than deductively—top-down from literature—the study is better able to elicit the accurate ideologies of the participants.

Phase One: Sampling

The sampling criteria for the 60-minute, semi-structured, interviews with farmers were as follows: (1) having greater than three years of experience; (2) using less than 20 acres of land for production; (3) selling directly to consumers, restaurants or institutions; and (4) growing and selling their vegetables within 100 miles of Minneapolis. Experience instead of age is used as a criterion, since the small, vegetable farming community is represented by a diversity of farmers who have started farming at different ages during their lives making an age-based requirement ineffective. In addition, longer experience would increase a farmer's likelihood of working through good and bad production seasons. Also, by having greater experience, farming is more of a career choice and not a short term job. The inclusion criteria used for acreage is included to identify lifestyle orientated farmers. Lastly, the inclusion criteria of vegetable production allows for a smaller scope of sampling. Although there was interest from non-vegetable farmers, the differing barriers across the production systems would have brought too much variety to the data.

These criteria were identified through email communication before setting up interviews. Although it is not a part of the explicit inclusion criteria, the researcher worked to obtain a representative sampling of different cultures and an even male to female represented in the sample.

The researcher recruited interviewees in two ways for phase one. First, the researchers reached out to known small farmer organizations (i.e. the Sustainable Farming Association, The Land Stewardship Project, The Hmong American Farmer Association, Minnesota Institute of Sustainable Agriculture) through email to recruit farmers. We were able to use the newsletter and email lists of these groups since these offices have extensive small farmer networks. Individual farmers reached out to the researchers through email expressing interest in participating. Since recruitment goals were not met by contacting these organizations, other recruitment strategies were adopted. Through the Hmong-American farmers' organizations the authors found there were previous researchers who had also been interested in qualitative interviewing; however, since most of the farmers in the organization did not choose this profession but was the only job available to them, they were more reluctant to share their experience.

The study recognized that by using organizations for recruitment an undesired elements was added to the sample population. Farmers that have joined these organizations may have joined due to specific motivations that are not representative of the entire population. For this reason, a second round of recruitment was completed through the snowball method or for referrals to other farmer. In this sampling group, the author added the exclusion criteria of farming organization involvement to develop a more accurate representation of the population.

Additionally as discussed in the explicit methods section, the researcher contacted the farmers from the first round of interviews to snowball into a second round. After completing the second round, the project reached its interview goal of 30 small, vegetable farmers.

Phase One: Data Collection

After approval by the University of Minnesota's institutional review board, data collection took place between March 1, 2017 and January 15, 2018.. The author of this paper is a graduate student in the Masters of Science in Science, Technology and Environmental Policy at the University of Minnesota's Humphrey School of Public Affairs and was involved with all 30 interviews. Even though the first eight interviews were coded originally to offer preliminary results, they were recoded with the other 22 interviews with the updated code book, which were the inductive themes developed during the coding process. The author conducted semi-structured, in-depth interviews using the interview guide described below. The lead author interviewed all participants and took notes. All interviews were audio recorded.

Phase One: Interview Guide

The interview guide was developed by the author through literature reviews focusing on quality of life, decision-making, and agriculture policy informed the selection of the original interview domains. Through the first eight interviews, the interview guide was refined. Questions in the interview guide revolved around the themes of: (1) perception of quality of life, (2) social interactions, (3) barriers to success, (4) and pathways of change and epistemology. *Table 3* includes questions from each theme.

Domains	Questions
1. Perception of Quality of Life	• How does farming help give meaning to your life? • In an ideal world, what would help you improve your quality of life? • What aspects of farming facilitate the life you want to live? • What aspects of your job do you most enjoy? • How does Quality of Life influence your decision-making?
2. Social Interactions	• How does farming facilitate your interactions with the community? • Please talk about any farming organizations you are a part of. • What are the Social Norms of vegetable farming?

3. Barriers to Success	• In your experience, what has been some challenges related to your farm you faced?
	  • How can you avoid these stresses?
	  • What are the tradeoffs associated with avoiding these stresses?
	• What barriers keep you from accessing the resources you need?

4. Epistemology	• Who/What influences your decision-making? • How do you determine credible information when making a decision?

Table 3: Thematic Domains and Interview Guide Questions

Phase One: Data Analysis

After each interview, the audio recordings were transcribed and coded to reoccurring, inductive themes using the software Nvivo. These themes are nested into the categories associated with the adapted Cognitive Hierarchy model discussed in Section 3 and further depicted in *Figure 4*.

The concourse was coded with deductive codes based on the study's general theoretical model and findings from the literature review. Underlying inductive themes, which fit into each code, developed from the concourse itself (expressed in *Figure 4*). The *Value* of autonomy, community and passion were observed as they were in the pilot results of phase one. With more interviews, the study was able to develop thematic saturation of nine *Value Orientation*s, which range from production and profit to eco-centric and generational identities. Farmers identified three ways of learning: self-learning, or learning through trial and error; farmer-to-farmer learning or organizational learning. Reflecting the ways farmers learn, farmers also identified three pathways for change: personal, community and institution. Lastly, seven barriers were observed

Category	Theme	Number of Statements
Value	Autonomy	4
	Community	4
	Passion	4
Value Orientation	Production	2
	Profit	2
	Eco-Centric	2
	Generational Identity	2
	Duty	2
	Consequence	2
	Character	2
	Risk	2
Epistemology	Self	3
	Farmer-to-Farmer	3
	Organizational	3
Influences of Change	Personal	3
	Community	3
	Institution	3
Barriers and Constraints	Personal	2
	Knowledge	2
	Capital	2
	Social	2
	Market	2
	Regulation	2
	Systematic	2
Additional		2
	Total Statements	62

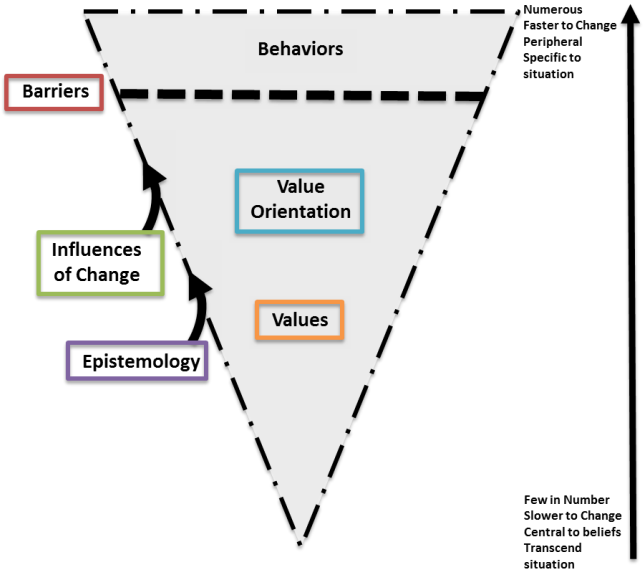

Figure 4: Matching Q Statements to Theoretical Framework

through the interview process. The author used the results to distill these observed themes into key statements. These coded statements from the semi-structured interviews were then used as input for phase two.

Phase Two: Design

The second phases of the study builds off the semi-structure interview results of phase one to produce a Q-Sort, the survey phase of the Q Methodology. This phase of the research aims to develop specific typologies of farmer ideologies based on farmer's opinions of the concourse statements (Brown, 1980; Brown, 1996; Davis and Hodge, 2007; Kamal, 2014). Q Methodology uses the term 'factor' to describe these typologies of farmers. First, a sample of opinions is drawn from the concourse. This is called the Q Sample (Brown, 1980; Brown, 1996; Davis and Hodge, 2007). The opinions making up a

Q Sample are a distilled set of statements representative of the diverse viewpoints present in the concourse.

The statements are then presented to the second round of participants in the form of a 'Q Sort'. During the Q Sort, participants are asked to sort the Q Sample into a pyramid (as depicted in *Figure 5*) with the left most statements being the statements with which they most disagree, the middle statements being statements that are perceived as neutral, and the right most statements being statements with which they most agree. The location of each sorted statement was recorded and will be used in the analysis. Additionally, short interviews were conducted with each participant after the Q Sort to add additional depth to the reasoning for each individual Q Sort. These interviews are essential because a participant's interpretation of the Q Sample may be different than the researcher's due to the farmer's personal context and inference. The information gained through this process also supports the clarity and depth of the final narratives of each farmer factor.

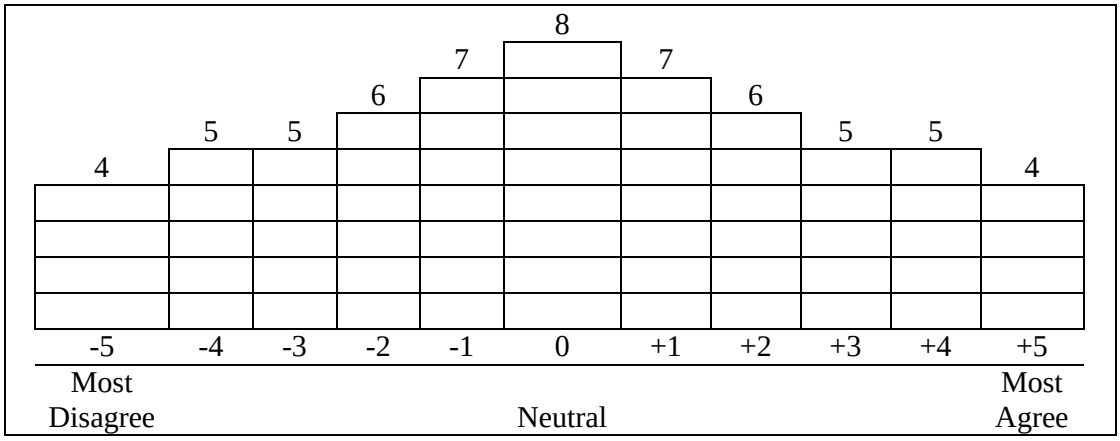

Figure 5: Q Sort Pyramid. Participants a part of the Q Sort sorted each of the 62 statements into the pyramid above. The statements they most agree with are sorted in the left most column and the statements they most disagree with are placed on the left. The participants then sort towards the middle, or more neutral statements. This model allows the researcher to record the participant's preferences in a model that reflects the decision-making process.

Phase Two: Sampling

The inclusion and exclusion criteria were held the same between phase one and phase two since it is the same population was being studied. For the in-person Q Sorts, participants were recruited while they were attending agricultural conferences within the inclusion criterion of 100 miles from Minneapolis. During recruitment the inclusion criteria were orally confirmed. Because the study recognized that a specific type of farmer may be motivated to attend these conferences compared to another, the study used the online platform PoetQ to do more random sampling. Farmers were recruited by email through farming organizations as well as through local, faming directories. Farmers who participated in the interview process of phase one were not excluded from participating in the sorting process of phase two.

Phase Two: Data Collection

A total of 50 Q Sorts were, obtained through in-person and online sorting through the PoetQ software, between February 1, 2018 and March 15, 2018. The in-person sorts were administered by the author at agricultural conferences within the inclusion criterion of 100 miles.

Phase Two: 'Q Sample' Selection

In this study, the Q Sample, the distilled collection of representative statements was directly developed from the coded interviews data of phase one. The Q Sample was developed from over 600 individual statements, which were then distilled down to 60 representative statements based on the same themes coded in the concourse. Sixty statements were selected to represent the voices in the concourse and retain the diversity of viewpoints observed. Two additional statements , which identified barriers for young

farmers, were added based on a report produced by the National Young Farmers Association (see Statement 61 and Statement 62 in Appendix A). As one can see in *Figure 4*, all themes for each category have the same number of statements. For example, the three themes under *Values (Autonomy, Community, and Passion)* all have four statements a part of the Q Sample. This is done in order to provide balance to all themes The specific Q Sample selected for the Q Sort are identified in Appendix A.

The Q Sort was piloted with two farmers who participated in phase one of this study. This was done to check for statement clarity, and check if their viewpoints in the concourse were accurately and fully represented in the Q Sample.

Phase Two: Analysis and Interpretation

The 50 Q Sorts, obtained through in-person and online sorting through the PoetQ software, were entered into the software package PQMethod, which is a statistical program designed specifically for Q studies. The sorts were manually entered and analyzed using the Principle Component Analysis (PCA) (Brown, 1996; Kamal, 2014). In contrast to regular PCA, which views the statements themselves as the variables, Q Method views the participants as the variable. This scope of analysis allows researchers to understand the common attitudes across the study population rather than differing attitudes towards a single statement (Brown, 1996; Brown, 1980). The sorts were then rotated and loaded to 3, 4, 5 or 6 factors based on the *Verimax* function in the program. The four-factor PCA was selected for two reasons: (1) the fewest number of sorts were dropped or left out as non-significant, and (2) the covariance between factors was the lowest, thereby offering the most distinct group of narratives.

Table A1 depicts the factor loadings for each of the Q sorts. The first column in the program's output is the sorter's individual name (i.e. Q Sort 2, 5, 17). This number is a designator used as a place holder and was not linked to the participant's identity to preserve anonymity. The next four columns represent that individual sorter's loading for each factor. If an individual loads as a '1' the individual perfectly aligns with the statements that make up the narrative of the factor (Brown, 1996; Kamal, 2014). Conversely, if an individual loads a zero, the individual has no connection to the narrative connected to that factor.

QSort	Factor 1	Factor 2	Factor 3	Factor 4
2	0.3383	0.1762	0.1333	-0.5661**X**
5	0.3451	0.0573	0.2388	0.3085
17	-0.0351	0.8227**X**	0.0857	0.0305

Table 4: Factor Loading Examples

One of the loading scores for each sort will have an 'X' placed to the right of one loading factor if it is significantly associated with that factor. This shows that, the sort is significantly influencing the overall narrative of the factor's identity. As you can see, there are some sorts loading heavily on one factor and some that are more evenly spread across two or more factors (Brown, 1996; Kamal, 2014). This is representative of their level of loading across factors and may show a participant has one strong identity or many more minor identities. As an example, 'Sort 17' in *Table 4* is most heavily loading on factor 2, as denoted with an 'X', and has a score if 0.8227. 'Sort 17'highly defines the overall orientation of factor 2 and mostly falls into this factor ideology (the sorts next highest loading score is Business via Social Network Farmers with 0.0857). Another example is 'Sort 5', whose highest factor loading is for Business via Social Network

Farmers with 0.3451. Although this is the sort's highest loading score, it is relatively low and other factors' score are near in loading (factor 2: 0.0573, factor 3: 0.2388, factor 4: 0.3085). Because of 'Sort 5's more even load score, 'Sort 5's data will not be as heavily weighted when calculating the general narrative of factor 1.

Based on their loading values, each sort influences the narrative of the factor. In *Table A2* are the statements as they are correlated to each of the factors. Statements with negative, marked in red, correlations, express greater disagreement across the whole factor (Brown, 1980). Statements close to zero in value, marked in yellow, are statements each factor collectively sorted neutrally. Lastly, the highest, marked in green, values denote statements the factor most often agreed with.

Last, a negative factor score for a sort means the participant is opposing the identity. Participants might load most heavily on a factor but have a negative score. This would be interpreted as a participant strongly defining the identity of the factor but in opposition to the majority of the participants loading on the factor. For instance, sort '2'

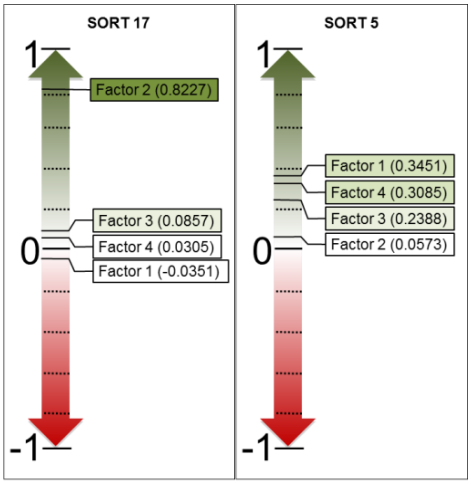

Figure 6 (left) & Figure 7 (right): Distributions of factor scores for individual Q Sort participants

most identifies with Business via Social Network Farmers but has a score of -0.5661. The participant's sort is one that would help the researchers better understand the factor group's ideology, but sort '2' would have an opposing viewpoint compared to other sorts loading on factor 1.

After defining the characteristics of each factor, it is important to understand farmers may be telling one or multiple narratives through their sorts. *Figure 6* and *Figure 7* are examples of two different sorts representing the hierarchical nature of the loading scores associated with ideological narratives.

In the case of the two sorts depicted above, sort '17' (*Figure 6*) has a large gap between factor 2's loading score and the next highest factor. In sort '5' (*Figure 7*) the factors' loading scores are much closer in hierarchical ranking. When the top identity is so dominant, as in sort '17', policies aiming to activate lower identities might be far less successful than in the case of sort '5', where all identities are much more closely bunched. By using a methodology, which allows farmers to reveal an entire belief system, the results more closely reflect the worldviews that drive farmers to participate in different programs and policies based on value judgements linked to their bounded rationality.

3. RESULTS

The Emergence of Four Factors

Through the analysis process, the author observed four major factors.

Factor 1: Business via Social Network Farmers

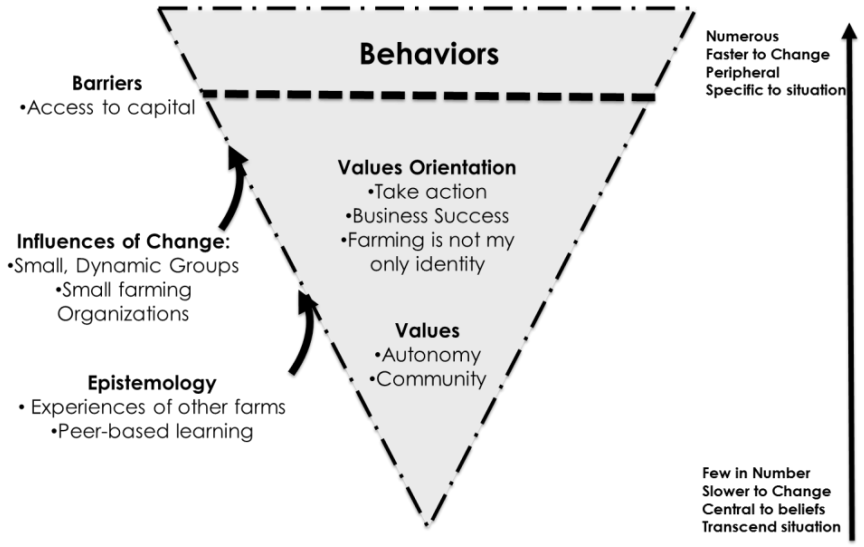

Figure 8: Business via Social Network Farmers' Framework based on the Q Method Results

The farmers significantly loading into the Business via Social Networks Farmers group express a very social and community based narrative. While other groups identify the social components of farming as a direct value, Business via Social Networks Farmers does not (Statement 60, -4; Statement 6, 0). Rather, they value the social components of farming, because they see community as a means to create change for farmers and society (Statement 29, 2; Statement 43, 3). The importance of social groups is made even stronger since the narrative explains learning and developing as a person comes from peers and other social groups (Statement 32, 3; Statement 29, 2). These farmers believe the knowledge leading to success is held by the small, vegetable farming community and knowledge transfer from farmer-to-farmer is a main barrier keeping

farmers from being successful. In this way Business via Social Network Farmers see social actions mainly as transactional and not reciprocal.

> "I chose to farm in the Midwest because I knew that there was a great community of sustainable agriculture organizations here. I am almost always texting, calling or emailing a farming friend with questions—during the season or in the off season."

In addition to their perceived barrier of knowledge transfer, they identify accessing capital to increase efficiencies on the farm as their biggest barrier (Statement 48, 4; Statement 47, 2). Although the group is business minded (Statement 60, -4) and enjoy the control the farm provides them (Statement 17, -2), these farmers do not consider the autonomy of being a boss as advantageous and include family or business partners in decision-making (Statement 2, -3). Many farmers in this group explain farmers still need to have a profitable business and keep 'good numbers' despite having many other values associated with the farm. They are the only group strongly disagreeing that nothing in farming makes money (Statement 60, -4) showing their potential business success as a group. While mentioning business success, it is important to Business via Social Networks Farmers are most likely to make business decisions mainly on profit-maximization by weighing the time and energy spent participating in different markets. Although these farmers do not want to emulate the market systems of the conventional agriculture system, these farmers believe local agriculture cannot expand its reach without gleaning from the success of conventional agriculture.

> "I think that the CSA market in the twin-cities is saturated, which is sad. Being able to sell your product is a huge problem. You can go to Hy-Vee and buy local organic produce and you can access it at so many places. It's great more people

> have access, but it is harder than for the small producers to sell. We have to adapt and get smart to find new markets."

Business via Social Networks Farmers are strongly driven to take action and make change (Statement 26, 5; Statement 23, 3), instead of being connected to a higher cause or purpose (Statement 10, -2; Statement 13, -1; Statement 3, 0). They hold themselves responsible for making change and believe if they do not take the time to make the change they want to see, there might never be any change. This group of farmers are also the most likely to see farming as only one component of their life—it is a job they enjoy, but they are driven by other talents and interests as well (Statement 20, -5).

> "It feels excessive, unnatural and unbalance when farmers only see themselves as farmers. It's like this is the only important thing and the only thing that people talk about all the time. They take every moment they can to promote the broader farming thing. I am like… I like doing that but I would way rather talk about a book I just read most of the time."

Lastly, Business via Social Networks Farmers are the likely to view research and resources coming out of the University system as valuable (Statement 31, -3). Ultimately, Business via Social Networks Farmers are business-minded and driven to farm as a means to create change they want to see while relying heavily on social and institutional systems for guidance and education.

Factor 2: Making Ends-Meet Farmers

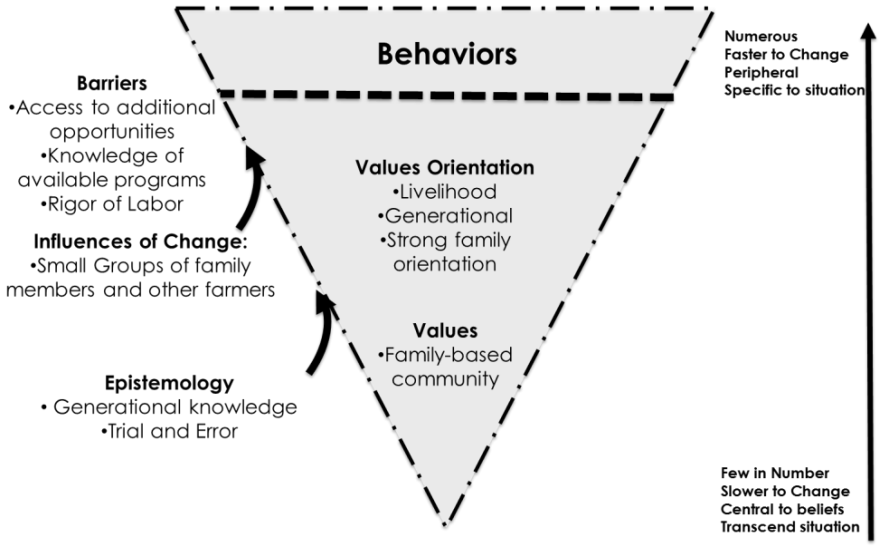

Figure 9: Making Ends-Meet Farmers' Framework based on Q Method Results

The Making Ends-Meet Farmers express farming mainly as a livelihood. Farming is seen as one of the only ways for them to earn money (Statement 19, 5; Statement 16, 2) as well as a means to supplement their own diet with fresh food (Statement 14, 4). Family and generational identity is closely tied to both personal value and success (Statement 6, 5). Family is seen as the main means to reduce the significance of barriers such as land access (Statement 61, -2) growing knowledge and market access (Statement 49, -2; Statement 50, 1), and organization (Statement 39, -3). Even though Making Ends-Meet Farmers are the only farmers that value farming as an identity (Statement 20, 2), their connection to farming is mainly seen as a livelihood and a business not a passion (Statement 12, -3).

> "Ideally I want to be able to find a stable job, because like I said we only farm because it was the only thing that my parents knew how to do and it was the only way that they could make money."

Unlike the Business via Social Networks Farmers, the Making Ends-Meet Farmers most strongly connect their identity to farming and do not see farming as a tool for change and means of learning. The group's strongest perceived pathways for change is identifying government programs for which they may be eligible (Statement 62, 3), but they are leery of being exploited by big organizations and companies and are the only group against the government paying small farmers (Statement 40, -1).

> "I don't have the money to really outsource to bigger companies to maybe get bigger. I also feel like the companies might scam me – there are no trusting relationship with bigger companies."

These values and attitudes reinforce the importance of family and trusted community members for these farmers, since they are seen as a major if not the only resource. Lastly, the narrative of the Making Ends-Meet Farmers emphasizes farming being mainly a job. They are the only group indifferent about creating change in the food system and the only group who does not see the future of farming having more farmers on the land (Statement 51, 0; Statement, 42, -5). Farming is seen as a labor intensive job that helps feed the family and pay the bills, and sometimes can boil over into the family lives that these farmers are driven by (Statements 54, 4; Statement 21, -4).

> "It is important that my kids learn that the hard work you put in today is going towards a bigger goal. They may be very smart and know their ABC but they need to keep working hard and study so they get good jobs."

Factor 3: Higher-Cause Farmers

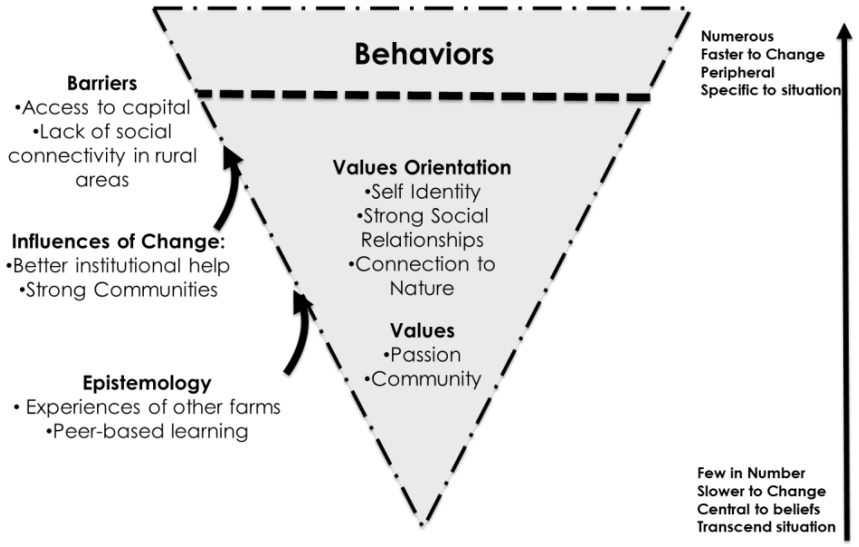

Figure 10: Higher-Cause Farmers' Framework Based on Q Method Results

Higher-Cause Farmers are driven by a higher cause more than any other group. The enjoyment in the act of farming itself is what drives the values of these farmers (Statement 3, 5). These farmers are the only group of farmers who explain a 'gut feeling' was what informed them that farming was the correct way to spend their lives (Statement 11, 2). This overarching call to farming is what drives them to continuously work to get better and makes them the only group that felt neutrally about the rigor of the manual labor associated with farming (Statement 24, 2; Statement 21, 0).

> "The first day of farming, I thought 'yes, this is what I am doing for the rest of my life.' It was total gut. I go by my gut a lot. It just finally felt right. I knew I wanted to do something to help the earth and people. It just felt right and I can't explain it more than that."

While all of the groups agree small farmers may need to have off farm jobs to support themselves, the narrative of Higher-Cause Farmers is the only one connecting working other jobs with living out their passion, not sustaining a livelihood. In addition to feeling

neutrally about manual labor, they are the only group who doesn't see the farm itself as a community building endeavor and highly value the autonomy the farm gives them in being their own boss (Statement 5, 0; Statement 2, 5).

> "It's definitely that type of manual labor that was appealing. It is a good thing for someone to be tired at the end of the day."

Despite the narrative not seeing the farm itself as a community building place, the farmers highly value the support and social nature of relationships in the community. They disagree their communities do not have a lot of common groups for connections to other farmers and still see the community around them as the main means of learning new information and improving their businesses (Statements 56, -2; Statement 46, 2). There is a strong relationship between these farmers and their customers (Statement 7, 3). As one farmer belonging to the Higher-Cause Farmers explains:

> "We have been in farming for many years and it can be very discouraging. Just when we are feeling low we will get a letter, phone call, or message about our products being the best someone has ever had and they appreciate the work that goes into them. This gets us so excited again and really reenergizes us."

This creates an interesting dichotomy, since these farmers aim to create social connectivity, but see the actions of the farm as insular. This desire to succeed in the social setting of community pushes these farmers away from seeing their farm through a strict market-based lens (Statement 28, -4; Statement 41, -4). Farmers in this group are driven by dynamic groups of people and even though they enjoy the autonomy of their business, they see the strength in a well-formed community. These farmers also see help from the government as a way to make a living as well as a way to not rely as heavily on an unjust market system (Statement 40, 3). Ultimately, farmers belonging to the Higher-Cause

Farmers farm because of personal fulfillment and want to live a life they find just and good for society even if they can't change society itself.

> "I cannot make anyone live the way that I want to live. I can't make anyone use an outhouse or have clothes with holes in them. But I can do it. I know a lot of people like me. Maybe they don't want to farm, but they want to live outside the current system."

Factor 4: Structural Change Farmers

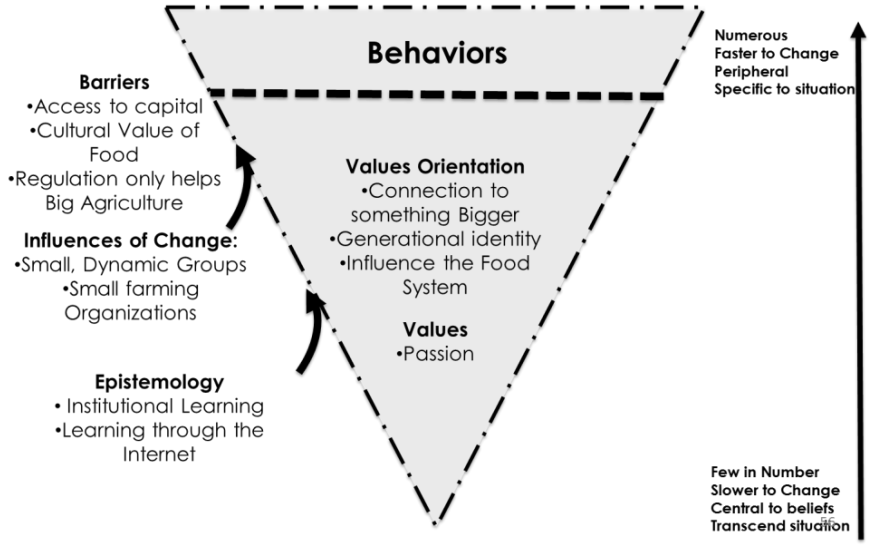

Figure 11: Structural Change Farmers' Model based on Q Method Results

Structural Change Farmers have started, or returned to farming, because of a draw of a higher cause much like the Higher-Cause Farmers. The Structural Change Famers becomes unique from the Higher-Cause Farmers due to a more market driven lens. Although Structural Change Famers see farming as a choice and understand why small farmers supplement their livelihoods with off farm incomes (Statement 19, -4; Statement 15, -5), they are more likely to have greater attention to market forces (Statement 59,4; Statement 60, 4). This market lens also pushes them to join and advocate for collective, market strategies like growers co-operatives (Statement 41, 5).

> "We are passionate about farming and believe in it. That doesn't mean we don't still want to make it work as a business—because we do. We want to make it viable... How can we make our [farmer] Co-op sustainable? That goes back to business too. The bottom line is if people are losing money it's not working. How can a local food system survive?"

Although this group is most likely to look towards its community for support in the market, they are the least likely to work on other farms before starting, the least likely to rely on other farmers for knowledge, and the most likely to go to the internet to find solutions to their farm's problems (Statement 23, 0; Statement, 46, 0; Statement 36, 2).

> "We've kinda just figured stuff out. Doing a lot of google. We trust google with our lives."

These farmers often have some connection to farming—such as growing up on or visiting a family farm as a kid—and look to reenter farming to fill the desire to farm and change a food system they perceive to be broken (Statement 52, 4; Statement 58, 4). Taking on their farm enterprise is a true fulfillment of deep-rooted desires to reconnect with both nature and a farming identity (Statement 10, 5; Statement 3, 2).

Comparing the Four Factors

The four factors emerged from the more quantitatively driven Q method results added clarity to and more distinct lines around the qualitative-based results of phase one. One narrative observed in the phase one result, which expressed the call to farm being rooted in a desire to achieve a better quality of life and not in the desire to farm itself, was expressed as two distinct groups through the Q analysis. These distinct narratives are observed in the Higher-Cause Farmer group and the Structural Change Farmer group. These two final factors are closely related in their indirect values gained through agriculture, but the specific values as well as their perceived pathways for change

are what make these final factors distinct. While Higher-Cause Farmers see farming as the means to achieve community and connect to nature, Structural Change Farmers are driven by generational identity or a desire to influence the greater food system. Both groups see their farms as a tool for change, but Higher-Cause Farmers more often connect with larger forms of institutions seeing formal institutions and large communities as a means for change while Structural Change Farmers sees small, dynamic groups and small, farming organizations as the means for change in their communities.

In addition to bringing greater clarity to the narratives of farmer factors, the Q methodology also allows one to understand the correlation between factors, as depicted in *Table 5*.

Correlations Between Factors

	Business via Social Network Farmers	Making Ends-Meet Farmers	Higher-Cause Farmers	Structural Change Farmers
Business via Social Network Farmers	x	0.1232	0.4797	0.3170
Making Ends-Meet Farmers		x	0.1817	0.0143
Higher-Cause Farmers			x	0.2682
Structural Change Farmers				x

Table 5: Statistical Correlations between Factors

Despite the Business via Social Network Farmers and the Higher-Cause Farmers having the greatest statistical correlation, it is important to understand the themes driving the correlation. Business via Social Network Farmers, Higher-Cause Farmers and Structural Change Farmers are most strongly correlated over their negatively associated values, which depict a shared identity explaining: (1) their involvement in farming is not only monetarily driven, (2) they did not feel like farming was the only job option for them, and (3) they believe there are social interactions that can thrive in rural areas. Although there

are strong correlations across these three themes, the nuances between these factors drive the narrative of each ideology (pictorially expressed in *Figure 7*).

Theme 1: Monetary Influences

It is true each of the farmer factors are not fully driven to farm for the monetary value it produces, but Business via Social Network Farmers still sees a strong connection to business, prosperity and their career as farmers. In other words, the Business via Social Network Farmers do not see money as the sole end goal of farming, but they do perceive it as one of the predominant end goals. Unlike the other factors, they are the most driven to enter many markets and seek additional capital and investment. For these reasons, the Business via Social Network Farmers are still heavily influenced by the profit generation of their farm even if it is not solely important. While the Business via Social Network Farmers is the group that most emphasizes the importance of profit, the Structural Change Farmers also values the profit of their farms. In other words, The Structural Change Farmers are still interested in being profitable, but are far more driven by the desire to reconnect with a generational identity. Unlike the Business via Social Network Farmers and the Structural Change Farmers, the Higher-Cause Farmers are the least likely to value the monetary aspects of their farm, since, for them, farming is so heavily connected to other values. Through understanding the nuances of each of these three factors, one is better able to understand the diverse implications of farmers not solely valuing the monetary benefits of their farms.

Theme 2: Option to Farm

When considering the second shared theme, which is the choice to farm, it is important to understand the different patterns distinguishing this theme. Through the post sort

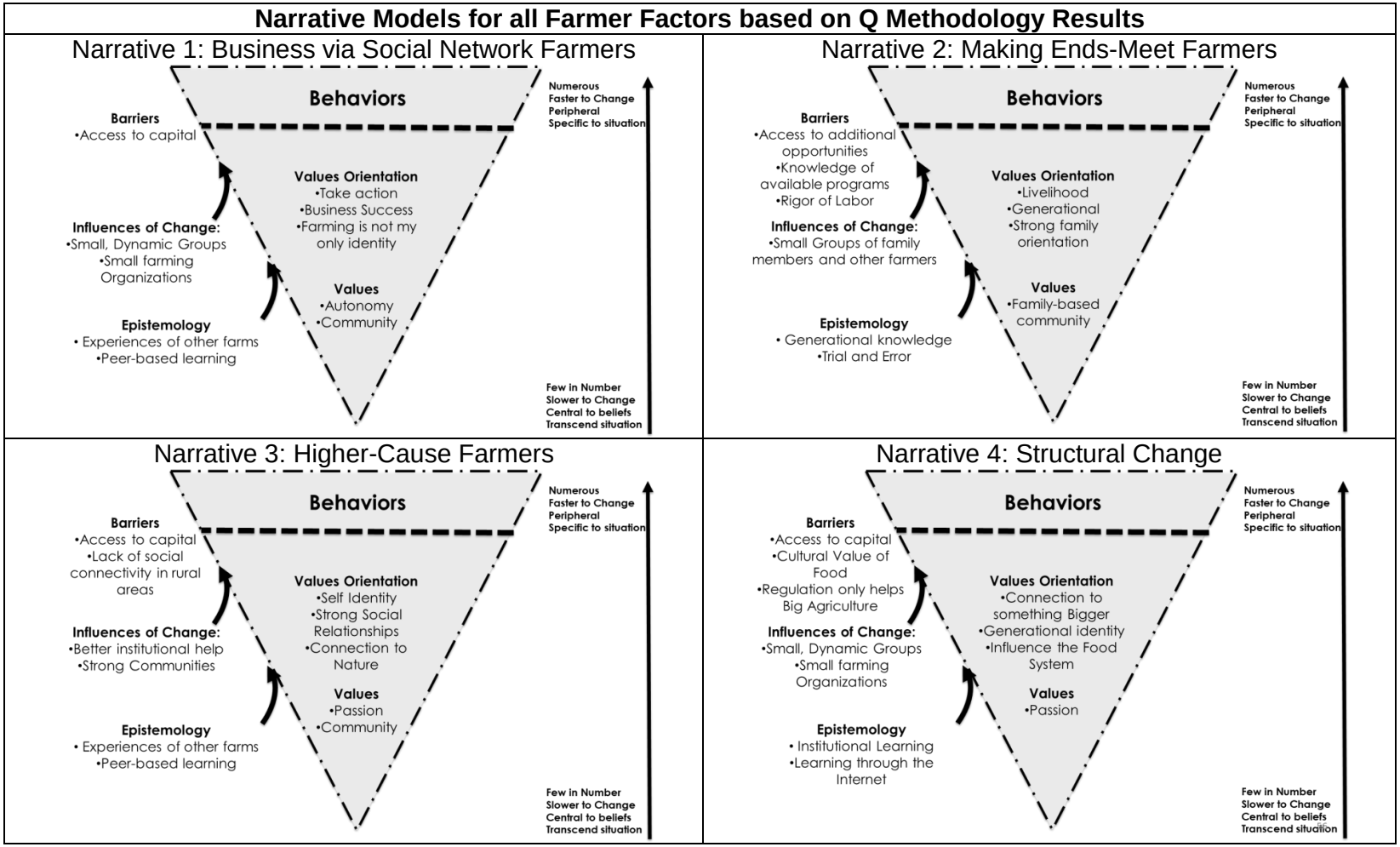

Figure 7: Narrative Models for all Farmer Factors based on Q Methodology Results

interviews, it is understood that even though the Business via Social Network Farmers, the Higher-Cause Farmers, and the Structural Change Farmers do not necessarily feel tied to the career path of farming, the Business via Social Network Farmers are most likely to exit farming if it becomes unprofitable, the Higher-Cause Farmers' passions are more closely tied to the identity of farming, and the Structural Change Farmers are chooses to re-enter the farming tradition as a nostalgic tie to their youth or family. In the case of each of these factors, the value of farming as a choice is paramount, although the specific reason to enter farming is entirely different for each factor. These more specific values also alluded to other ideologies in each factor. The Business via Social Network Farmers are also driven by a stronger free-market lens seeing the decision to farm as the ability to move in and out of the marketplace based on success or failure. Driven by passion, the Higher-Cause Farmers' narrative is less market driven, more socially driven and also associated government help as a pathway for change. Lastly, the choice to return to farming as a means to reconnect with a generational identity is key to the Structural Change Farmers.

Theme 3: Social Connections

Lastly, the shared theme of social viability in rural areas is also important to all factors and is driven by nuanced. Both the Business via Social Network Farmers and the Structural Change Farmers see the social interactions as a means to achieve a goal. For Business via Social Network Farmers, farmers see social connections as the most relevant way to gain knowledge and improve their operation. In this factor, peer-based information is the most important in decision-making. While the Business via Social Network Farmers see themselves as the agents of change, the Structural Change Farmers

sees their social-network as the means for changing the food system. The Structural Change Farmers is the factor more aligned with institutions and looks towards small, farming organizations as well as growers co-ops for educational and business support. Much like the Business via Social Network Farmers and the Higher-Cause Farmers, the Making Ends-Meet Farmers also tell a narrative advocating for the social groups they rely on. Because these farmers often associate in small, close-knit groups, they are heavily reliant on family and close community members for emotional and capital support. Rather than seeing their social network as a means to achieve a goal, the Higher-Cause Farmers see social community as one of the main goals of becoming a farmer. Lastly, Business via Social Network Farmers, Making Ends-Meet Farmers and Higher-Cause Farmers, all, at some level, see learning as a social process; whereas, The Structural Change Farmers give heavier weight to internet sources in their decision-making process.

4. Discussion

By observing these four factors of farmer, this study works to develop targeted policies and programs linking Homegrown Minneapolis' goals to the pathways for change expressed in the policies. The term 'factors' will be replaced by 'typologies' throughout the discussion section to more closely reflect language used in public policy. By connecting Homegrown Minneapolis's economic, food security, and social connectivity goals to the values, epistemologies and the perceived paths for overcoming barriers for small, vegetable farmers serving Minneapolis by typology, the policies and programs implemented by decision-makers can offer a higher likelihood of uptake by the farmers—ultimately leading to an increased likelihood of achieving their goals.

Homegrown Minneapolis's economic goals are linked to creating new business opportunities supporting small farms and local jobs and encouraging local spending in the city and region; food security goals aim to supply consistent, sustainably grown foods to local communities and families; and social connectivity goals promote community cohesion and resource sharing.

Although this study has linked the economic, food security and social connectivity goals of Homegrown Minneapolis to the values and pathways for change observed in each of the four farmer narratives the policies and programs developed to fit each farmer typology may be difficult to promulgate since many of the farmers who would be affected fall outside of the jurisdictional boundary of Minneapolis. For this reason the following sections identify policies at the state level and policy agendas for organizations working to enact new policy for each of the four farmer typologies. The matrix illustrates the conceptual framework in the introduction fully operationalized and links strategic objectives, operational objectives, target variables and instruments to each farmer typology discovered with this research (*Table 6*).

Targeted Policy #1: Training for Community Leaders

Because all of the farmer typologies identify dynamic leaders as an important part of their pathways for change, programs training community member on effective leadership could be helpful across typologies. A farmer explains the impact a dynamic leader can have on a farming community:

> "It's one group and one set of dynamic leaders that create places and opportunity and community. I see the power of community and how that assists in the creation of something larger."

Matrix linking the Four Farmer Typologies and their Narratives to Homegrown Minneapolis's goals using the OECD Targeted Policy Guidelines								
Targeted Policy #	Typologies				Strategic Objectives	Operational Objectives	Set of Target Variables	Instruments
	Business via Social Network Farmers	Making Ends-Meet Farmers	Higher-Cause Farmers	Structural Change Farmers				
1	High	High	Low	High	Increased Information Access for Small Famers (Social Connectivity)	Access to Social Communities	Increase training for community leaders	Development educational programs helping current or aspiring community leaders develop skills in effective meeting management, information dissemination, community deliberation, etc.
2	High		High	Low	Increased Business Success (Economic)	Increase access to Capital	Increase the total capacity of micro-loans by 10%	Development educational programs or loan matching programs through existing Small farming Organizations
3		High	High	High	Increase Number of Small Farmers (Social Connectivity)	Access to Social Communities	Increase Structures and programing that develop strong social communities	Support organizations that foster cultural and community development
4	Low		High	High	Increased Business Success (Social Connectivity)	Increase affordability to return to rural areas	Tax incentives to rent land	Allow landowners the ability to receive tax breaks if land is kept in production and rented to beginning farmers
5	High		Low		Increased Information Access for Small Famers (Social Connectivity)	Increase peer-based knowledge and learning	Develop structures of knowledge sharing in communities	Funding public organizations, such as the university extension system, to develop and maintain community-based science programs and a system of open source knowledge communication

Targeted Policy #	Business via Social Network Farmers (continued)	Making Ends-Meet Farmers (continued)	Higher-Cause Farmers (continued)	Structural Change Farmers (continued)	Strategic Objectives (continued)	Operational Objectives (continued)	Set of Target Variables (continued)	Instruments (continued)
6	Low		High		Increased Information Access for Small Famers (Social Connectivity)	Increase knowledge exchange pathways from/with Formal Institutions	Develop structures of knowledge sharing to communities	Funding public organizations, such as the university extension system, to develop and maintain research programs with knowledge exchange programs for small farmers or project that include small farmers in the project itself
7		High		High	Increased Business Success (Economic)	Access to more formal markets	Increase the number of farmers selling through grower co-ops	Working with existing community groups to expand the access to produce aggregation in order to collectively reach formal markets
8		High		High	Increased Business Success (Economic/ Food Security)	Access to more formal markets	Increase the number of institutions (schools, hospitals, etc.) able to process fresh produce	Implement training programs that helps instructional chefs/cooks better understand how to source and prepare local food. Establish a grant or loan program allowing institutions to invest in the equipment need to process/cook fresh produce.
9	High		High		Increased Information Access for Small Famers (Social Connectivity)	Access to Social Communities	Increase Structures and programing that develop strong social communities	Development of internship and apprenticeship programs that develop both farm and community knowledge
10		High			Increased Information Access for Small Famers (Economic)	Increase educational access	Increase events which offer educational advice	Working with existing community groups offering programs which help farmers identify pathways for career transitions
11			High		Increased Business Success (Economic)	Increased Government Support	Develop Security Structures for Small Farmers	Develop a more just crop insurance program for small vegetable farmers who do not fit traditional crop failure programs

Table 5: Matrix linking study results to Homegrown Minneapolis's goals using the OECD targeted policy guidelines
High- high connection to typology's narrative; **Low-** low connection to typology's narrative

By creating programs that develop dynamic, local leaders in agricultural communities, many of the following goals built around community will become easier to achieve.

Targeted Policy #2: Increased Access to Capital

While the Business via Social Network farmers, the Higher-Cause farmers, and the Structural Change farmers all identify access to capital as a driver of success, the Business via Social Network identified the access to capital as a major barrier to their success. Farmers in this typology are the most ambitious in their desires to scale-up the farm, but are often trapped by capital constraints. The Business via Social Network farmers see lines of credit from current formal institutions as unreasonable since the loan terms are not inclusive to small, vegetable farmers. A farmer discusses the disparity of programs helping small farmers access capital:

> "There are some programs that support small farmers but they are by far not the major parts of the institutions that are supposed to help farmers. There needs to be a way for farmers to get capital. There are no large coherent institutions or organization that affectively gives farmers access to reasonable credit."

The Higher-Cause farmers feel neutrally about the requirement of capital for success but still desire more coherent institutions offering credit for small farmers. Structural Change farmers feel slightly more positive on the need of capital for success and the need for coherent institutions. For these reasons, this targeted policy has low connections to the Higher-Cause and Structural Change farmers' narratives.

Both the National Sustainable Agriculture Coalition (NSAC) and National Young Farmers Coalition (NYFC) have aimed to address these issues when lobbying for the 2018 Farm Bill. Although there are multiple programs offered federal government to either offer lines of credit to farmers or increase support to private lenders, both groups

feel the government is not doing enough. Specifically, NSAC aims to increase the max Direct Farm Ownership Loans amount to $500,000, adjust annually based on farmland inflation rates, and authorize Direct Farm Ownership Microloans (<$50,000). While NSAC aims to open lines of credit, NYFC s working to develop tax breaks for farmers who are spending earnings on farm related purchases. This program would reauthorize and fund the Individual Development Accounts, which establish tax free savings accounts for farm-related purchases. These programs directly address the main barrier of the Business via Social Network farmers and would help farmers achieve their expectations of business and scaling success.

Targeted Policy #3: Fostering Strong Social Communities

The farmers a part of the Making Ends-Meet, the Higher-Cause, and the Structural Change typologies all have a strong link between farming and their identity as well as valuing the social communities around them. These two components of the farmers' narratives drive the importance of fostering strong social communities.

First, the narratives of both the Making Ends-Meet farmers and Structural Change farmers strongly identify with the generational identities in farming and the importance of their farms creating community. As one farmer in his interview explains:

> "I have to speak to the need to farm as an identity. I grew up on my grandparent's farm. I was the next oldest male and felt that it was my duty to farm, but I wanted to do it on my own terms so I wanted to wait 'til I was midlife. It is that deep rooted and seed thing to, like, do it because it was my turn."

By creating structures helping farmers connect to other farmers with similar generational and farming identities, farmers can better fulfill their desires for social connectivity.

While the Making Ends-Meet farmers and Structural Change farmers were driven to farm to connect to a generational identity, the Higher-Cause farmers are the most likely seek farming communities that already have vibrant communities and social dynamics. As a farmer explains:

> "We have had a handful of younger folks that we have offered the opportunity to farm in partnership with us, but social life isn't easy. It is a huge impediment. So you have to create places of cultural opportunities. You see communities around the Midwest who have succeed in those kinds of things—Montevideo, Viroqua, Monroe, Wausau. Those communities have developed the culture that small farmers want."

While this group strongly relies on dynamic leaders in their community to make change and drive social connectivity, programs funding community centers or social places like the Milan Village Arts School in Milan, Minnesota can help spur the vibrant communities these Higher-Cause farmers are seeking.

Targeted Policy #4: Tax Incentives for Land Rental

Creating structure that allows these farmers to reconnect to their generational identity while passing capital investments on to new farmers could be a win-win scenario for multiple typologies. Since Structural Change farmers are emotionally connected to a rural or farming identity and have often reentered farming after a successful career in another field, these farmers often have the capital but maybe not the knowledge to run a successful farm. The connection between this generational identity of the Structural Change farmers and the land access barrier observed in the Business via Social Structure and Higher-Cause farmers is embodied by the following farmer:

> "We don't need a farm income to make a living. We are passionate about it and believe in it. That's a main driver. Maybe were supposed to rent it to a young

> farm because land access is so bad. If just feels bigger than us. I feel like I'm just here caretaking it, but I feel incredibly fortunate to be here."

A policy that helps bridge the Structural Change farmers' desire to return to rural areas to fulfill a generational or rural identity and the poor access to land for other farmer typologies beginning or expanding their farms could be an effective way to successfully achieve the goals of both groups.

Starting in 2018, The Minnesota Department of Agriculture promulgated a tax credit for land or farm assets rented or sold to beginning farmers. This tax credit allows renters a 10% credit on the grow rental income for the first, second, and third years of the agreement with a maximum credit of $7,000 per year. By connecting their value to reconnect and their desire to impact the food system, tax incentives to rent the land to small, beginning farmers that may have more experience but don't have access to land can achieve this win-win scenario.

In addition the use of tax credits to keep farm land accessible, the National Sustainable Agriculture Coalition advocates for programs connecting retiring farmers to beginning farmers as well as land easements. The National Sustainable Agriculture Coalition calls for the federal government to provide $5 Million to help FSA effectively connect retiring farmers with beginning, social disadvantaged or veteran farmers. This is seen as a way to effectively transfer capital from an aging farming population to the next generation. Organizations in Minnesota, like the Land stewardship Project, have worked to fill this space through farm land renting or buying forums. To help spur this transfer, the National Sustainable Agriculture Coalition also calls for the prioritization of Agriculture Land Easement Projects that maintain agriculture farm viability and have programs such as an option to purchase at agriculture value. Agriculture easements are

seen as legal ways to fight the inflating costs of land—especially at the suburban-rural fringe. Because the land is ineligible for development once an agricultural easement is placed on the land, the land can only be assessed at its agricultural value rather than at its potential value of development.

Targeted Policy #5: Peer-based Learning Initiatives

Because Business via Social Network farmers and Higher-Cause farmers strongly identify as farmers who rely on their social networks to learn, a farmer-to-farmer based research platform would allow farmers the space and place to share and discuss innovative strategies for combating common problems would be a policy tool effectively fitting their perceived pathway for change. Self-driven or grass-root platforms might be more tailored to Business via Social Network farmers since they are more action oriented, so the following policies have a high connection to the narrative told by Business via Social Network farmers but low connection to Higher-Cause Farmers.

By connecting the immense knowledge base held by farmers to the robust power of a citizen science initiative, policy can produce a system enabling farmers to see their actions as science, see themselves as scientists, and see their own experiences as data worth sharing. By connecting knowledge to power, a citizen science initiative can help farmers make choices that make sense for them in order to preserve food security and develop a successful farming business. A citizen science platform, which allows farmers to ask questions together to overcome barriers, has three advantages: (1) farmer driven solutions, (2) farmer driven data, and (3) large, collective enrollment. First, by allowing farmers to develop solutions collectively to problems, technology is often more appropriate for the context, more affordable and more reliable. Second, with farmers

driving their own pathways towards solutions, they will be empowered to measure the data that matters to them. Third, research is often driven by what researchers think is important. By developing a citizen science program for small farmers, farmers can push their own research agenda. They can collectively choose the barriers they want to address. All three of these components align with the Business via Social Network Farmers' desire to learn through peer systems and the desire to take action.

An example of a policy which aims disseminate agricultural information through social groups is The Movimiento Campesino a Campesino (farmer-to-farmer movement) of Mesoamerica (Holt-Giménez, 2015). The decentralized farmer-to-farmer education movement is seen as a social movement driven by farmer themselves. Agricultural techniques and methodologies are exchanged through horizontal learning networks, where there are no formal leaders or teacher-learner hierarchies. Although this might be the most desirable means of knowledge development and dissemination for the Business via Social Networks, due to the action driven and social-network based components of the movement, the high decentralized nature of the movement also makes the program hard to manage and infeasible at a policy level.

Targeted Policy #6: Institution-based Learning Initiatives

While Business via Social Network farmers more heavily favor peer leaning through collectively taking action, Higher-Cause farmers have greater trust for institutional, like the government or university. Institution based programs are a strong fit for Higher-Cause farmers and Business via Social Network farmers. There are two programs, through the Sustainable Agriculture Research and Education (SARE) extension group

and the Minnesota Department of Agriculture (MDA), aiming to increase small farmers' research involvement in.

Since 2002, SARE has offered grants of up to $15,000 for up to 2 years through the On-Farm Research Grant Program to extension agents, university researchers, NGOs, and government personal (including, but not limited to NRCS and USDA-ARS). The grant is mostly organized to drive relationship building between farmers and researchers, and proposal requirements and outcome demonstrations are minimal. This grant is not directly accessible by farmers, which could be a major disincentive for the farmers a part of this typology. Because the value of taking action to make change and become better farmers is co-associated with the epistemology of learning from neighbors and other farmers, the Business via Social Network Farmers could be turned off by the larger institutional connection. The results of this study suggests that grants awarded to small, farmer-based non-profits, the Business via Social Network Farmers belong to, will be more successful in disseminating knowledge than universities or extension agents. Although this grant is mainly aimed to build a bridge between farmers and researchers, this program will most likely have better success with the farmers a part of the Higher-Cause farmer typology. This is because the program heavily relies on larger institutions, which the Higher-Cause farmers tend to trust more than the Business via Social Network farmers.

With similar aims as the SARE's On-Farm Grant Program, the MDA Agriculture Growth, Research and Innovation (AGRI) program has a Sustainable Agriculture Demonstration Grant Program, which aims to fund projects exploring sustainable agricultural practices and systems. Priority is offered to farmers who directly apply and

projects can be awarded up to $25,000 over 3 years. Additionally all results are published in the MDA's *Greenbook* annually. Every year $250,000 is awarded to projects ranging from cover crops and conservation tillage to input reduction and season extension. This program plays off of the high ingenuity of the Business via Social Networks and their drive to take action themselves. Additionally, because the grant prioritizes applications of farmers, farmers a part of this typology are more likely to utilize this program. Last, the utilization of the MDA *Greenbook* as a means to disseminate information to farmers will drive a more effective result, since this group wants to learn through social interactions and other farmers.

Targeted Policy #7: Aggregation Markets

The development of policy creating successful grower co-ops or aggregating groups will offer the most help to the Making Ends-Meet farmers and the Structural Change farmers. Making Ends-Meet farmers associate with insular groups, which makes accessing larger formal markets difficult. Because Structural Change farmers are often entering farming later in their careers or while having another 'main job', marketing and sales are often difficult to fully attend to. In both cases, produce aggregation schemes can help relieve pressures for these farmers. Currently there are many examples of local aggregation schemes. By pooling products in aggregation schemes, groups of small farmers are able to collectively work together to capture some economies of scale advantages from which larger producers benefit. Farmers have also used local packers and distributers to reach growing intermediary markets. In attempt to sell into larger markets, some small farmers have turned away from selling directly to consumers using a 'middle-man' to increasing

the time farmers can spend farming and scaling up on farm rather than marketing, negotiating and distributing.

There are currently a few different models for produce aggregation offered to small farmers in the research area. First, there are examples growers co-op oriented models of product pooling. These models rely on a member-owner model for collectively sharing risks and benefits. Non-profits have also entered the product pooling space. Although the individual aims for buying from small farmers differ and range from market development for local farmers to equitable food availability for underprivileged consumers, the aggregation has ultimate opened up additional markets for small local growers. Lastly, there is institutional aggregation, were institutions such as schools, hospitals and nursing homes are able to use their large purchasing power to create markets for local farmers.

Targeted Policy #8: Institutional Market Development

While Targeted Policy #7 aims to help the farmers a part of the Making Ends-Meet and Structural Change typologies meet formal market demands through the aggregation of product, Targeted Policy #8 aims to help develop the markets by reducing barrier for institutional purchasers.

At a federal level the healthy-Hunger Free Kids Act of 2010 uses grants, training, technical assistance, and research to develop farm to school programs. Between the 2011-2012 school year and the 2013-2014 school year, local food purchases throughout the country increased from $386 million to $598 million. At a state level, the MDA's Agriculture Growth, Research and Innovation (AGRI) program has a Farm to School Grant Program, which aims to provide specific equipment, tools, training or policies need by school districts to serve more Minnesota grown food. Although this does not directly

affect farmers, if a growers' co-op is able to properly leverage a Planning Grant and Equipment Purchases and Physical Improvement Grant, the growers' co-op will be able to reduce the barriers for entry into a new market. Despite these programs, there is still a lot of work need in training the staff preparing food. During the interviews an experienced farmers discussed the difficulties of making farm-to-school programs work:

> "Schools don't happen in the summer time when the most of the vegetable production happens in Minnesota. That is a large speed bump. It can still happen if the person at the school is willing to work with you and knows how farming works. If not it is difficult."

By funding the purchase of equipment need to process and prepare fresh food as well as the training required to develop institutional interest in buying local food, additional markets can be developed for small farmers.

Targeted Policy #9: Internship and Apprenticeship Programs

The Business via Social Network farmers and the Higher Cause farmers are most driven to learn through internships and apprenticeship.

> "I don't think anybody should jump straight in. I know that everyone is different, but it is a big. Apprenticeships and internships are valuable, since there is a structured learning component. Now when I went to farm on my own I knew all of this and knew it well."

Additionally, Higher-Cause farmers aim connect to the social networks which already exist in the community around them, which can be achieved through internship or apprenticeship programs in their communities. Many organizations such as the National Center of Appropriate Technology's (NCAT) ATTRA, Willing Workers on Organic Farms (WWOOF), and Northeast Organic Farming Association (NOFA) and Good Food Jobs, maintain forms of apprenticeships and internships both nationally and

internationally, which could help this group of farmers connect with pre-existing farming communities as well as developing their farming skills.

Despite the many current forums for finding apprenticeships and internships, there are currently no laws giving guidance to apprenticeships and internships for agriculture in Minnesota. Minnesota has 80+ occupations with registerable apprentice programs. The State of Minnesota offers three reasons for maintaining apprenticeship programs through the Department of labor and Industry: (1) strengthen and maintaining Minnesota's industries through skilled labor, (2) assure a constant level of skilled labor, and (3) help keep the quality of products competitive. Although these three aims align with barriers facing the local food system as a whole, Minnesota does not have an apprentice program for and farming based occupations. The lack of farming apprentice programs across the nation has been identified as a problem and has become a main point of action for groups like NYFC. Funding of an apprenticeship program, either at a state or NGO level, will allows new farmers to develop skills over a number of years.

Targeted Policy #10: Educational Services

The Making Ends-Meet Farmers are the most pragmatic farmers of the group. They are good farmers and see farming mainly as a livelihood. In saying that, they often struggle with accessing formal markets and executing business plans. Because these farmers are a part of close-knit groups (mostly family members), creating a positive policy may be difficult. The most successful policies will be ones that target pre-existing local organizations like cultural groups or member lodges. Policy can be put in place to assist in the community's self-organization.

Additionally, the best mode of action might be helping develop their career paths through education or opportunity programs. The MDA Agriculture Growth, Research and Innovation (AGRI) program's Beginning Farmer Food Business Management Scholarship program, which aims to fund up to 50% of a beginning farmers cost of enrollments in the program. The program helps beginning farmers assess profitability, monitor cash flow and make marketing decisions while providing beginning farmers with one-on-one mentors. The program coincides with a 40 credit program held by Minnesota State College and University Systems. Programs like the Beginning Farmer scholarships have the ability to bring educational opportunities to farmers in a formal classroom setting.

Targeted Policy #11: Crop Failure Support for Small Famers

The Higher-Cause farmers are the only farmer typology who strongly desires help from the government. In addition, they are the only typology who feels like they have a good knowledge of the government programs available to them. The Higher-Cause farmers are aware of the government programs available and still feel like small farmers are being underserved. A direct example of the underservice to small farmers is exemplified by an interviewed farmer:

> "Small farmers just need better help. Last year we had a bunch of rain that flooded out all of our fields. I had crop insurance—they paid me $226. All of my plants for a 50 share CSA and I get $226. We don't fit the system and that's what the system sees our value as. It's a joke."

While the National Sustainable Agriculture Coalition is working at the federal level to allow the Non-insured Crop Disaster Assistance Program to cover farmers who are unable to purchase a Whole Farm Revenue Protection policy due to lack of product or

revenue history, more policies helping small farmers during crop disaster would help maintain business success. This being said, the Higher-Cause farmers are the typology who most strongly looks to government agencies for this type of support.

5. Conclusion

Through the mixed methodology approach of this study, four farmer typologies have been identified in small, vegetable farming community serving Minneapolis: (1) the Business via Social Networks farmers, (2) the Making Ends-Meet farmers, (3) the Higher-Cause farmersand (4) the Structural Change farmers. Each of these groups has a unique combination and co-association values of quality of life, epistemology, and perceived barriers. By understanding the perceived pathway for change rooted in farmers' values, the study is able to link current and prospective policies to the goals set out by Homegrown Minneapolis.

The observation of these four farmer typologies and their unique link to current and proposed policy was made possible by Q methodology. Because this study started by interviewing small, vegetable farmers, the themes expressed in the survey as well as the final results are rooted in the farmers themselves. This gives decision makers a more clear understanding of the values, barriers and pathways for change important to small, vegetable farmers. In addition, by working to observe values, barriers and pathways for change together in each farmer typology, decision makers are able to understand the goals farmers find most important, the constraints keeping farmers from obtaining those goals, and the ways farmers set out to obtain those goals. By understanding all three components together, decision makers can find appropriate ways to help farmers overcome barriers with policy levers conforming to the farmers values and perceived

pathway of change. By using Q methodology this study is able to tailor policy instruments for each unique farmer typology.

The distinct and diverse motives seen in these typologies are congruent with bounded rationality theory which balances business, social and altruistic influences when making personal and business decisions (Simon, 1985). The results of this study confirm the importance of community on small, vegetable farmers' values and emphasize its influence on decision-making and perceived pathways for change (Flora, 1998). While each of the typologies used or valued community in different ways, it consistently proved important. These results are consistent with the quality of life literature, which describes social relationships as an important, if not the most important components, of quality of life.

The reliance on social interactions is also explained by market innovation theory. The promotion of local producers has developed a semi-isolated niche market within the socio-political landscapes. As Geels et al. (2002) explain, successful niche systems rely heavily on social networks and user-producer relationships. This is markedly different than formal institutions, who offer written rules like government groups or organizations. Instead they often rely on informal institutions, which are social groups whose rules are unwritten, or social norms. The overlap of domains between niche market development and quality of life shows a clear connection between a farmer's perception of quality of life and business motivations. This connection further drives the need to understand small farmers' perception of quality of life.

To achieve the market expansion of small, local vegetable produces, for which Homegrown Minneapolis is calling, policy makers must not focus merely on market

motivations and barriers but also the social, quality of life motivations driving this diverse group of farmers. Current agriculture policy promotes an agricultural system with increasing requirement of capital investment and the specialization to a few commodity crops (Arbuckel, 2012). This form of policy has been described as the 'Agricultural Treadmill': a system driving rapid adoption of new technology to increase yields and an expansion of operations to spread costs over more acres. Previous scholars have shown quality of life in rural areas is strongly tied to non-farming elements (i.e. community vibrancy, community strength, and neighbor connection) (Wimberly, 1993; Arbuckel, 2012). This has driven a call for a more balanced approach between production support and community investment in rural development policy.

Although the farmers of all four typologies emphasized the importance of operating a successful business, farmer's quality of life was strongly rooted to personal, familial and/or communal development. Throughout the results, a balance between social cognition, a producer's understanding and promotion of their benefits to society, and business cognition, a producer's understanding and promotion of the economic viability of their business model, develops for each farmer typology, The balance between social and business values aligns with social entrepreneurship theory (Mitchell et al, 2007; Krueger, 2010).

The diverse values of small, Minnesotan, vegetable producers beyond economic profit exemplifies the importance of policy-makers understanding small vegetable farmers as social entrepreneurs who are balancing interpersonal relationships and informal institutions alongside their business goals. For this reason, future research is required to better understand how small, vegetable farmers are actually balancing social

values and business strategy through cases studies of small farmers that have succeed and failed. By better understanding these practical components of success and failure, more direct and accurate policy recommendations can be made.

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Appendix A: TableA1: Factor Array-Statements a part of the Q Sample and Factor scores.

Statements	Business via Social Network Farmers	The Making Ends-Meet Farmers	The Higher-Cause Farmers	The Structural Change Farmers
1. There are so many things in life that I can't control. On my farm, I am in control. It might not be large enough to make a difference, but it's important to me that I can have that control.	0.07	0.09	0.49	-2.24
2. There is an autonomy that farming provides by being your own boss.	-0.75	0.29	1.65	-2.14
3. Farming just brings such a sense of fullness. When I'm out in the field I am not worrying about if I'm living my life to the fullest. I know farming is what I want to do.	-0.01	-0.43	1.68	1.03
4. In the city I felt like now it is time for work, now it is time for exercise, now it is time for cooking. Everything is in weird boxes. When I'm farming my life is completely integrated and just feels like one whole life.	-0.09	-0.52	0.12	-0.68
5. What's being created by the farm is more of a community of people. At the end of the day that community is most rewarding.	1.09	1.07	0.08	1.04
6. The biggest benefit for us is in our family unit. It is what is most important.	0.03	1.87	-0.46	-0.61
7. The excitement and gratitude of our customer is absolutely worth farming in and of itself.	0.75	0.86	0.81	-0.13
8. There are very few careers that you can tackle things in your immediate spheres. Farming allows us to do that in a way that really resonates.	0.98	-0.65	0.81	-0.27
9. Farming makes me feel closer to my family and my culture. Sometimes I feel it helps me feel more attached to my ancestors.	-1.51	1.39	-0.75	1.41
10. This farm just feels bigger than us. I feel like I'm just here care taking it, and I feel incredibly fortunate to be here.	-0.37	0.12	0.14	2.15
11. The first day of farming, I thought 'yes, this is what I am doing for the rest of my life.' It finally felt right.	-0.87	-1.22	0.66	-1.15
12. Farming is how I live out that passion.	0.18	-0.95	0.39	0.25
13. I think the best part is when you feel so proud that you've grown something from a little seed, and nurtured it, and all of a sudden it becomes this thing that you can eat.	-0.04	1.16	1.16	-0.48

14. Having the home as a producing thing instead of a consuming thing was very appealing to me. It makes me so happy not buying everything I need.	0.43	1.34	0.81	0.56
15. It doesn't make sense that people are vegetable farmers and they still have to get another job. It basically means they are not a successful vegetable farmer.	-1.58	-1.79	-1.89	-2.39
16. Farming is just about money. It's about sustaining your business	-1.66	0.49	-2.34	-2.01
17. I like the idea of being the one that is not in control but being responsive to nature. Farming is about being responsive to what the land can do and having the time to be in tune with the land.	-0.38	0.18	1.03	1.53
18. We farm in a way that allows for diversity. I think, our farm is an example of the way you want a farm to influence the ecosystem.	1.17	-0.3	0.92	0.65
19. Farming was never a decision we made. We only know how to farm.	-2.3	1.74	-2.34	-1.13
20. Farming itself is my identity. It is deeply rooted and seeded.	-1.77	0.87	-0.05	-0.2
21. It's definitely that type of manual labor that was appealing. It is a good thing for someone to be tired at the end of the day.	-0.44	-1.23	0.14	-0.59
22. I am attracted to a life style that forces me to really work on myself; I see farming as that life style.	0.48	0.49	0.4	0
23. If I don't make change, maybe no one will. We all like to talk. Now is time for action.	1.02	-0.2	-0.39	0.03
24. I just want to be better. I want to continue to produce the best possible products I can.	1.18	1.06	0.61	-0.55
25. It's also about being a role model. I want to do it the right way to be an example for other farmer.	0.69	0.3	0.44	0.22
26. Farming's all about taking actions and seeing how it plays out over the years. It is fun to slow down and see how those things ripple out.	1.19	0.18	0.03	-0.23
27. All new startups, like farming, are a gamble. People need to take risks. Economically I'm a risk taker.	0.39	-1.29	-1.1	-0.95
28. The more markets we have—the safer we are.	0.27	-0.1	-1.31	-0.35
29. We find value in organizational programs. They are set up to help farmers and you might as well take advantage.	0.91	-1.21	-1	0.19

30. I always get great information from field days held by extension and other organizations.	-0.61	-1.11	-1.52	-1.03
31. I feel like the research coming out of the university is not applicable to us. Research is only for big agriculture.	-1.2	-0.34	-0.35	0.46
32. We advocate for people to work on other people's farms. You will learn from someone else's mistakes. That a huge part for future success.	1.14	-0.04	-0.63	0.01
33. My peers have the best information. I trust them because I know their farms and their personalities.	1.23	1.37	-0.8	-0.47
34. I learn best by watching how people are doing things and asking them questions.	0.4	1.29	1.24	-0.11
35. Growing vegetables is very intuitive for me. I have a feel for what to do.	-1.45	1.88	1.53	-1.78
36. We just figured stuff out. Doing a lot of Google. We trust Google with our lives.	-1.46	-1.42	-1.87	0.83
37. Overtime you learn from trial and error. Time and Practice.	1.37	1.66	1.64	-0.27
38. We need a university that is interested in actually working with farmers and not sending glossing publications to seed salesmen.	-0.36	-0.65	1.01	0.87
39. I support small farming organizations, because they are grassroots efforts working to change the agricultural system.	0.91	-0.79	1.03	0.95
40. In a perfect world, the government would help small farmers.	0.26	-0.37	0.99	0.27
41. You are sacrificing your power in the marketplace by staying small. Growers co-ops are needed so small farmers can come together and increase their influence in the market place.	0.24	-0.19	-1.16	1.37
42. I mean we have a different vision for rural America. We want to see the size of farms become smaller and to have more people on the land. We are really committed to finding a way for finding more farmers.	1.14	-1.75	1.28	0.97
43. It is really a small groups of people and dynamic leaders who can create realistic hope and change.	1.03	0.61	0.22	0.53
44. I want to have a replicable model of farming for other people. I shouldn't be producing the food for other people. People should be doing what I'm doing.	-0.68	-0.81	-0.72	0.18
45. If you can make a difference in your immediate surroundings, it might take off, catch on, and spread to other people.	0.84	0.78	0.31	0.58

46. As farmers, we have this wealth of knowledge accumulated through mistakes. We just need to share this knowledge with people who have a burgeoning interest in agriculture.	1.58	1.24	0.66	0.13
47. There needs to be a way for small farmers to get capital. There are no large, coherent institutions or organization that effectively give small farmers access to reasonable credit.	0.94	-0.38	0.53	0.06
48. Capital investment is required for success.	1.19	-0.2	-0.17	-0.05
49. The limitation is that there is a huge learning curve to farming. It's a big challenge to learning the nuances and that's why farmers fail.	0.44	-0.51	0.06	0.37
50. The technical stuff is the easy part of farming. It is the business management and holistic management is hard.	-0.26	0.42	-0.89	-0.11
51. I feel very strongly that we need to do something about our food system. It is broken in so many ways. Farming is one way I can change the food system.	1.16	-0.17	1	1.55
52. It would be really nice if our culture valued food more. We could actually charge a decent rate.	0.73	0.21	0.44	1.26
53. When we got into farming, family members definitely though that it was just a phase. In the back of their heads I feel like they were thinking, 'we will see how long this lasts.	-0.22	-1.9	-0.83	-0.79
54. By the end of the day you are tired and beat. That can boil over into personal relationships.	0	1.42	-0.89	-0.54
55. I don't think there are social interactions in rural areas that can survive outside of the formal interaction of farming organizations.	-1.93	-1.4	-1.38	-0.88
56. There is not a lot of common ground to connect with other farmers in our area. This has been a problem.	-1.27	-1.72	-0.82	-1.54
57. There are some regulations and programs we choose not to enter because they do not offer the amount of flexibility that we need on our farm.	0.01	-0.62	-0.05	-0.2
58. Farmers need a cushion for hard times, but Ag. policy has become a giant cash cow for some people and has left small farmers in the dirt.	-0.08	-0.37	0.28	1.23
59. The problem is, one can only charge so much of a premium. There is a ceiling for how much you can charge for that head of broccoli above and beyond industrial broccoli.	-0.03	0.12	-0.09	1.15
60. The reality is that nothing in farming really makes that much money.	-1.66	-0.47	-0.02	1.19
61. What it comes down to is land. It's so hard to even get land to start farming	0.01	-0.68	0.59	0.97
62. I don't use government programs, but I also don't really know what's out there	-1.67	0.93	-1.36	-0.13

Appendix B: Table A2 Factor Loadings for All Q Sorts

QSort iIdentifiers	Business via Social Network Farmers	The Making Ends-Meet Farmers	The Higher-Cause Farmers	The Structural Change Farmers
1	0.5504X	0.3756	0.1713	0.3357
2	0.3383	0.1762	0.1333	-0.5661X
3	0.4840	0.1350	0.0924	0.5318X
4	0.2593	0.4503X	0.2522	-0.0803
5	0.3451	0.0573	0.2388	0.3085
6	0.6232X	0.2174	0.0401	0.1344
7	0.7312X	0.1422	0.2305	0.2192
8	0.6298X	0.1785	0.0722	0.5561
9	0.1406	0.4288X	0.1911	0.1458
10	0.3033	0.6159X	-0.0094	0.3441
11	0.5087X	0.3858	0.2251	0.1292
12	0.3333	0.2062	0.4543	0.5048
13	0.7425X	0.0344	-0.0345	-0.0044
14	0.6256X	-0.2177	0.3330	0.0563
15	0.3179	0.1479	0.5239	0.5002
16	0.0909	-0.0392	0.8047X	-0.0068
17	-0.0351	0.8227X	0.0857	0.0305
18	0.0531	0.7909X	-0.1895	-0.0011
19	-0.0493	0.7424X	0.0552	0.2796
20	-0.0925	0.8240X	0.0831	0.0054
21	-0.1678	0.8161X	0.1508	-0.2009
22	0.1596	0.3313	0.1168	-0.5065X
23	0.7761X	-0.0088	0.3152	-0.0467
24	0.4520	0.1713	0.2835	0.4989
25	0.1468	0.2785	0.2618	0.2858
26	0.5334X	0.1660	0.1631	0.4785
27	0.4986X	0.1059	0.2881	-0.0175
28	0.3545	0.0655	0.5096X	0.3015
29	0.1703	0.1733	0.4483X	0.2506
30	0.4863X	0.0856	0.2973	0.3577
31	0.1319	0.0264	0.1583	0.2522X
32	0.7854X	-0.0437	-0.0919	0.1407
33	0.5200X	-0.0009	0.3443	-0.3139
34	0.6417X	0.0391	0.3717	0.2510
35	0.1319	-0.0946	0.1972	0.5935X
36	0.1158	0.1767	0.2179	0.5265X
37	0.2995	0.1211	0.7637X	0.0309
38	0.0205	0.2201	0.4067X	0.0617
39	0.2995	0.1211	0.7637X	0.0309
40	-0.0237	-0.0667	0.6852X	0.0668
41	0.6223X	0.1259	0.1548	0.0905
42	0.0382	-0.0260	0.5561X	0.2119
43	0.5786X	-0.0758	-0.0369	0.3108
44	0.1725	0.0437	0.0657	0.5793X
45	0.3273	0.2403	0.3501	0.0051
46	0.0592	0.0565	0.5145X	0.4758
47	0.2442	0.4009X	0.0840	-0.1819
48	0.2994X	-0.1623	0.1272	0.0492
49	0.2920	0.2375	0.5968X	0.1495

Appendix C: Table A3 Policy Review

	United Nations Division of Sustainable Development	National Sustainable Agriculture Coalition (Farm Bill Priorities)	National Young Farmer Coalition
Objectives related to farmers	**Farm Organizations and Extension is Indispensable-** calling for friendly public policy and institutional support as well as the push more effective public-private partnerships	**Land Access-** ~Prioritize Agriculture Land Easement Projects that maintain agriculture farm viability and have programs such as an option to purchase at agriculture value ~ Provide $5 Million to help FSA effectively connect retiring farmers with beginning, social disadvantaged or veteran farmers.	**Land Access-** ~Increase and prioritize funding from workable farm easements -Increase funding for *Direct Farm Ownership Loans* through the Farm Service Agency and increase the loan limit ~Remove barriers to farm land transfer in the tax code, use tax credits to incentivize generational transfer of land, and fund transition assistance services
	Including Women and giving them a voice in policy activities- gender equity is of the development and it has been shown that women farmers are pivotal in increasing household food security. They will need easier ways to access training, information and credit.	**Credit-** ~Increase the max Direct Farm Ownership Loans amount to $500,000 and adjust annually based on farmland inflation rates. Authorize Direct Farm Ownership Microloans (<$50,000) ~Increase support and education for loan borrowers	**Student Loan forgiveness-** ~Add farmers to the Public Service Loan Forgiveness program -Establish a federal-state student loan repayment program for young farmers
	Technology at and affordable and appropriate scale- implementing scientific breakthroughs that include: improved breeding and traits, precision agriculture, improvement of minor or neglected crops, perennialization grains, and better access to mobile forms of price information, plant analysis, and digital transcripts.	**Rural Development-** ~Clarify and reinforce the priority if Value Added Producer Grant Program's funding from beginning and socially disadvantaged farmers ~Increase funding to $5 million annually for Rural Microentreprenuer Assistance Program	**Labor and Training-** ~Expand support for training opportunities for new farmers through the Beginning Farmer and Rancher Development Program ~ Repairing the nation's immigration code bay providing a legal pathway to citizenship rather than a deportation first policy. ~Develop state guidelines for apprenticeships
		Research and Education- ~Establish permanent funding for new farmer training programs nationwide ~Expand the focus in the	**Business Planning-** ~Establish tax free savings accounts for farm-related purchases and reauthorize and fund Individual Development Accounts

		Agriculture and Food Research Initiative to fund research on the barriers and bridges to entry and farm viability ~Direct the USDA to collect data on farm ownership, tenure and transition as well as barriers to entry and profitability	~ Repairing the nation's immigration code bay providing a legal pathway to citizenship rather than a deportation first policy. ~Develop state guidelines for apprenticeships
		Crop Insurance- ~Allow the Non-insured Crop Disaster Assistance Program to cover farmers who are unable to purchase a Whole Farm Revenue Protection policy due to lack of product or revenue history	**Race and Equity-** ~Increase funding for programs that help historically disadvantaged farmers ~ Focus on first time land owners
Objectives related to consumers	**Defining the goal as human nutrition and not more production-** create policies that work to strengthen market delivery systems as well as promote local food production. Eliminate subsidies for foods that do not contribute to public health and replace with low-cost, high-nutrition options.		
Objectives related to society at large	**Pursue high yields in a healthier Ecosystem-** policies that aim from multi-functionality of ecosystems and move away from 'yield per acre' views of productivity. Investment in water and soil conscious agriculture production systems through the adoption of conservation tillage, modern genetics, and advanced irrigation systems.		**Climate and the Environment-** ~Fully fund voluntary USDA conservation programs such as the Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP) ~Establish conservation pilot programs that are specifically directed towards small farmers ~ Promote climate resilient agriculture through existing programs ~Reauthorize the Sustainable Agriculture Research and Education (SARE) program and expand other conservation education and outreach
	Aggressively invest in advanced agriculture approaches while scaling-up ecosystem services- Public good such as biodiversity, genetic resources and traditional knowledge are not		

	traditionally valued and are often not always seen as ways to implement change.		initiatives
	Transparent and inclusive innovation and data- technology should not only be developed through complex mechanisms but also through indigenous knowledge. Innovation should be spurred through visible incentives pushing for the advancement throughout the supply chain and especially at the local level.		